RAYDON

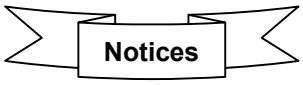
RAYDON Electronics

RA-510

Li-ion Battery Analyzer

Quick Guide

V1.00



Version Control

Version	Description	Date
V1.00		23 November, 2017
V2.00		23 July, 2018

Analyzer introduce

Procedure selection with button and LED indicate

Display LCD background lamp

Front panel of the RA-510

Control Button with Start and Cancel

Battery status and voltage selection with button and LED indicate

Power ON/OFF Switch

Test Channel connect to Battery

USB port connect to PC

Back panel of the RA-510

Power IN Plug

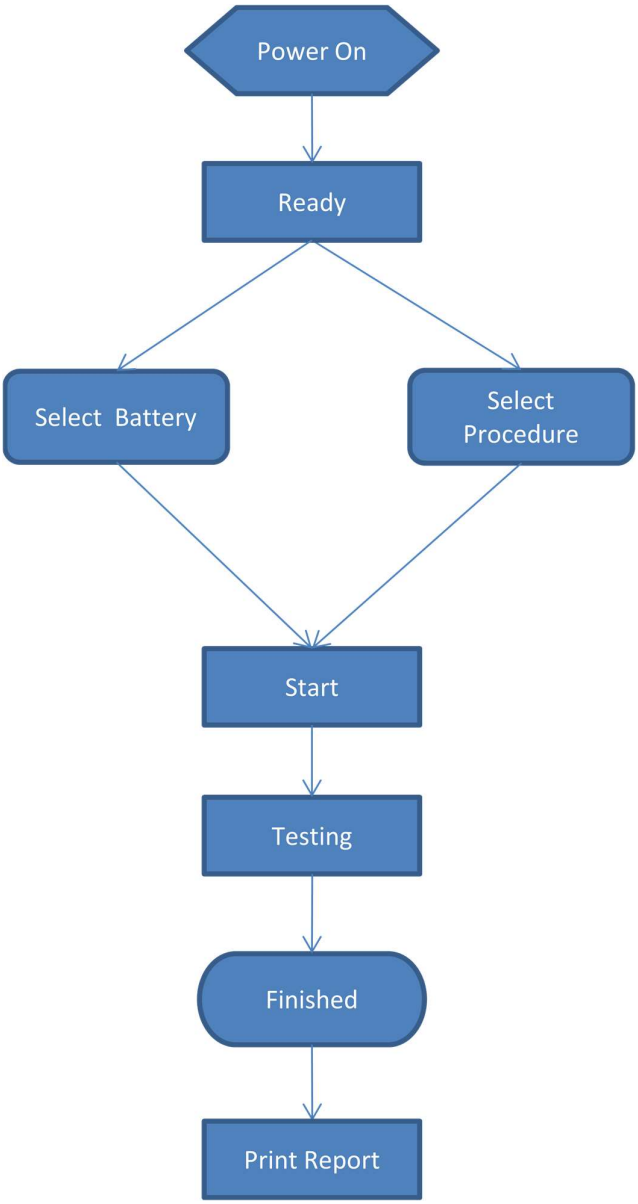
RS-232 Connect to Printer

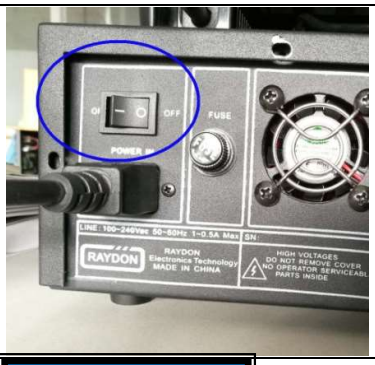
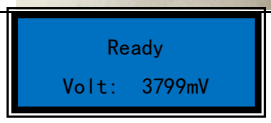
Printer

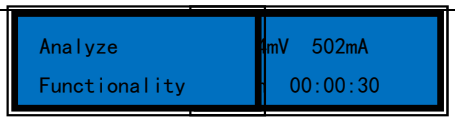
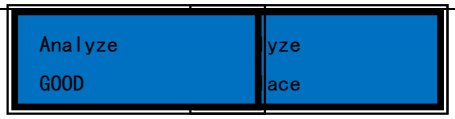
Connect battery, ready to start

Over View

Test Flow Chart



Step No.	Item	Description	Picture
1	Power On	Boot Analyzer	
2	Ready	Ready to test status	
3	Select Battery	Battery LED ON: 1S: 3.7V/3.8V 2S: 7.4V 3S:11.1V 4S: 14.V *[S]: Number of Series*	
4	Select Procedure	Procedure LED ON: 1. Analyzer 2. Charge 3. Capacity 4. 30% Capacity	

5	Start	Click Start Button quick start test	
6	Testing	Testing status display in LED, including procedure, battery status real time.	
7	Finish	Display test result	
8	Print	Print test report, and then return to Ready.	

