NESMU-ASC-001E (V.0)

Microchip type Automatic Cell Counter

ADAM Adam-SCC

USER'S MANUAL

Digital Bio

Adam series

User's Manual

Digital Bio

ADAM Adam-SCC**, User's Manual**

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The information in this manual is described as correctly as possible, but it may be changed without prior consent or notification.

Documentation:
NESMU-ASC-001E (V.0) Oct. 10, 2008-10-17

Contents

1. System Components

When opening the Adam-SCC, you will find the following components in your package:

[Instrument parts]

Adam-SCC main device: 1 unit

Power cord (1.5 m): 1 ea

Paper roll (57.5 mm): 2 roll

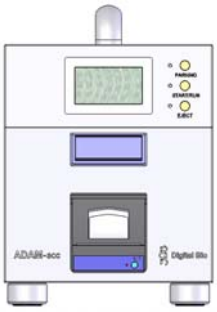
Installation CD: 1 ea

USB cable: 1 ea / RS-232C serial cable: 1 ea

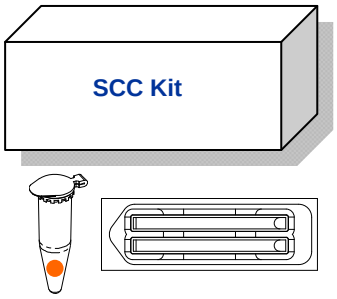
Keypad: 1 ea

[Consumable parts]

SCC Kit (Test kit): Reagent & Two or four channel chip



Adam-SCC (Main device)

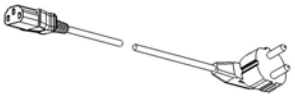


SCC Kit

Fuse

Keypad

Power cord



Paper roll

Installation CD

USB cable

RS-232C serial cable

Figure1.The components of the Adam-SCC

The excitation source is a green laser. The emission filter removes all wavelengths except red fluorescent light. The red fluorescent light from the particles in the sample is focused onto the detector (CCD camera). Then, the image analysis program counts the red particles to represent the cell number in the sample.

The Adam's SCC Kit is intended for easy use in farming or milk truck, 100 µl of stain solutions are prepared separately in small tubes (CRS-K01: 100 test/pack or CRS-K02: 400 test/pack). One kit is capable of 100 tests. Each tube has 100 µl reagent of somatic stain solution.

The disposable chip is a significant plastic disposable for loading and detecting of the sample. The chip loads the volume of 20 µl (for SCC kit CRS-K01, 2 channel chip) and 12 µl (for SCC kit CRS-K02, 4 channel chip)and with the height of 100 µm. The chip is treated by gas plasma to get a hydrophilic surface of channels, which drives the sample flow through the channel.

2. Hardware Section

2-1. Front side of Adam

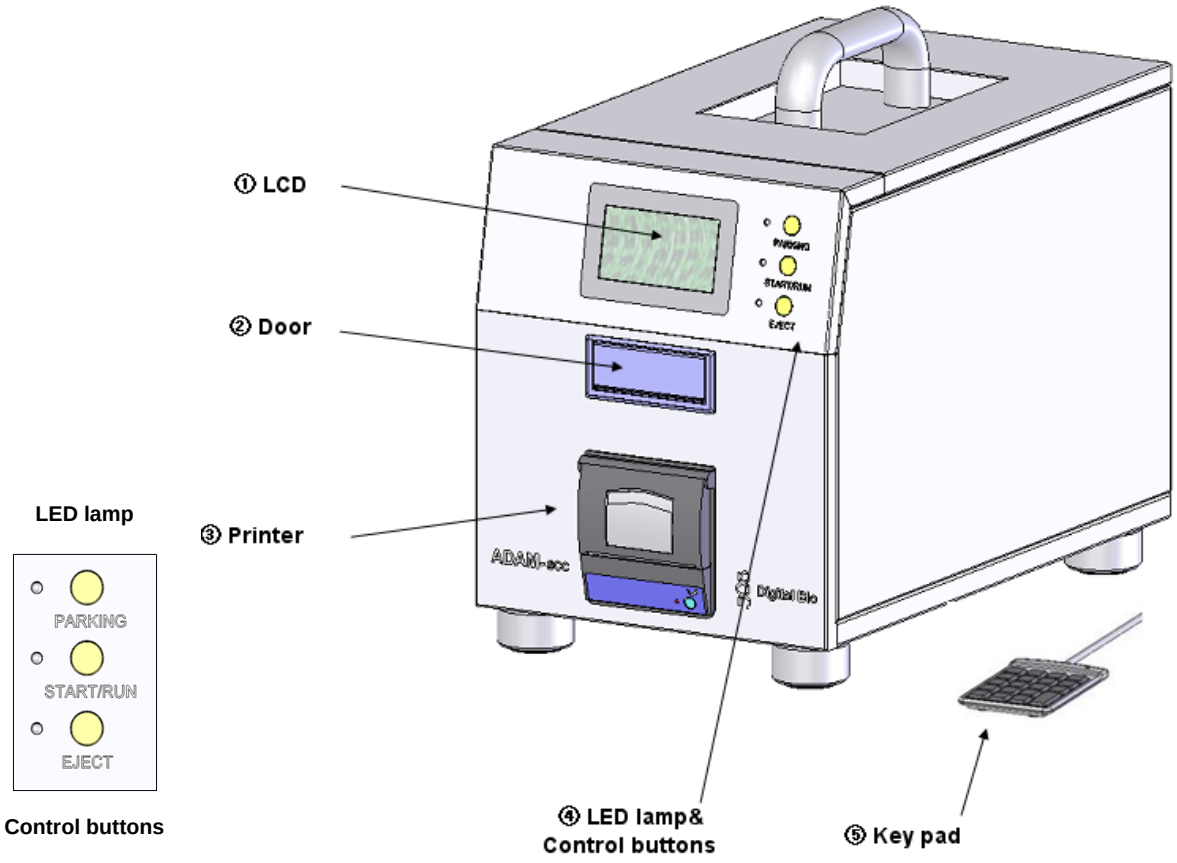


Figure 2.The front side of the main device

① LCD: Displays the process and the results

② Door: Chip holder comes out here.

③ Printer: Print the experiment information using the thermal printer. An example of a printout is shown below.

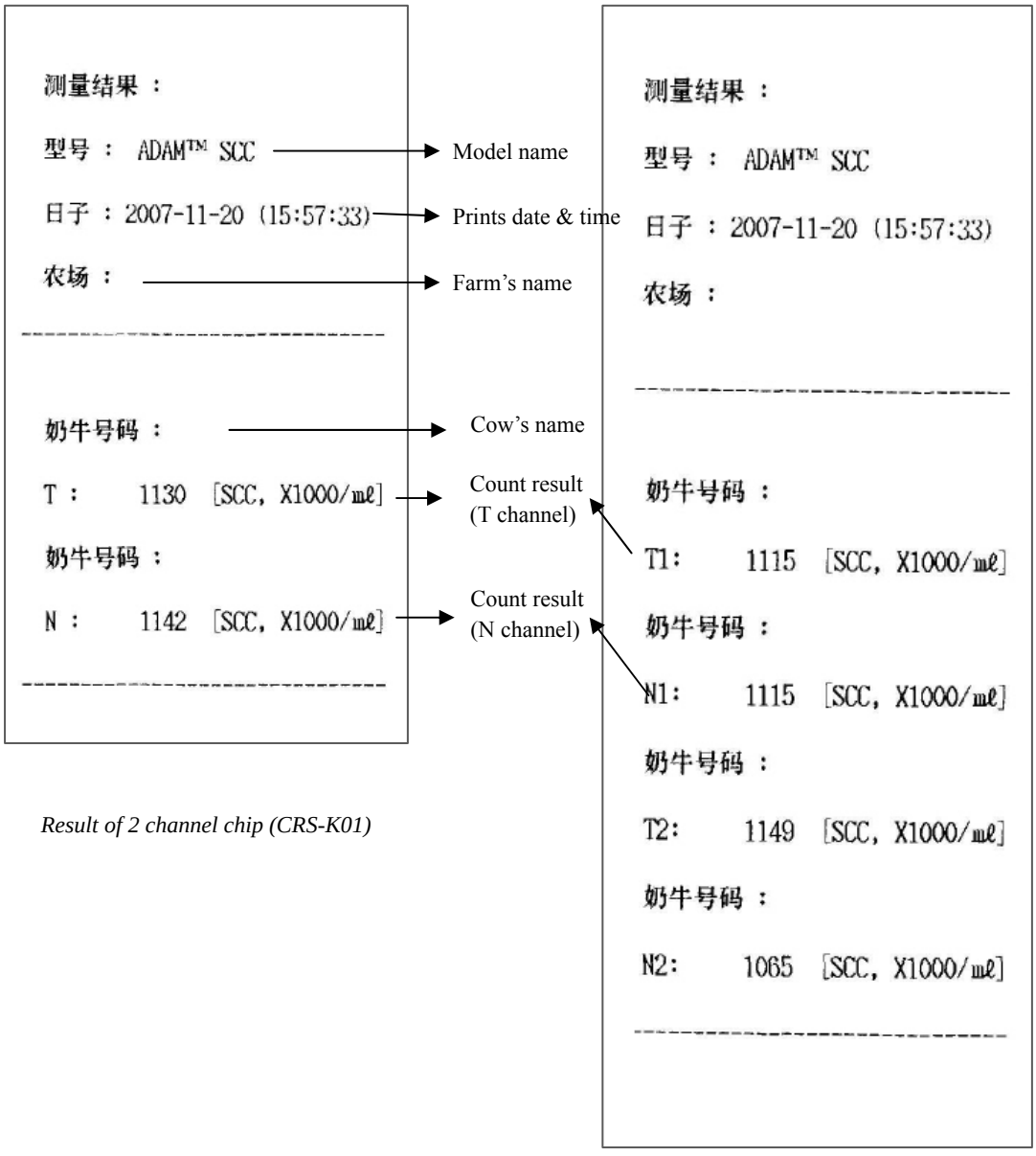
④ LED lamp & Control buttons:

- Parking: Protect the alignment of stage from external shock when the main device

is moved to the other places.

