Labotronics

Nano Spectrophotometer

LB-10NSP

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1. Introduction

Nano Spectrophotometer LB-10NSP is a compact-sized, easy-to-carry device with built- in advanced software to execute powerful functions and meet various experimental needs. Offers wavelength range of 200 to 850 nm, with a wide detection range of 2 to 1500 ng/µl (ds DNA), and test sample volume as low as 0.5 µl, suitable for on-site sample testing. Expertise in fast detection, results displayed within 5 seconds. A Xenon lamp as a light source, alongside2048 a linear CCD array as detector medium ensures high stability and long operation life.

2. Features

1. Compact and portable ultra-micro unit with advanced software
2. The wide detection concentration range of 2 to 1500 ng/µl (ds DNA)
3. Requires low test sample volume of 0.5 to 2 µl to provide results
4. No pre-heating required can provide fast detection within 5 sec
5. Xenon lamp as light source with 2048 linear CCD array detector
6. The self-test function ensures reliable and safe operation
7. Stainless steel and quartz optical fiber sample detection platform
8. Anti-corrosive and dust-proof designed sample detection platform
9. HD display with touch screen interface for smooth and convenient operation
10. High-efficient, stable and reliable unit for quick and accurate on-site operation

3. Specifications

Model No.	LB-10NSP
Sample capacity	0.5 to 2 µl
Wavelength range	200 to 850 nm
Accuracy	< 1 nm
Resolution	≤ 2 nm
Light absorption range	0.04 to 300 Abs (10 mm)
Accuracy	0.002 Abs (1 mm)
Absorbance accuracy	1% (0.76 Abs at 256 nm)
Detection concentration range	2 to 15000 ng/ µl (dsDNA)
Optical path	≤ 0.7 mm
Analysis time	<5 sec
Light source	Xenon lamp
Detector	2048 linear CCD array
Sample platform material	304 stainless steel and quartz optical fiber
Display	HD 7-inch touch screen display
Power adapter	12 V, 5 A
Power	20 W
Dimension (W×D×H)	197×327×181 mm
Net weight	3.1 kgs

4. Applications

Nano spectrophotometer is used for the quantitative identification of nucleic acid, protein, and cell culture components across biochemistry, biomedicine, physical chemistry, research, etc.

5. Instrument Introduction

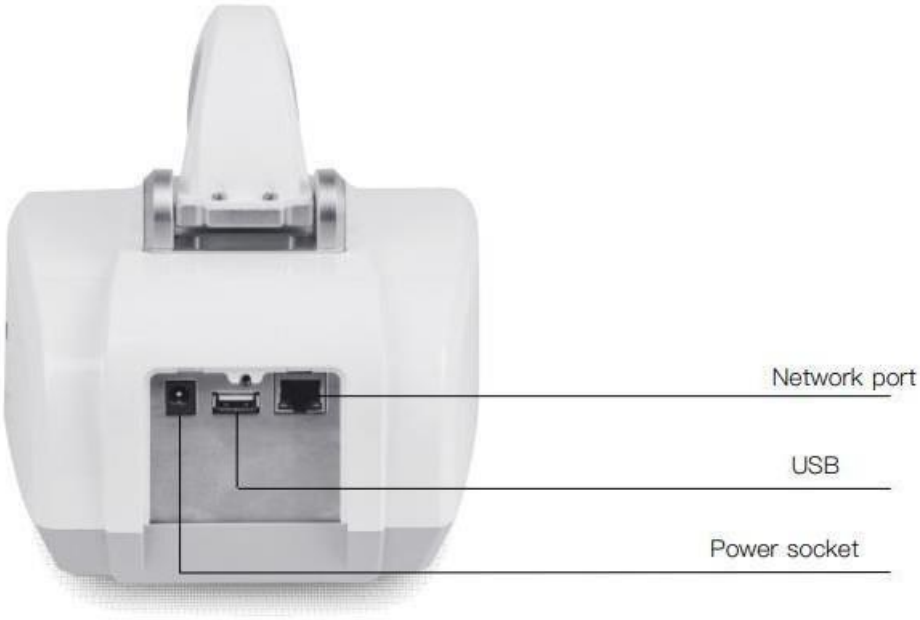

Figure.1

6. Operations

6.1 Startup

After the instrument is powered on, press the power switch, and the LCD screenlights the instrument and enters the welcome interface the LCD screen displays the product name in the welcome interface and then enters the main menu interface.