• Start/Run: Performs all procedures of automatic counting or changing the mode for inputting cow numbers.

• Eject: Ejects the chip holder from the Adam.

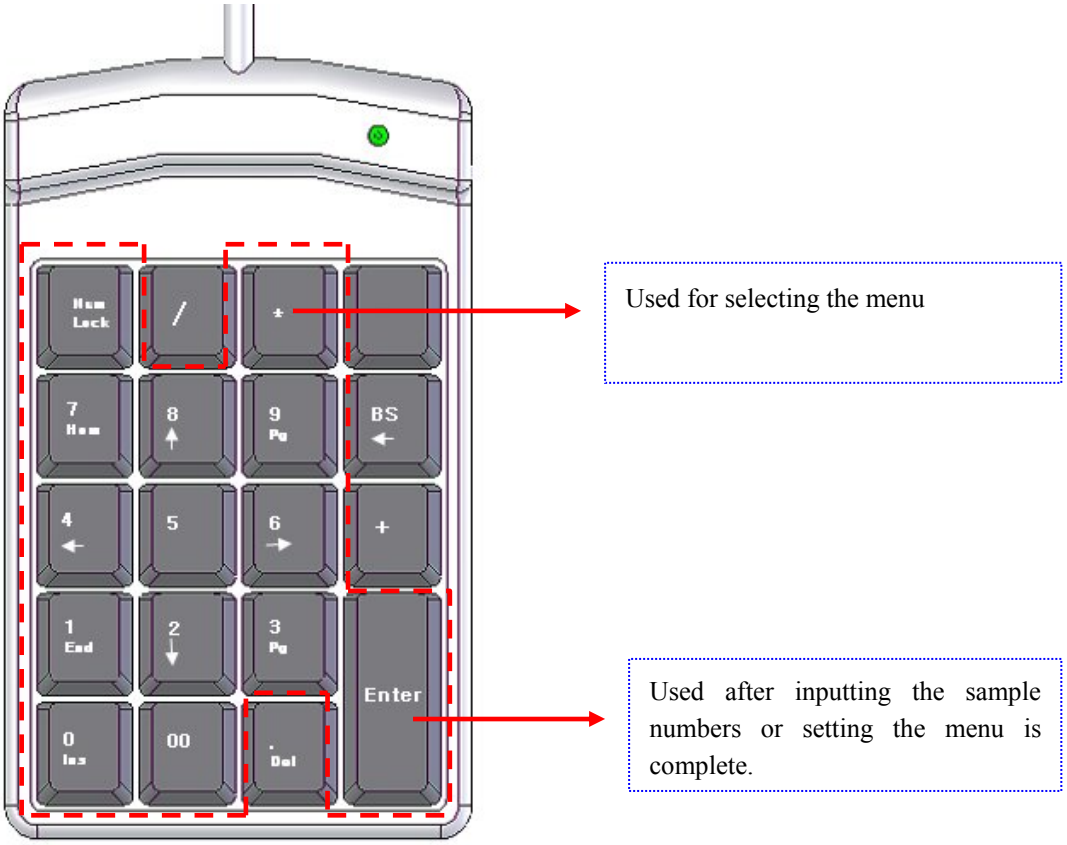


Result of 2 channel chip (CRS-K01)

Result of 4 channel chip (CRS-K02)

Figure 3.The example of the result

⑤ Keypad:



CAUTION: The keypad should be connected to the device before the power is turned on.. Otherwise, the instrument will not work properly.

In order to check whether the device is working properly, turn on the instrument and press 'Nm Lock'. The LED lamp should be flickering.

If the lamp is not flickering or the keypad does not work properly, this might be a result of a connection error. In this case, turn off the power, check the connection and reboot.

The available keys are number keys, 'Nm Lock', 'Enter' and '*' only. And please ignore others.

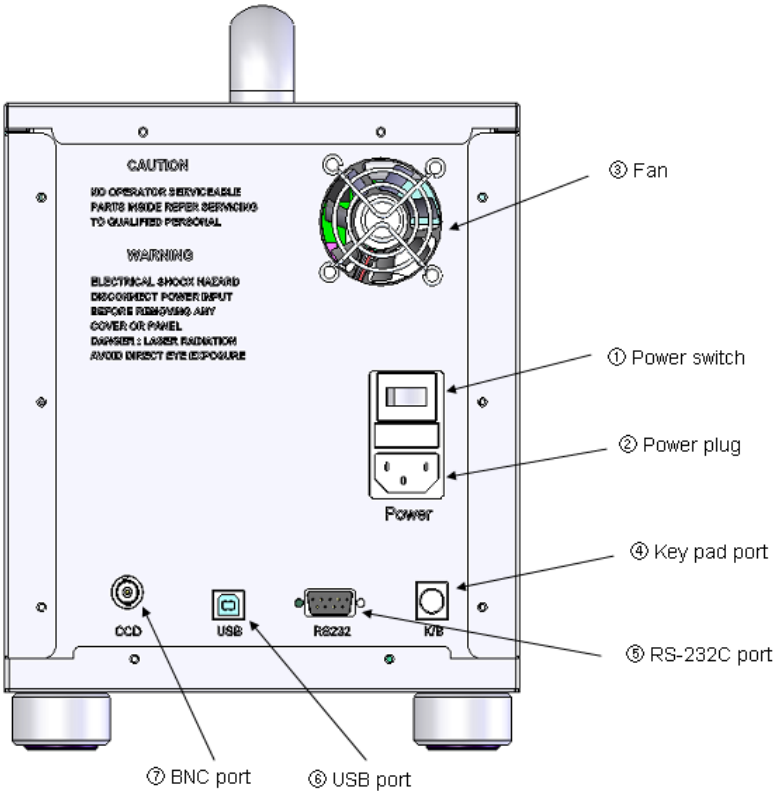


Figure 4.The rear side of the main device

① Power switch: Main power ON/OFF control

② Power plug: Connects the Adam power cord to wall outlet

③ Fan: Adam's cooling fan

④ Keypad port: Key pad connector

⑤ RS-232C port: Serial cable connector

⑥ USB port: USB serial port

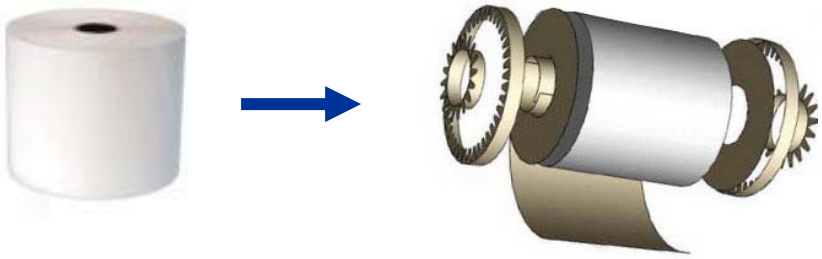
⑦ BNC port: CCD camera cable connector

2-3. Paper Roll Refill Method

To insert or replace the paper roll of thermal printer see figure shown below. Ensure that the paper roll is installed in right direction.

Figure 5.The method of paper roll refill

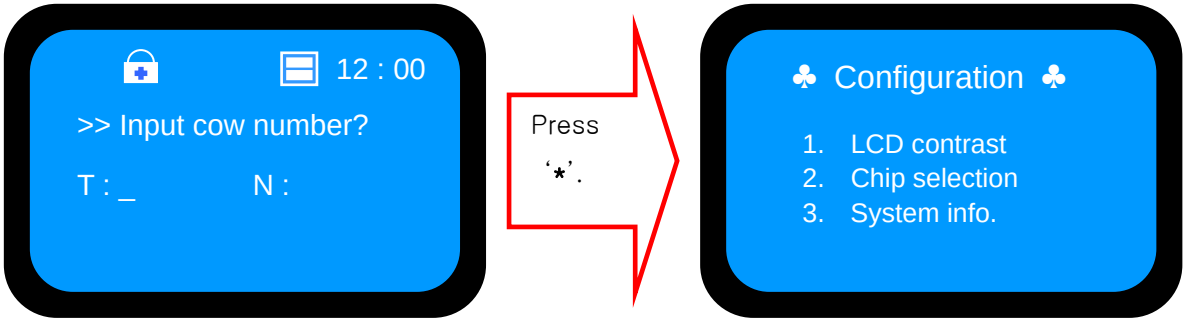
CAUTION: In order to print the results using the thermal printer, check that the printer cover closed and that the paper roll installed properly. If the printer cover is open or there is not enough paper roll, the print function would not work.



Paper roll will rotate and come out once the "FEED" button is pressed.