Figure.2

6.2 Blank cycle detection

- Add the blank solution to the sample base.
- Click the **"Blank"** button to measure the blank light intensity.
- After wiping the sample base clean, add the blank solution to the sample base and click the "**Measure**" button to measure the absorbance value.

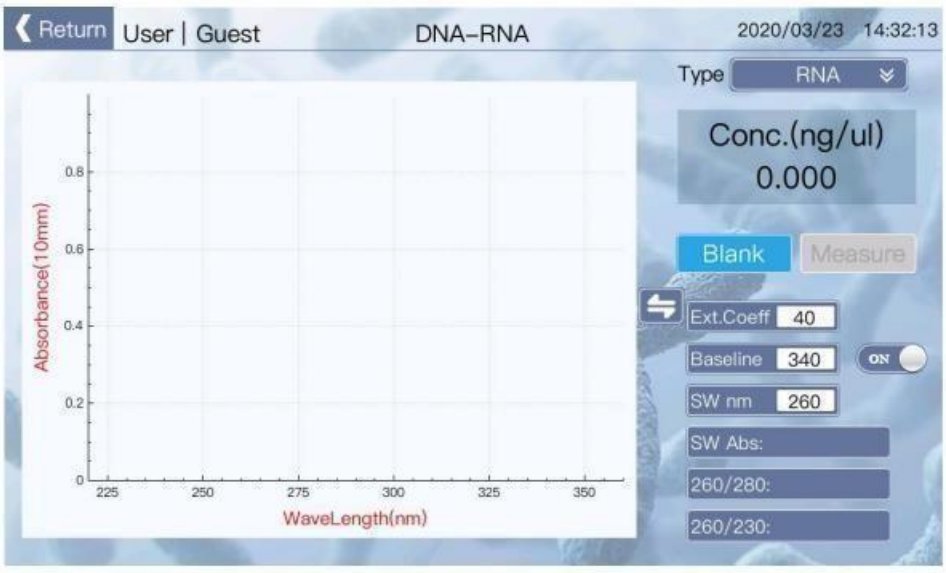

Figure.3

- The measurement result curve is basically at a horizontal line, and the change in absorbance value should not exceed 0.04A (0mm).
- **260/280** : The ratio of 260nm absorbance to 280nm absorbance. This value is used to determine the purity of DNA and RNA.

- Generally, the ratio of pure DNA is about 1.8, and the ratio of pure RNA is about 2.0. If the ratiois too small, it indicates the presence of protein, phenol, or other contaminants, these substances have obvious light absorption at 280nm
- 260/230 : Ratio of 260nm absorbance and 230nm absorbance, this is the secondary nucleic acid concentration indicator, generally between 1.8 and 2.2.If the ratio is too low, it means that there are pollutants in the nucleic acid.

6.3 Micro nucleic acid array

The nucleic acid array module simultaneously measured the concentration of nucleic acid and dye at the set wavelength.