2-4. Menu setting

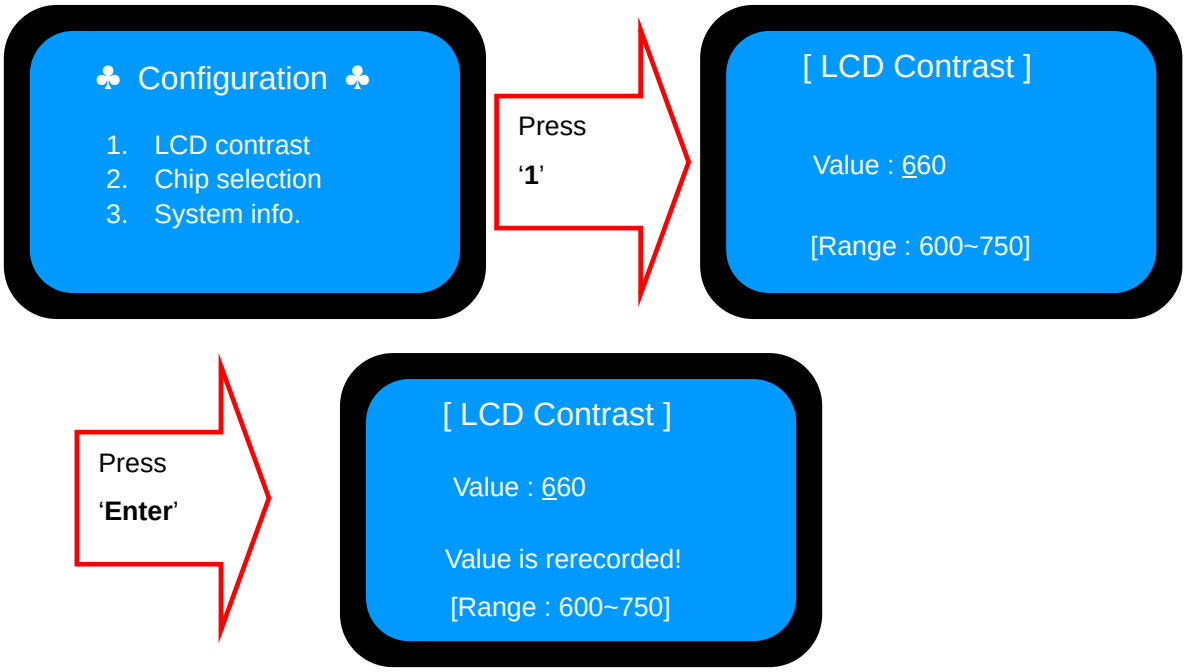
You can set the menu as you press the '*' button on the keypad from the screen for inputting cow numbers.



You can find the setting modes by selecting the number from the Menu.

1) LCD contrast

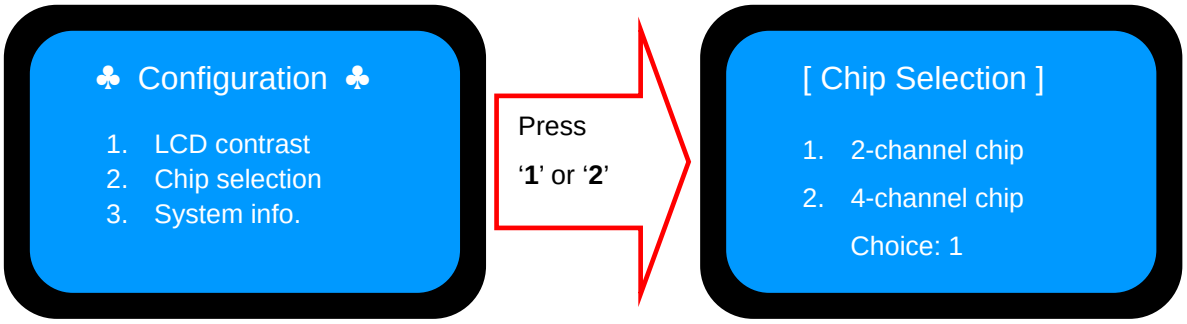
Press the number 2 key to adjust the brightness of the LCD screen from the MENU.



Adjust LCD contrast if the letters do not appear clearly on the screen. Press the 'Enter' key after you input the three digits. The range is from 600 to 750. After pressing the 'Enter' key, the screen will return to the Menu screen automatically.

2) Chip Selection

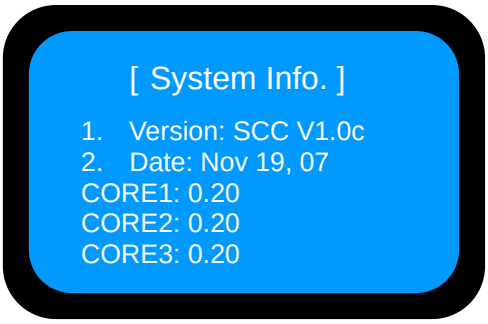
User can select the 2 kinds of chip type. One is the two channel chip for SCC Kit CRS-K01. Another is the four channel chip for SCC Kit CRS-K02.



Press the 'Enter' key after you input the three digits. After pressing the 'Enter' key, the screen will return to the Menu screen automatically.

3) System Information

The device versions and date which have been installed in the device can appear when the number 4 key is selected from the MENU. After pressing the 'Enter' key, the screen will return to the Menu screen automatically.



*** Press the '*' key after menu setting. Once inputted, the screen will return to the counting mode automatically.**

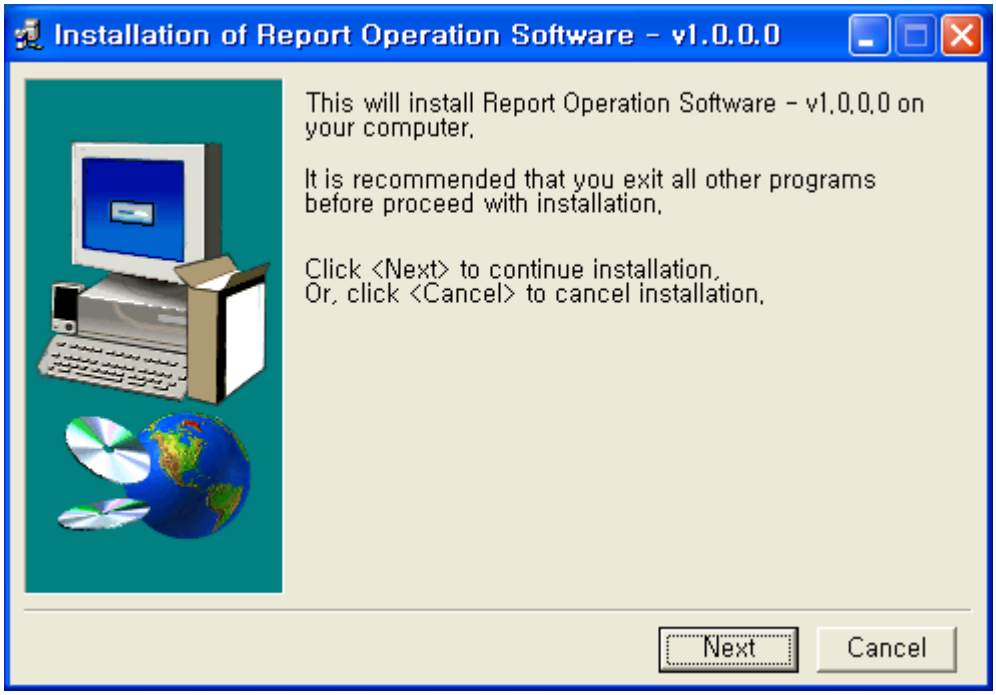
3. Software Section

3-1. Software Installation

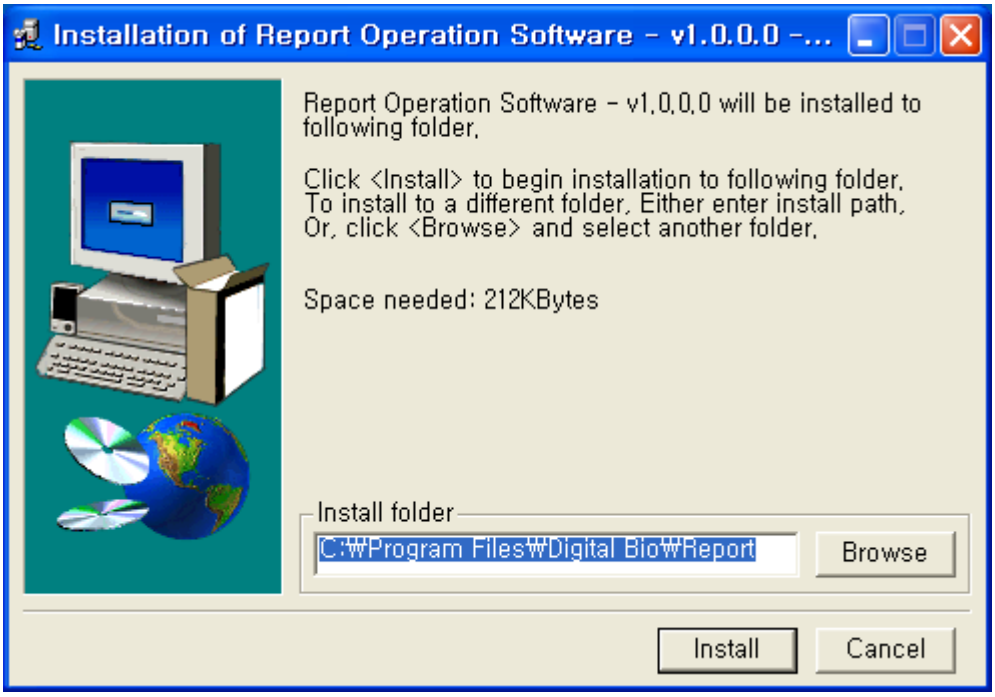
To install the Adam-SCC Report Operation software, follow the directions below. First, insert the installation CD-ROM into the computer. Then open the file "**Setup_Report_v1.0.exe**". The start-up dialogue of the software will appear. It is recommended that the "Digital Bio folder> Report" is located in the default directory of the local hard disk.

When the location has been selected, click "Install" to proceed with the installation. The computer activates the "Installation of the Software".

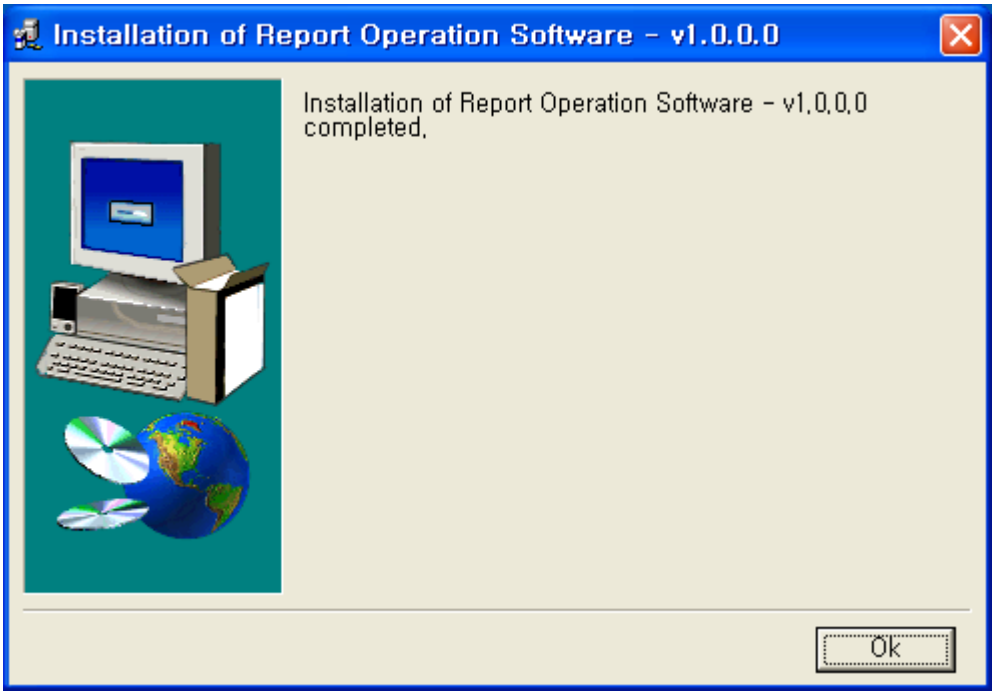
1)Click "Next" to continue.



2) Click “Install” to begin installation to “C:\Program Files\Digital Bio\Report” folder.



3) Click “Ok” to finish the installation.

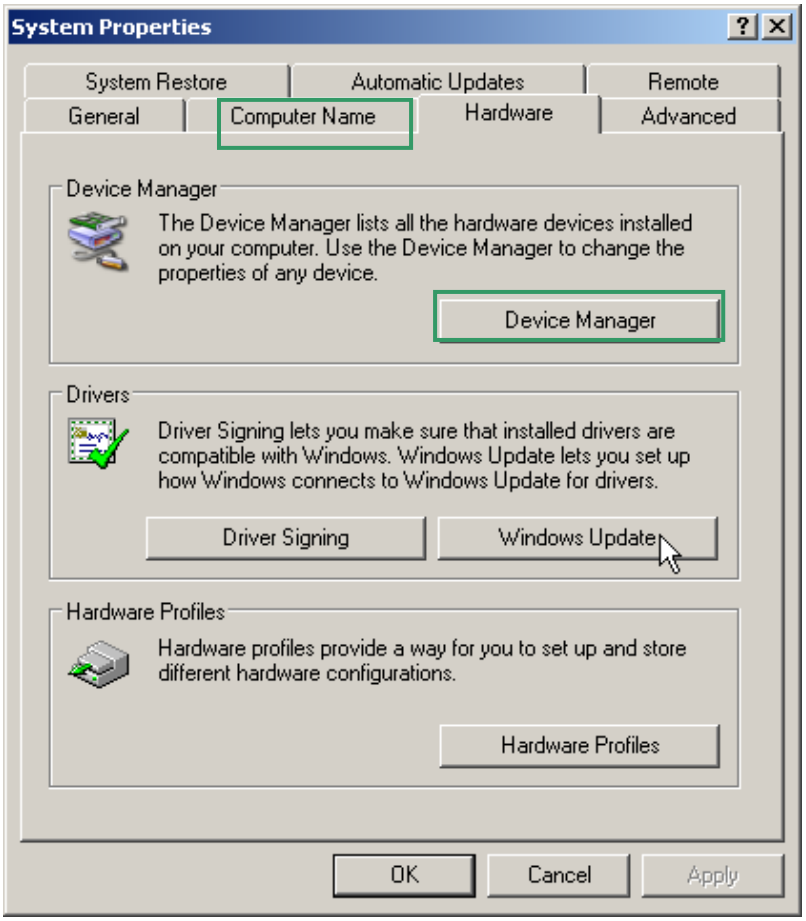


4) If the installation was successful, the report program can be found at **Start>All Program>Report Operation Software>Report**.

3-2. Port setting with Adam

The fist time using the ADAM monitor or report program, you must confirm the comport settings. In the desktop window, follow the steps below.

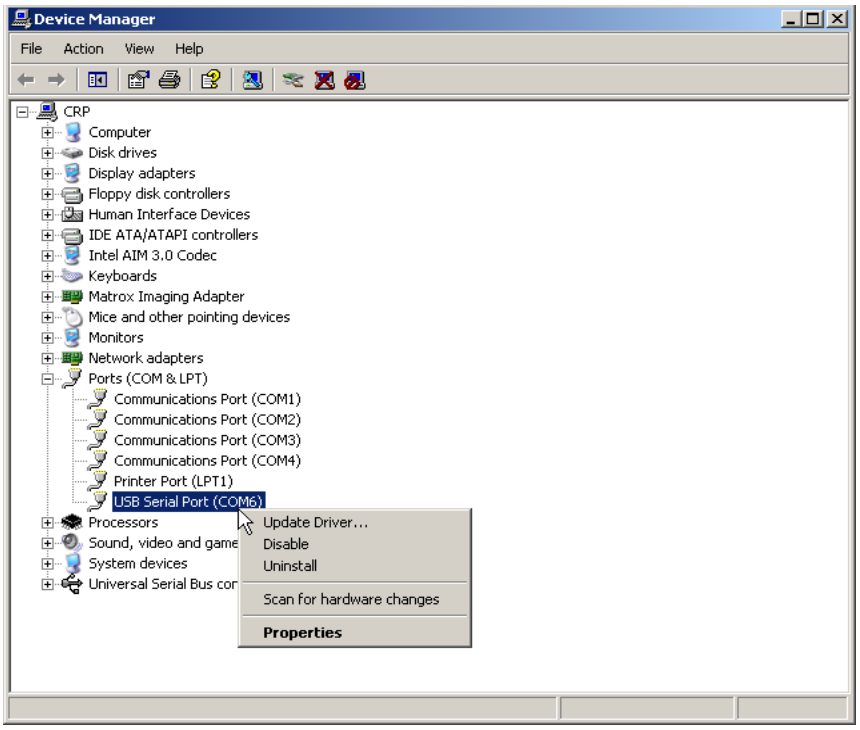
1) Start>Control Panel>System
2) Click on “Device Manager”.



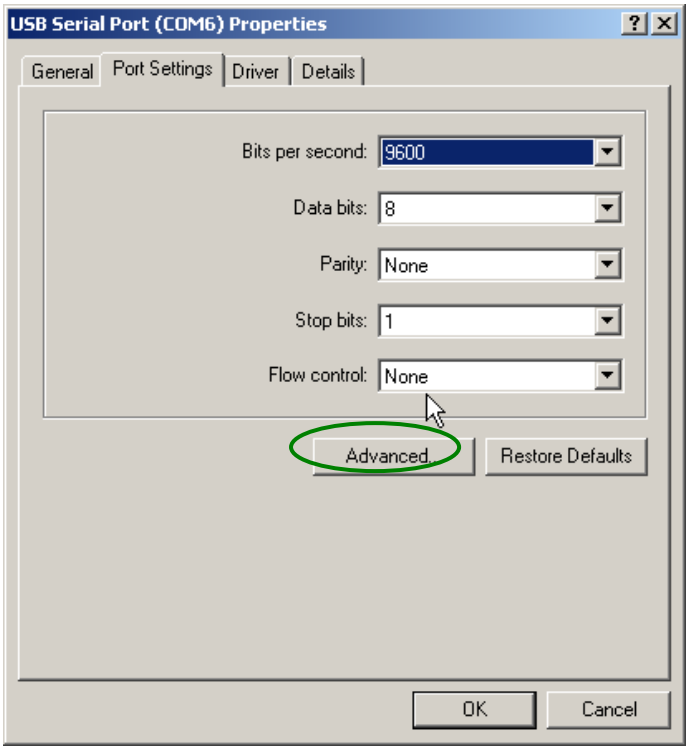
3) Click on “Ports (COM & LPT)”

   If the USB serial port is not set to COM5, change it to COM5.