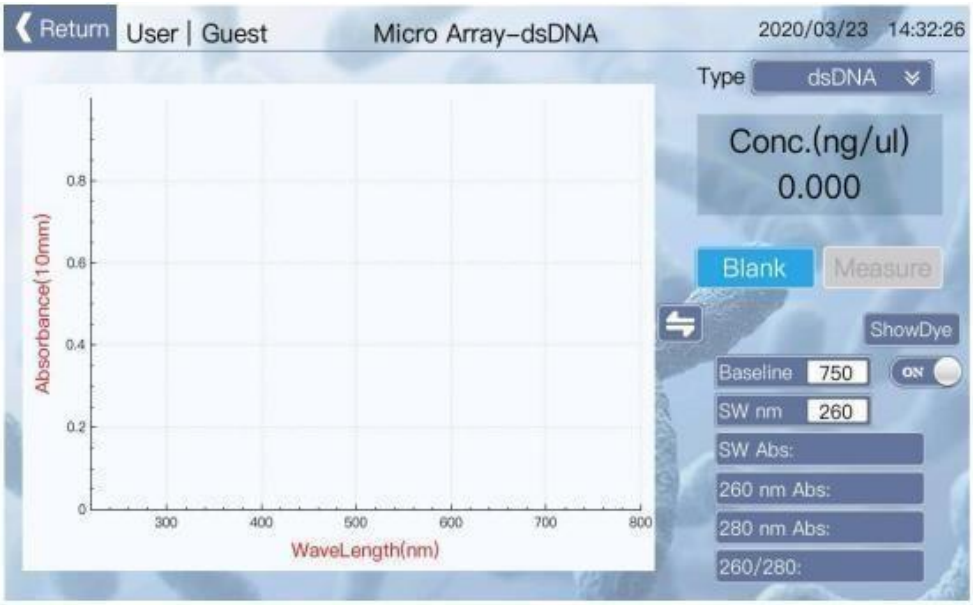

Figure.4

Figure.5

Type:

1. Measurement type, dsDNA, dsDNA, and RNA can be selected.
2. There is a Show Dye / Hide Dye button in the sidebar to open/hide the dye concentration interface.
3. The user can set the dye type and check the dye concentration.

Baseline

Baseline calibration wavelength setting, default 750nm, user can modify according toactual needs, user can turn on and offline calibration.

Baseline

The baseline calibration wavelength, default is 340nm, default is on; the user can customizethe wavelength and can turn it ON or OFF.

SW nm:

Select the measurement wavelength, the default protein is 280nm, and users can customize themeasurement wavelength.

SW Abs

Select the measurement wavelength, the default protein is 280nm, and users can customize themeasurement wavelength.

SW Abs

Select measurement wavelength absorption value.

- 260 nm Abs： 260nm light absorption value.
- 280 nm Abs：280nm light absorption value.
- 260/280： The ratio of 260nm absorbance to 280nm absorbance.