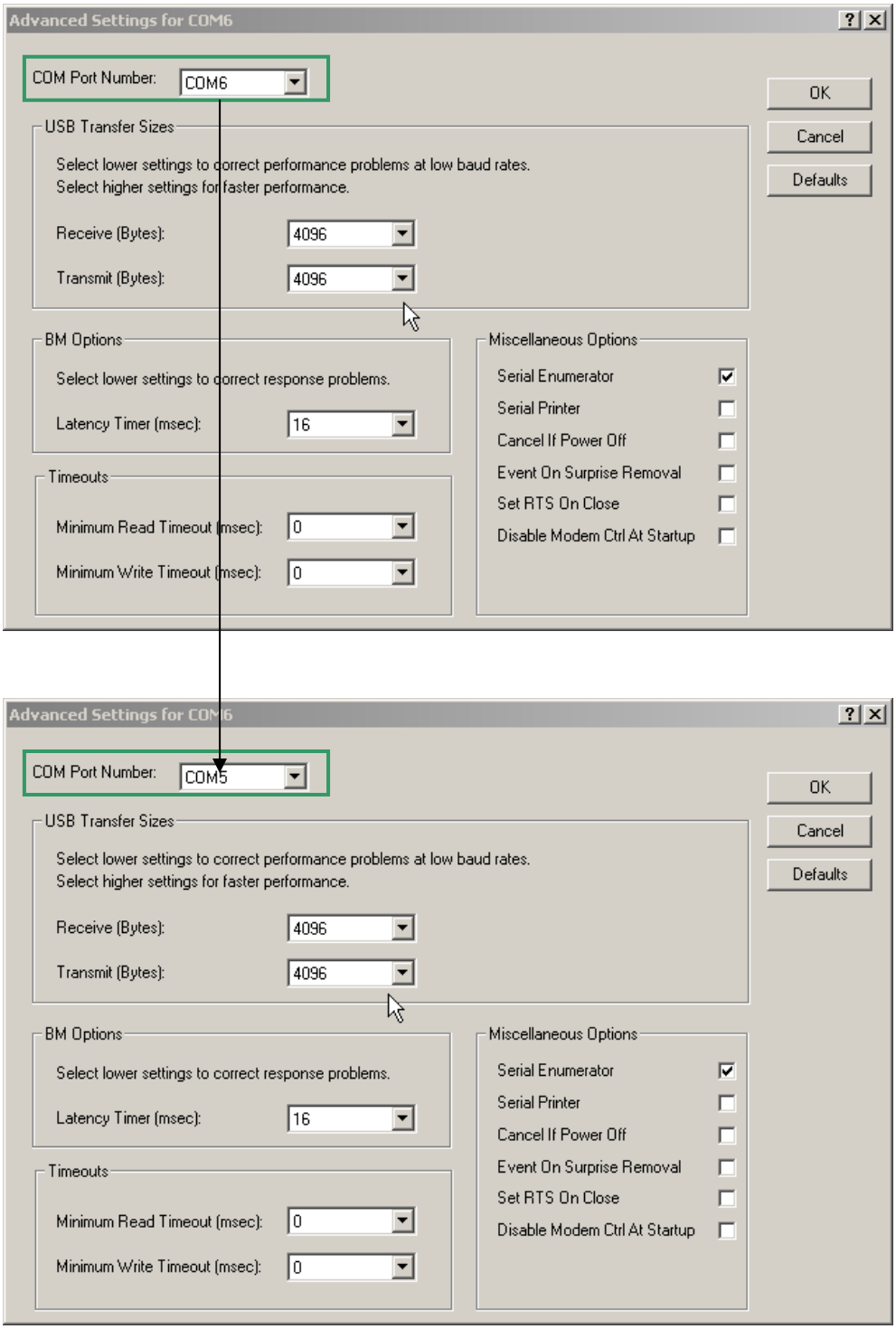
4) Click the **right mouse button** on USB Serial Port (COM6) and click on “Properties”.



5) Click on the “Advanced” button.



6) Change the COM Port Number from COM6 to COM 5.



7) Click the “OK” button.

3-3. USB Serial Driver Installation

1) To install the Adam USB serial driver, follow the directions below. First, insert the installation CD-ROM into the computer. Then open the file "**CDM_Setup.exe**".

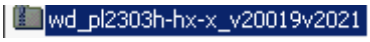
2) Click "Ok" to finish the installation.

3-4. USB to serial driver installation

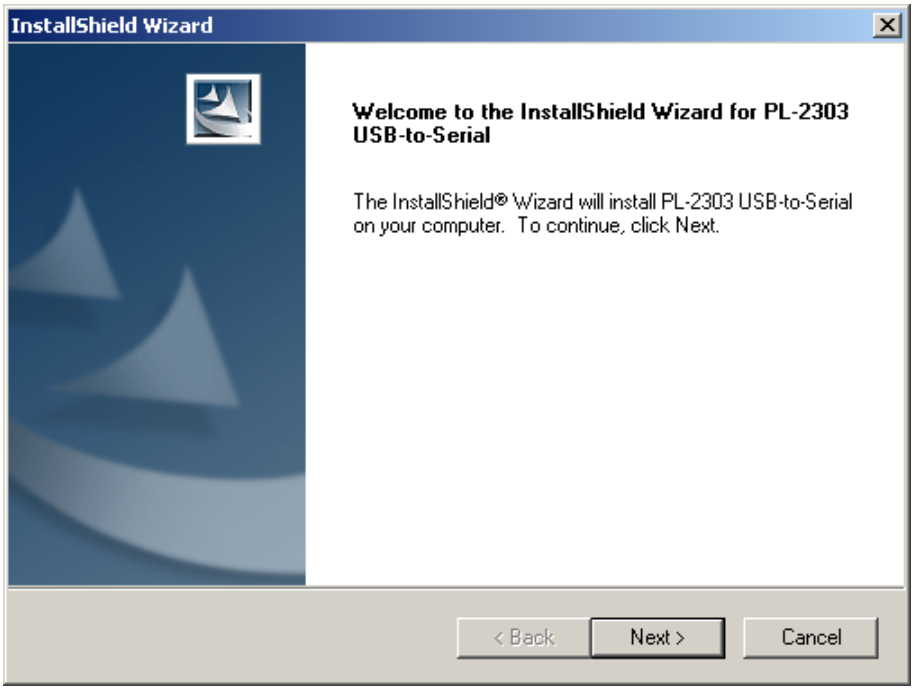
If experiencing trouble using the serial port (COM1), use the USB to Serial device. (If comport1 in your PC is not working or does not have a serial port.)

This is an example in how to use the 'pl-2303' model. If you use another USB to Serial Device, you should install suitable device driver file. To find the **device driver file,** visit the company's web site to find additional support.

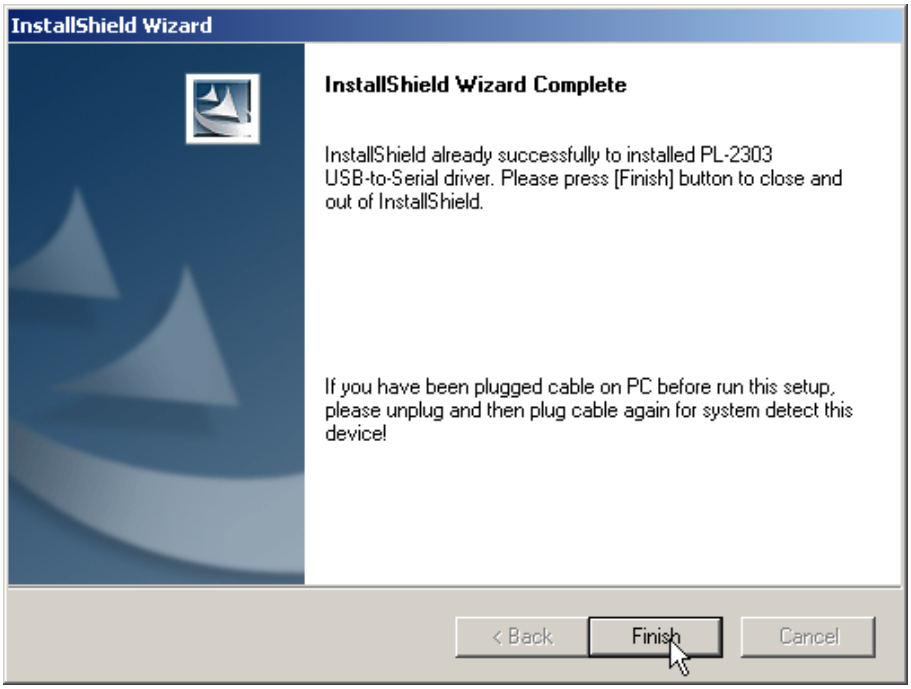
Install pl-2303 model device driver.



1) Double click on "PL-2303 Driver Installer.exe".
2) Click "Next" to continue.