Labelled protein detection

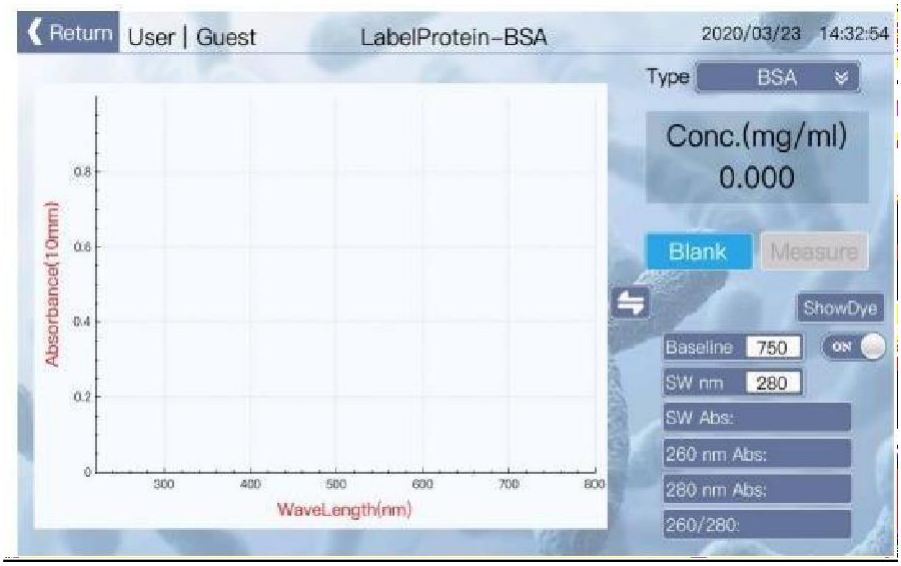

Figure.6

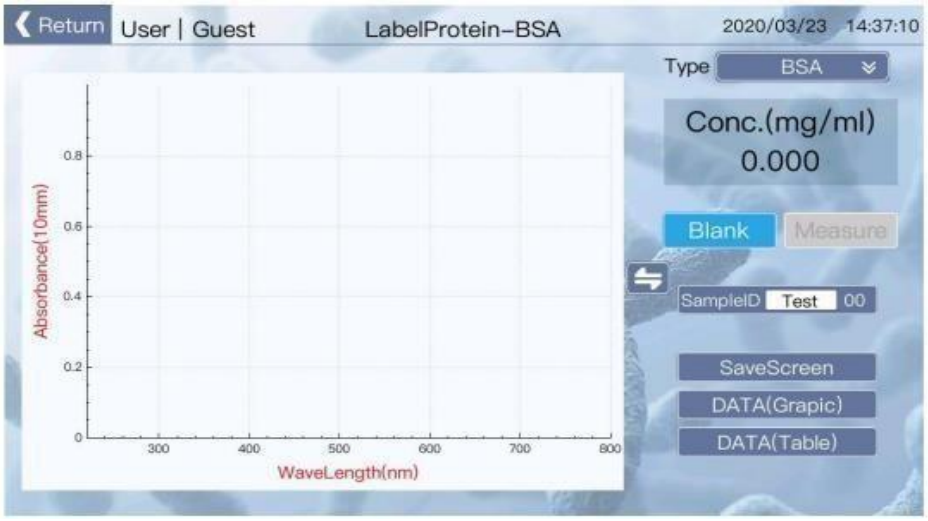

Figure.7

Type

Detection protein type, BSA、1Abs=1mg/ml, IgG, Lysozyme.

Baseline

The baseline calibration wavelength, default is 750nm, the baseline calibration is turned ON by default and the user can customize the baseline wavelength and turn it OFF and ON.

SW nm

Select the measurement wavelength, the default protein detection.

View line

Because the drawing of the standard curve requires data of at least two standard products, this button is not clickable by default; click this button to view the standard curve of the currently measured protein standard sample.

Delete

After opening the page, the button is gray and cannot be clicked by default, because when opening the page, the standard sample is not selected by default. When a standard sample is selected in the standard sample table, the button becomes available, and clicking the button clears the selected standard. After the measurement data of the sample is cleared, the standard sample does not participate in the calculation of the standard curve.

Standard

Click this button to view the standard measurement interface.

Sample

Click this button to enter the sample measurement interface. After measuring the sample concentration in the unknown sample concentration measurement interface, you cannot return to the Standard measurement interface. This is to prevent the user from modifying the standard measurement value by mistake.

Standard measurement table

1) Click this button to enter the sample measurement interface.
2) After measuring the sample concentration in the unknown sample concentration measurementinterface, you cannot return to the Standard measurement interface.
3) This is toprevent the user from modifying the standard measurement value by mistake.
4) **Name:** The standard sample name defaults to Standard 0 to 7, and the name cannotbe modified.
5) **ID:** Standard sample measurement serial number.
6) **Average Abs:** The average absorbance value of the standard sample can be measured multiple times for the same standard sample. Here, the average value ofall measured absorbance values is displayed.
7) The average value used for subsequent drawing of the standard curve also uses the average value to improve the calculation accuracy.
8) **Concentration:** The concentration of the standard sample measured by the user needsto be set by the user; when setting the concentration, the user should note that only the concentration of StandArd0 can be set to 0, and the others cannot be zero. If it's zero, it cannot be measured.

Standard curve viewing

6.4 Other testing

Microbial cell culture testing (cell-culture)

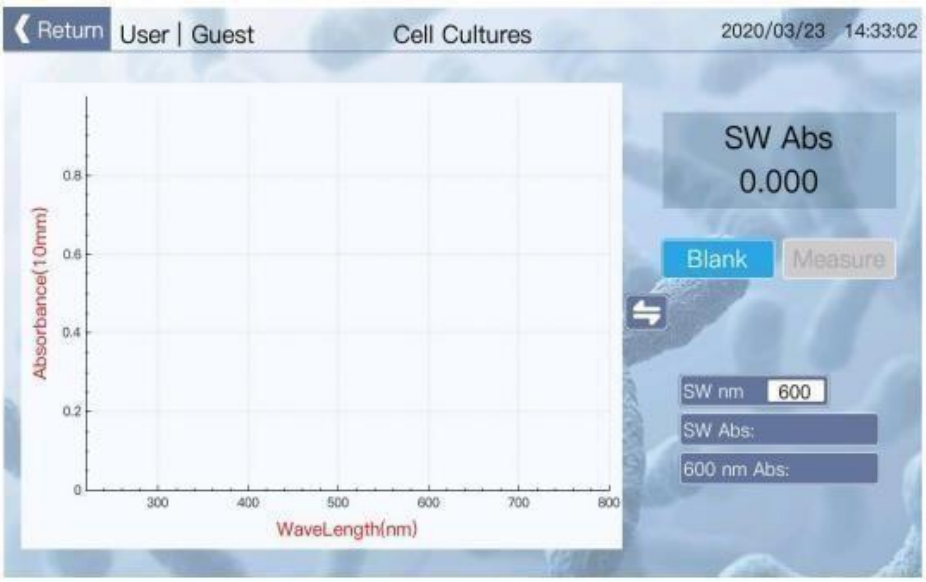

Figure. 8

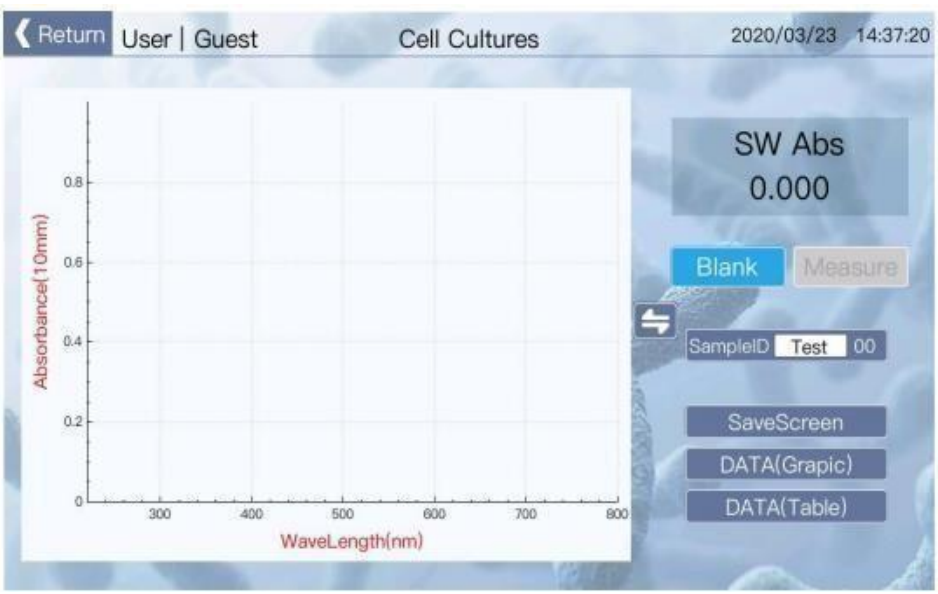

Figure.9

1) The instrument can measure the suspension density of cells or microorganisms by detecting the absorbance at a wavelength of 600 nm.
2) **SW nm:** The incident wavelength and absorbance value are displayed in SWAbs
3) **SW Abs:** The absorbance value at the incident wavelength.
4) **600 nm Abs:** The absorbance value at 600nm is equivalent to the absorbance value at 10mm.
5) **Delete:** Delete the selected graphic data.