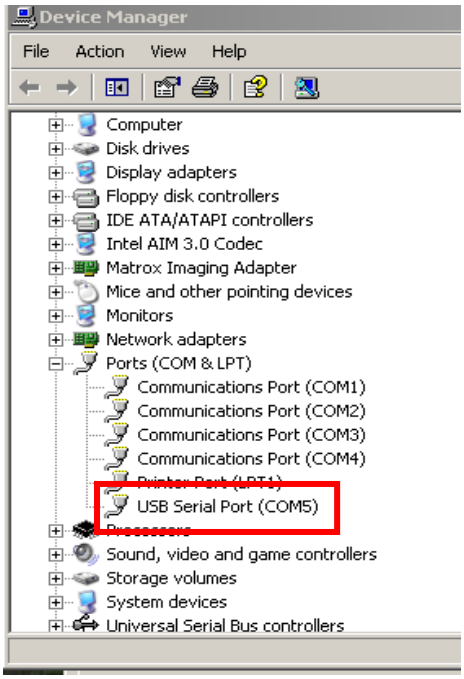


3) Click “Finish” to complete the installation.



3-5. Communication Port Check

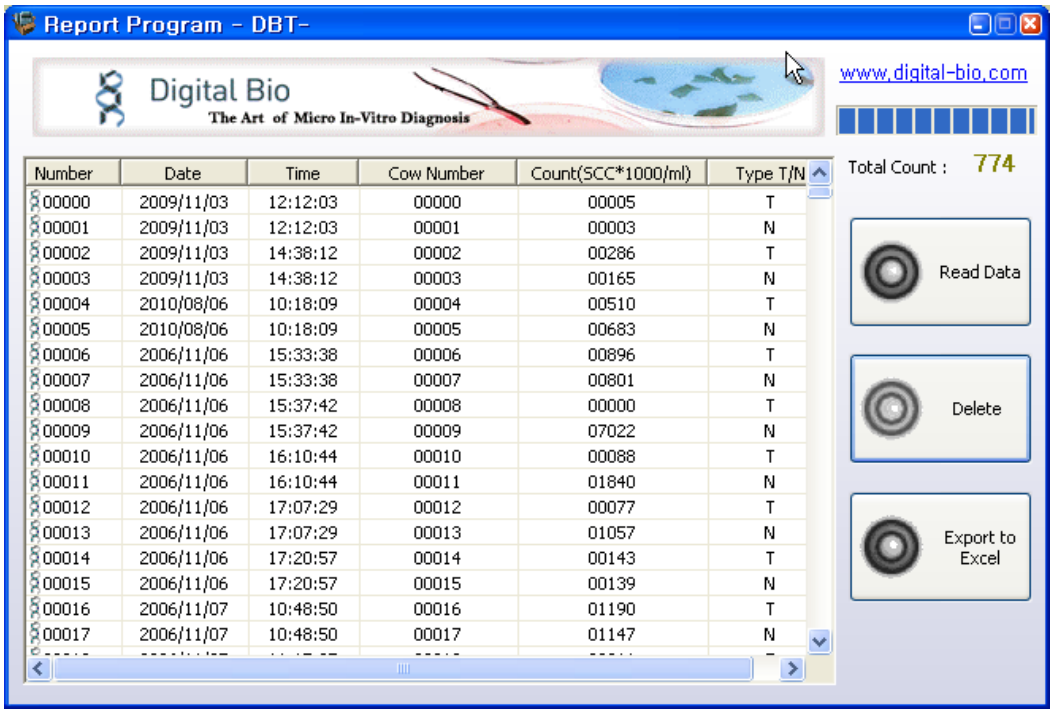
1) Check the connection between the main device and computer via the USB-to-serial line.
2) Check the communication port and USB serial port.
   [START>Control Panel>System>Hardware>Device manager>Port (Com & LPT)].



3-6. Description of the Control Software

Report program: Interface to manage and report all results from the main device. All measurement results are automatically saved on the memory of the main device, **excluding experimental images**. The user can also download and delete the individual data from the memory and export it to Excel (*.xls) format.

⚠ **CAUTION**: **Before running the program, check the connection of two cables (RS-232C & USB) between the Adam and the PC or desktop. Then check the communication port on the PC or desktop and refer to Section 3-5.**

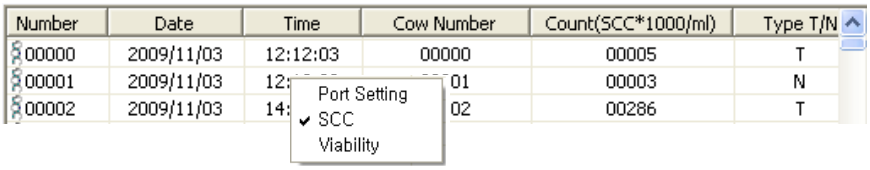


Number	Date	Time	Cow Number	Count(SCC*1000/ml)	Type T/N
00000	2009/11/03	12:12:03	00000	00005	T
00001	2009/11/03	12:12:03	00001	00003	N
00002	2009/11/03	14:38:12	00002	00286	T
00003	2009/11/03	14:38:12	00003	00165	N
00004	2010/08/06	10:18:09	00004	00510	T
00005	2010/08/06	10:18:09	00005	00683	N
00006	2006/11/06	15:33:38	00006	00896	T
00007	2006/11/06	15:33:38	00007	00801	N
00008	2006/11/06	15:37:42	00008	00000	T
00009	2006/11/06	15:37:42	00009	07022	N
00010	2006/11/06	16:10:44	00010	00088	T
00011	2006/11/06	16:10:44	00011	01840	N
00012	2006/11/06	17:07:29	00012	00077	T
00013	2006/11/06	17:07:29	00013	01057	N
00014	2006/11/06	17:20:57	00014	00143	T
00015	2006/11/06	17:20:57	00015	00139	N
00016	2006/11/07	10:48:50	00016	01190	T
00017	2006/11/07	10:48:50	00017	01147	N

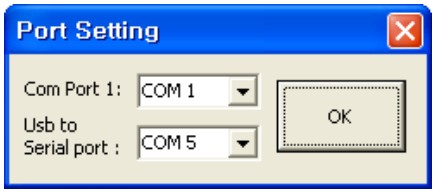
Figure 6.The main report program

1) Port Setting and Application Selection

Using the right button on the mouse click “Port Setting” first, and confirm as bellows:



- Port Setting: To set the communication port (Com port COM 1 / USB port COM 5).



- SCC: To be used by the database of the main device.

2) Experiment list

The experiment list window consists of the number, date, time, cow number, counting result and channel type.

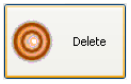
Number	Date	Time	Cow Number	Count(SCC*1000/ml)	Type T/N
00000	2009/11/03	12:12:03	00000	00005	T
00001	2009/11/03	12:12:03	00001	**R-O**	N
00002	2009/11/03	14:38:12	00002	00286	T
00003	2009/11/03	14:38:12	00003	00165	N
00004	2010/08/06	10:18:09	00004	00510	T
00005	2010/08/06	10:18:09	00005	00683	N
00006	2006/11/06	15:33:38	00006	00896	T
00007	2006/11/06	15:33:38	00007	00801	N
00008	2006/11/06	15:37:42	00008	**S-E**	T

After sample test, if the sample result is “Range over”, it describes result as R-O, and the result is “Check Sample”, it describes result as S-E.

3) Function Buttons

Shows the number of experiment data.

Loads the experiment data from the memory of the main device.



Deletes all of the loaded data and memory of the main device.

Transfers the report to Excel format and saves it.
Saved location (Default): “C:\Report\Excel”
File name (Default): Report_Date (Time).xls

4. Measurement Section

SCC Kit (CRS-K01) is composed of Propidium iodide (PI) for counting somatic cells. CRS-K01 can be used without diluting raw milk.
Measuring range of cell density is 0 to 4 × 10^6 cells/ml. Appropriate range of the sample mixture is 5 × 10^4 to 1 × 10^6 cells/ml.

One kit is capable of 100 tests. Each tube has 100 µl reagent of somatic stain solution. Simply add the same volume of the raw milk sample in the tube then every preparing for experiment end. Once the experiment is complete the results can be printed through the thermal print. Printed number indicates cell concentration (× 1000/ml) in each channel.

- **T**: The cell concentration in the T channel of the chip
- **N**: The cell concentration in the N channel of the chip

Store kit box upright and at room temperature. Expiration date of stain solution is written on the bottom of the kit box (yy-mm-dd). Be sure to check the expiration date before using. Follow the exact steps detailed in the Instructions for Use section.

1) Add 100 µl of the raw milk sample in the tube.
2) Mix the sample thoroughly by turning the vial upside down 3-5 times.
3) Load 20 µl of the cell sample onto the Chip. Ensure that no bubbles enter the channel.

4-1. Material & Method

The following list contains the items needed for somatic cell counting using the Adam.

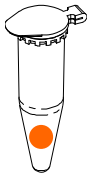
A raw milk sample

SCC Kit

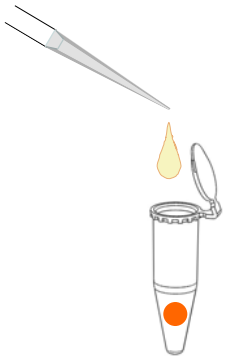
Pipette and tips

1. The prepared materials ready to be used

Raw Milk

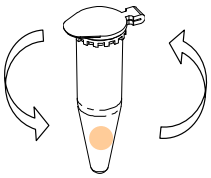


2. Add 100 µl of the raw milk sample in tube.

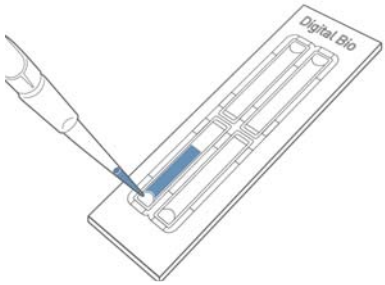


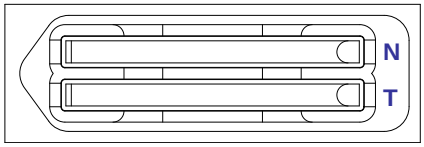
..