Label data file export

1) Click the DATA (Table) button on the measurement page to enter the graphical data viewing page.

#	Sample	ID	Type	ExtCoeff	Conc(ng/ul)	260/280	260/230	SW(nm)	SWAbs	A260(10mm)	A280(10mm)	Time
0	Test	23	dsDNA	50	14.180	1.735	2.354	260	0.284	0.284	0.163	14:47:38
1	Test	22	dsDNA	50	14.405	1.753	2.331	260	0.288	0.288	0.164	14:46:53
2	Test	19	dsDNA	50	3.965	2.049	2.299	260	0.079	0.079	0.039	14:42:54
3	Test	18	dsDNA	50	4.355	2.280	1.355	260	0.087	0.087	0.038	14:42:00
4	Test	17	dsDNA	50	3.550	1.945	2.367	260	0.071	0.071	0.036	14:41:28
5	Test	16	dsDNA	50	148.545	1.657	2.362	260	2.971	2.971	1.793	14:37:35
6	Test	15	dsDNA	50	147.130	1.665	2.340	260	2.943	2.943	1.767	14:35:52
7	Test	14	dsDNA	50	1514.895	1.667	2.257	260	30.298	30.298	18.171	14:31:40
8	Test	13	dsDNA	50	1520.025	1.667	2.256	260	30.400	30.400	18.241	14:31:10
9	Test	4	dsDNA	50	13338.859	1.650	2.297	260	266.777	266.777	161.707	14:17:04
10	Test	3	dsDNA	50	12769.615	1.647	2.298	260	255.392	255.392	155.045	14:15:38
11	Test	2	dsDNA	50	13162.195	1.648	2.296	260	263.244	263.244	159.771	14:14:27

Figure-10

2) **Export:** Insert the U disk and click the button to enter the file export page.
3) **Delete:** Delete the selected graphic data.

Screenshot file export

Click the Save Screen button on the measurement page to enter the screenshot export page. To export screenshots, you need to insert the U disk first.

6.5 Dye

When performing Micro Array and Label Protein detection, Lambert-Beer law is used for dye calculation. The following table shows the dye parameters saved in the software displayed. If you want to browse earlier files you can customize the time period.

Dye	Unit	Coeff (1/mole-cm)	Analysis Wavelength(nm)	260nm Correction	280nm Correction
Cy3	uM	1.5E+5	550	0.04	0.05
Cy5	uM	2.5E+5	650	0.00	0.05
Alexa Fluor 488	uM	7.1E+4	495	0.30	0.11
Alexa Fluor 546	uM	1.04E+5	556	0.21	0.12
Alexa Fluor 555	uM	1.5E+5	555	0.04	0.08
Alexa Fluor 594	uM	7.3E+4	590	0.43	0.56
Alexa Fluor 647	uM	2.39E+5	650	0.00	0.03
Alexa Fluor 660	uM	1.32E+5	663	0.00	0.10
Cy3.5	uM	1.5E+5	581	0.08	0.24
Cy5.5	uM	2.5E+5	675	0.05	0.18

Figure-11

6.6 User management

1) Click the setting button on the main menu page to enter the settings page.

Figure-12

2) The user management provided on the settings page includes switching the current user (Switch User) and entering the user management interface (Management); users entering the user management interface need to enter the administrator (admin) password, and the administrator password is 123456 by default.