3. Mix the sample by turning the vial upside down 3-5 times.



4. Load 20 µl (for SCC kit CRS-K01, 2 channel chip) or 12 µl (for SCC kit CRS-K02, 4 channel chip) of the cell sample onto the Chip. Ensure that no bubbles enter the channel.

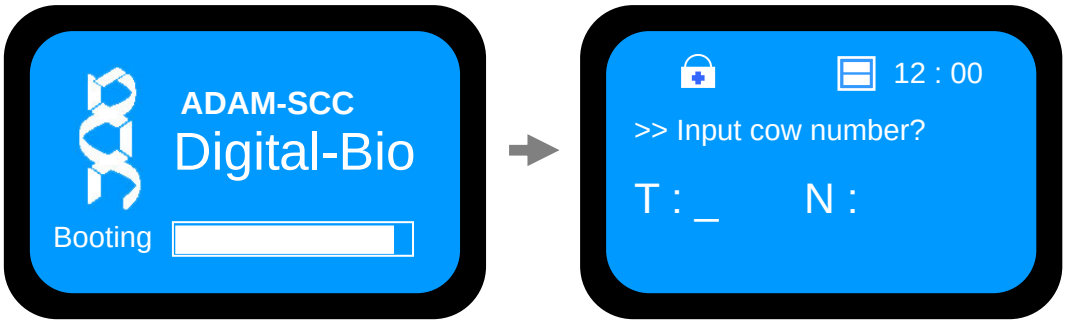




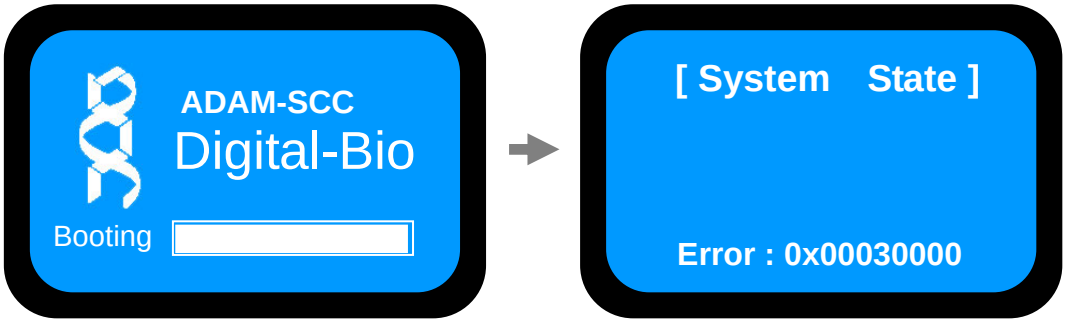
Insert the chip into the chip holder and push the run button.

5. Operation of the Adam

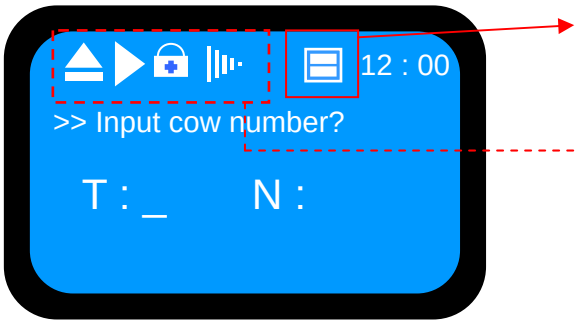
1. Check the connection of the main device power cord.
2. Make sure that the main power switch is in the “ I ” (ON) position. (On the rear side of the main device.)
3. Check initial **LCD** display of the **READY** state.



The screen above is the first display of the ADAM when you turn on the ADAM-MC. It starts to run system check automatically. And the next screen follows continually if there is no system error.



Please let us know if the first screen does not run to the next display automatically or the error message comes on the screen.



Status of setting menu

Displays the order status of the performances onto the ADAM-SCC such as eject, run, parking or insert. (Status of the Chip Holder)

Displays the status for Cell Counting (After you press the run button).

Displays the status of the Chip Holder is being ejected(After you press the eject button).

Displays the status of Chip Holder is being parked(After you press the park button).

Displays the status of Chip Holder is being inserted.

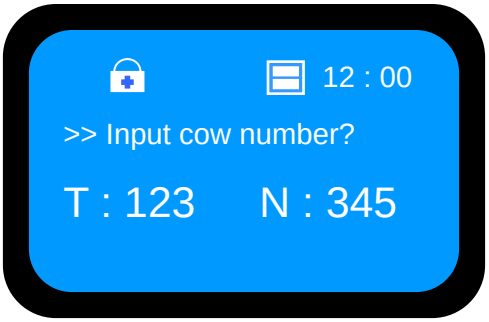
Displays the status when you use the 2 Channel Chip (CRC-T01) (refer to the "2) Chip Selection" of Menu setting on the page 13).

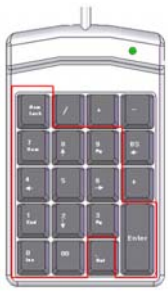
Displays the status when you use the 4 Channel Chip (refer to the "2) Chip Selection" of Menu setting on the page 13).

4. 2 Channel Chip (CRC-T01) Cell Counting

1) If no system error is found, Adam is ready to receive the sample numbers. Screen for inputting the sample numbers will appear and it requires the inputting of **three digits**. Press Enter key once the digits have been inputted.

⚠ **CAUTION**: **Inserting numbers is not possible with a PC or desktop keyboard. Please use the provided keypad only.**

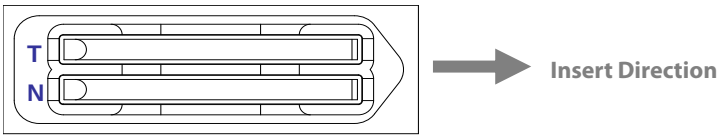




2) Press " ⏏ , **EJECT"** button on the main device to eject the chip holder.

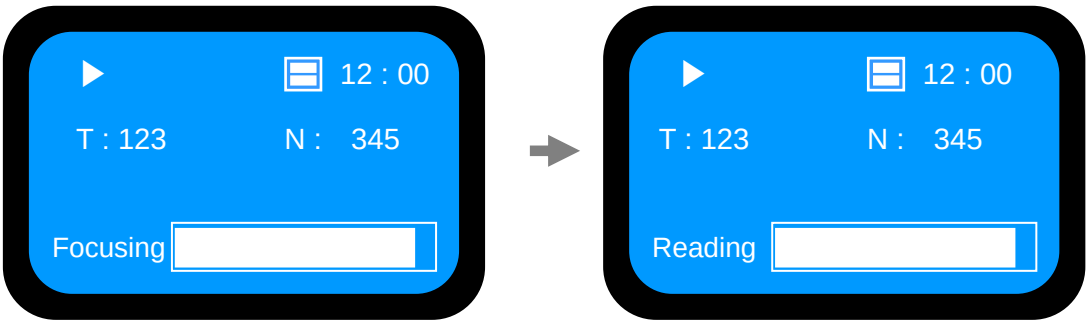
3) Insert the **Chip** loaded with the sample onto the chip holder. Please be careful not to make bubbles.

[**Sample Preparation**: Please refer to the 4-1. Material & method section for the detailed operation.]



4) Press the **"▶, Run"** button on the main device.

Automatic Focus will be carried out the first time the device is booted. Shut down the device properly and the following time the device is turned on, the Auto Focus process will be skipped.



5) After acquiring the image, the chip will be ejected automatically. Then chip can be removed.

6) The calculated cell number per 1ml will be displayed and printed automatically.

If the density of sample is over-range, you may see "Check Sample" or "Over Range" message at display monitor. If you see those messages, please check below list first.

< In case of "Check sample!" >

1. Check sample contamination, or Chip with dust or other materials.
2. Check mixture of sample and reagent. It has to be mixed well.
3. Check test tip whether stained with something.

If you have problems that mentioned above, you will get a result sheet like below.

Number	Date	Time	Cow Number	Count(SCC*1000/ml)	Type T/N
00000	2009/11/03	12:12:03	00000	00005	T
00001	2009/11/03	12:12:03	00001	S - E	N
00002	2009/11/03	14:38:12	00002	00286	T
00003	2009/11/03	14:38:12	00003	00165	N
00004	2010/08/06	10:18:09	00004	00510	T
00005	2010/08/06	10:18:09	00005	00683	N
00006	2006/11/06	15:33:38	00006	00896	T
00007	2006/11/06	15:33:38	00007	00801	N
00008	2006/11/06	15:37:42	00008	00000	T

< In case of “Over Range!” >

1. In case of the result of cell-counting is over 4000[X1024mL]

2. Check mixture of sample and agent. It has to be mixed well.

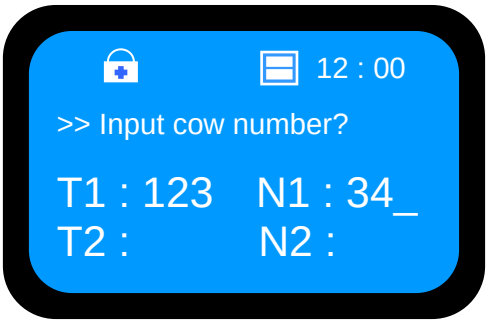
If you have problems that mentioned above, you will get a result sheet like below.