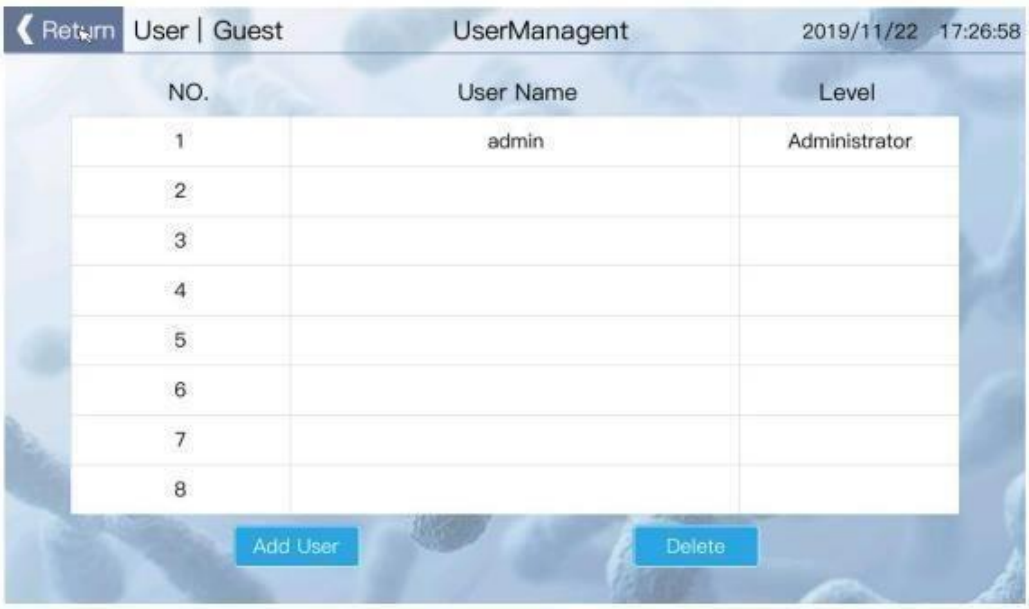

Figure.13

3) On the user management page, users can add new users and delete users, but they cannot delete admin users. Users can add up to 7 users, a total of 8 users including the administrator user.

6.7 Dye editing

1) Click the Setting button on the main menu page to enter the Dye Editor page.

Figure.14

2) Users can view related dye parameters, or they can add custom dyes and save them for use. The system's default dyes cannot be deleted, and users can delete custom dyes.
3) Click "**Show Dye**" on the measurement interface to select a customdye or select the default dye. Click the dye setting box to pop up the dye selectioninterface, as shown below.

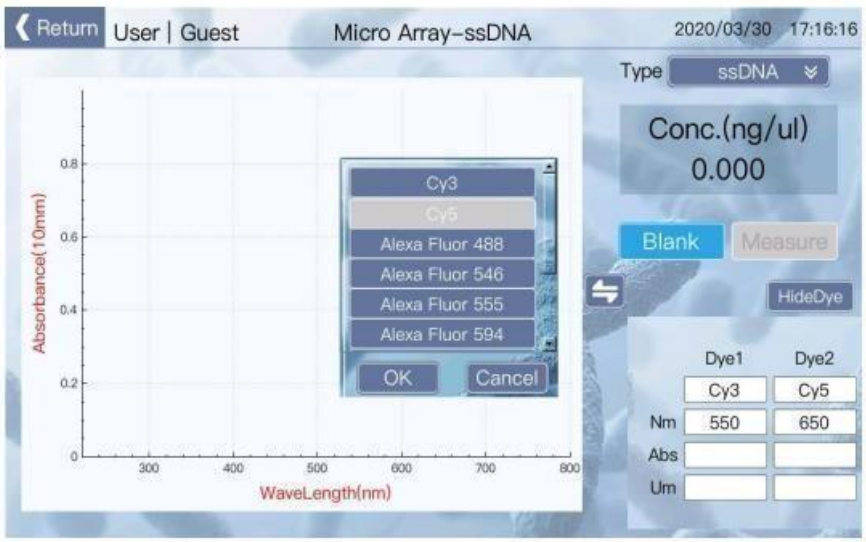

Figure.15

7. Accessories

Optional Accessories
Printer

8. Circuit Diagram