Number	Date	Time	Cow Number	Count(SCC*1000/ml)	Type T/N
00000	2009/11/03	12:12:03	00000	00005	T
00001	2009/11/03	12:12:03	00001	R - 0	N
00002	2009/11/03	14:38:12	00002	00286	T
00003	2009/11/03	14:38:12	00003	00165	N
00004	2010/08/06	10:18:09	00004	00510	T
00005	2010/08/06	10:18:09	00005	00683	N
00006	2006/11/06	15:33:38	00006	00896	T
00007	2006/11/06	15:33:38	00007	00801	N
00008	2006/11/06	15:37:42	00008	00000	T

7) For another experiment, repeat the process from steps 4~7.

5. 4 Channel Chip (CRC-T02) Cell Counting

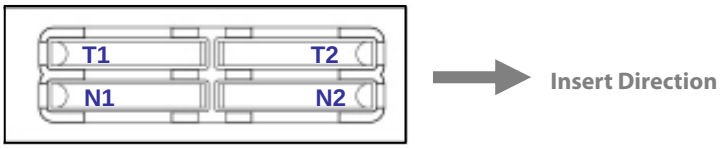
1) Screen for inputting the sample numbers will appear and it requires the inputting of **three digits**. Press Enter key once the digits have been inputted.



2) Press **“ ⏏ , EJECT”** button on the main device to eject the chip holder.

3) Insert the **Chip** loaded with the sample onto the chip holder. Please be careful not to make bubbles.

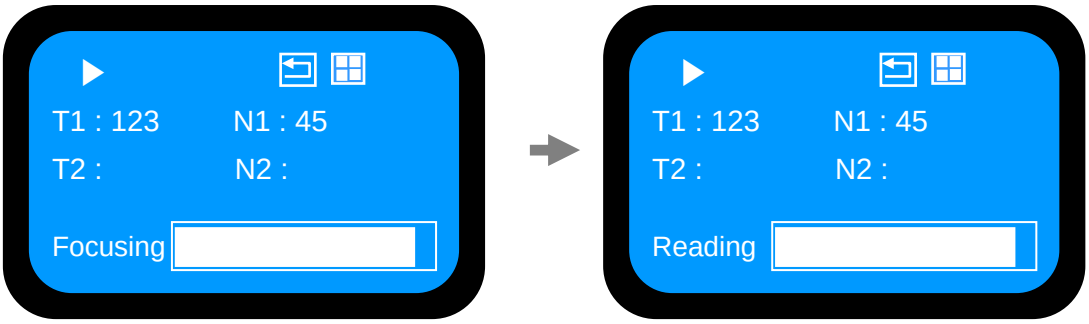
[**Sample Preparation**: Please refer to the 4-1. Material & method section for the detailed operation.]



4) Press the **“▶, Run”** button on the main device.

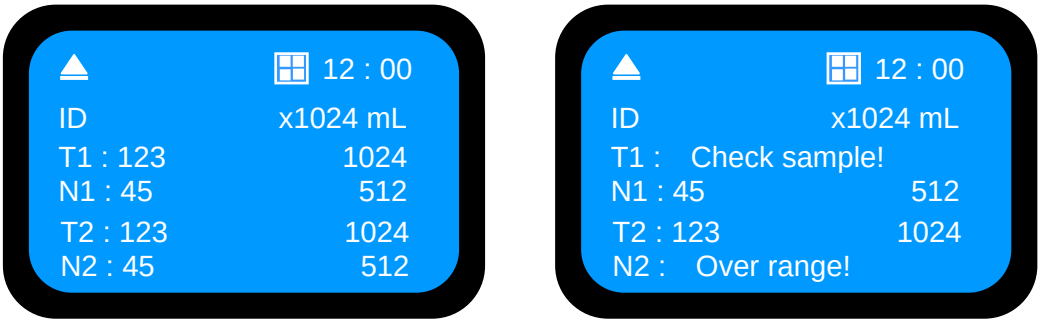
Automatic Focus will be carried out the first time the device is booted. Shut down the device

properly and the following time the device is turned on, the Auto Focus process will be skipped.



5) After acquiring the image, the chip will be ejected automatically. Then chip can be removed.

6) The calculated cell number per 1ml will be displayed and printed automatically.



If the density of sample is over-range, you may see “Check Sample” or “Over Range” message at display monitor. If you see those messages, please check below list first.

< In case of “Check sample!” >

1. Check sample contamination, or Chip with dust or other materials.
2. Check mixture of sample and agent. It has to be mixed well.
3. Check test tip whether stained with something.

If you have problems that mentioned above, you will get a result sheet like below.

Number	Date	Time	Cow Number	Count(SCC*1000/ml)	Type T/N
00000	2009/11/03	12:12:03	00000	00005	T
00001	2009/11/03	12:12:03	00001	S - E	N
00002	2009/11/03	14:38:12	00002	00286	T
00003	2009/11/03	14:38:12	00003	00165	N
00004	2010/08/06	10:18:09	00004	00510	T
00005	2010/08/06	10:18:09	00005	00683	N
00006	2006/11/06	15:33:38	00006	00896	T
00007	2006/11/06	15:33:38	00007	00801	N
00008	2006/11/06	15:37:42	00008	00000	T

< In case of “Over Range!” >

1. In case of the result of cell-counting is over 4000[X1024mL]

2. Check mixture of sample and agent. It has to be mixed well.

If you have problems that mentioned above, you will get a result sheet like below.

Number	Date	Time	Cow Number	Count(SCC*1000/ml)	Type T/N
00000	2009/11/03	12:12:03	00000	00005	T
00001	2009/11/03	12:12:03	00001	R - 0	N
00002	2009/11/03	14:38:12	00002	00286	T
00003	2009/11/03	14:38:12	00003	00165	N
00004	2010/08/06	10:18:09	00004	00510	T
00005	2010/08/06	10:18:09	00005	00683	N
00006	2006/11/06	15:33:38	00006	00896	T
00007	2006/11/06	15:33:38	00007	00801	N
00008	2006/11/06	15:37:42	00008	00000	T

7) For another experiment, repeat the process from steps 4~7.

⚠**CAUTION**: **At low temperature (≤10℃), please warming up the system for 10 min.**

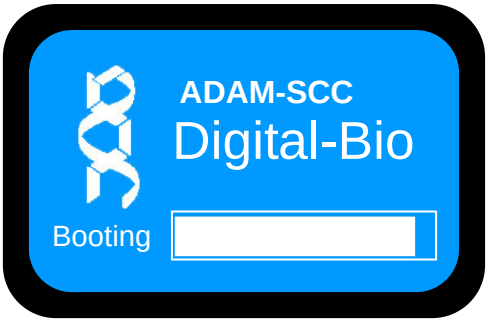
6. Trouble shootings

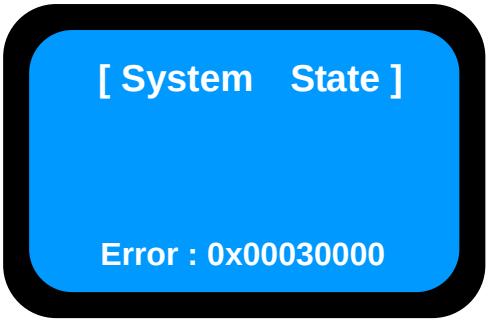
1. ADAM is not working:
   - ① Check the connection cable and power.
   - ② Turn on ADAM and check working.
   - ③ Check the COMPORT settings in Section 1 and Section 2.
   - ④ At low temperatures (≤10℃), please warm up the system for 10 minutes before use.
   - ⑤ If you experience any further problems, contact us.

2. USB to Serial Port is not COM5 in my PC.
   - ① Check COMPORT as detailed in Section 1 and Section 2.
   - ② If you experience any further problems, contact us.

3. My PC does not have a serial port.
   - ① Use USB to Serial Device as explained in Section 2.
   - ② If you experience any further problems, contact us.

4. Please let us know if you see an error message or the following step does not operate properly.





7. Technical Specifications

• Hardware

Objective lens : 4 ×

Laser : 532 nm

CCD : 1/3 inch B/W CCD

Display : 128 × 64 LCD Monitor

Printer : Thermal printer, 57.5(W) mm paper roll

Stage controller

• Dimensions

220(L) × 350(W) × 250(H) mm

• Weight

Approximately 10 kg

• Power

AC 115~230 V, 6/3A, 50-60 Hz

• Environment Condition

$5 \leq T \leq 40$ ℃

$rH \leq 80$ %

Altitude ≤ 2000 m

• Loading Volume

Prior to analysis, the sample is mixed with a stain solution.

20 µl is recommended for each channel in Two Channel Chip.

• Measuring Time : About 1 min/test

• Measurement Range

Operational: $5 \times 10^4 \sim 4 \times 10^6$ cells/㎖

• Accessories

Power cord : 1.5 m

Fuse: 250 V.AC 3A

Paper roll: 57.5(W) mm

• Related products

Model No.	**Product**	**Contents**
Adam-SCC	Adam	Main device
CRS-K01	SCC Kit	50 pcs Soma Chip (CRC-T01) 100 ul Stain solution 100 ea (Max. 100 tests/kit)
CRS-K02	SCC Kit	100 pcs Soma Chip (CRC-T02) 100 ul Stain solution 400 ea (Max. 400 tests/kit)
ADM-001	External video monitor	[Optional]

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