Procedure introduce

[Analyze]

[Analyze] Test including below check points:

Initial Test: Check battery statics status

- ✓ Voltage
- ✓ Temperature*
- ✓ Current*
- ✓ Remaining Capacity*
- ✓ Charge State

* Read smart data from battery (Special design for smart data build in battery, like iPhone battery, laptop battery)

Functionality Test: Check battery physical status

- ✓ Normal charge test
- ✓ Normal discharge test

Usability Test:

For iPhone battery, laptop battery and other smart data phone: read smart data from battery, and analyze the usability

- ✓ Design Capacity
- ✓ Full charge capacity
- ✓ Efficiently: compare Design capacity and Full charge capacity
- ✓ Cycle Count

For android phone battery and other battery: check charge/discharge voltage status, and analyze the usability

- ✓ Charge dV1
- ✓ Discharge dV1
- ✓ Charge dV2
- ✓ Discharge dV2

[Charge]

[Charge] charge battery by 2 different ways:

- ✓ Battery power less than 60%, [Charge] will charge battery to 60% (normal status).
- ✓ Battery power more than 60%, [Charge] will charge battery to 100% (fully charge status).

[Capacity]

[Capacity] follow below steps:

1. Charge battery to full;
2. Discharge battery to empty (calculate the capacity in this step);
3. Charge battery to 60% normal status.

[30% Cap]

[30% Capacity] special design for air shipment battery, according to Air Safety rule, battery must less than 30% power to ship by air:

- ✓ Battery power less than 30%, charge battery to 30% (air shipment status).
- ✓ Battery power more than 30%, discharge battery to 30% (air shipment status).

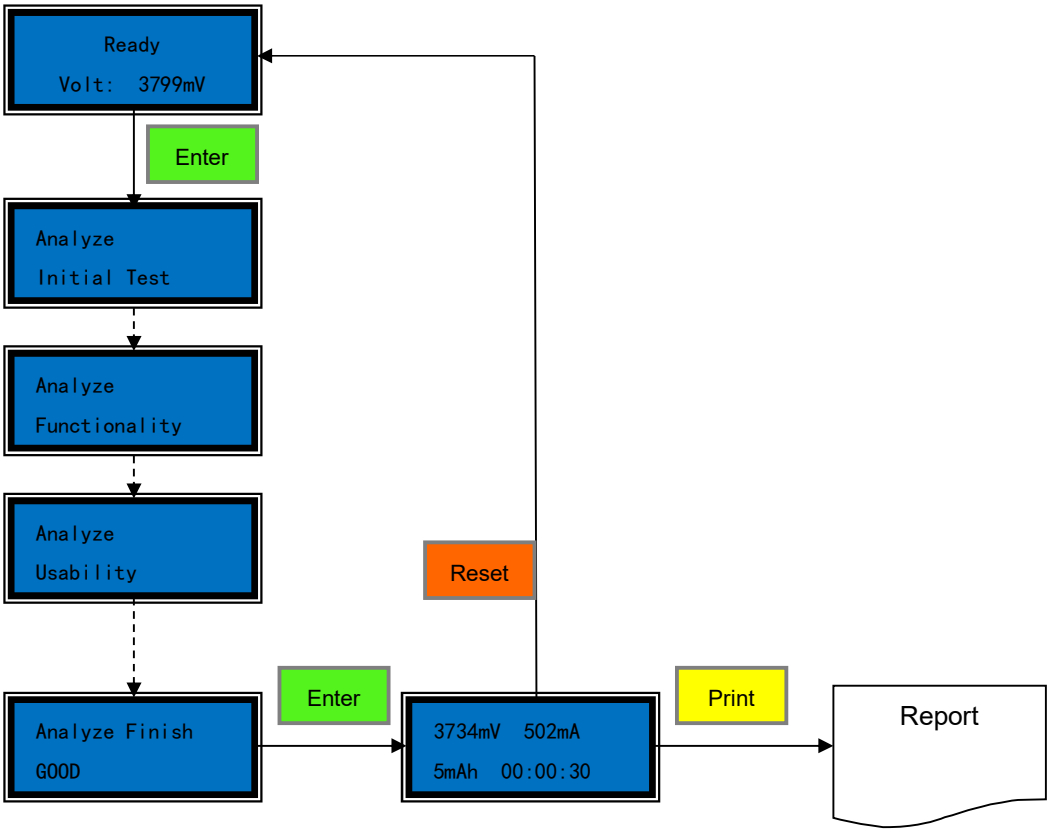
Analyze Result Description

Analyze Usability Result description:

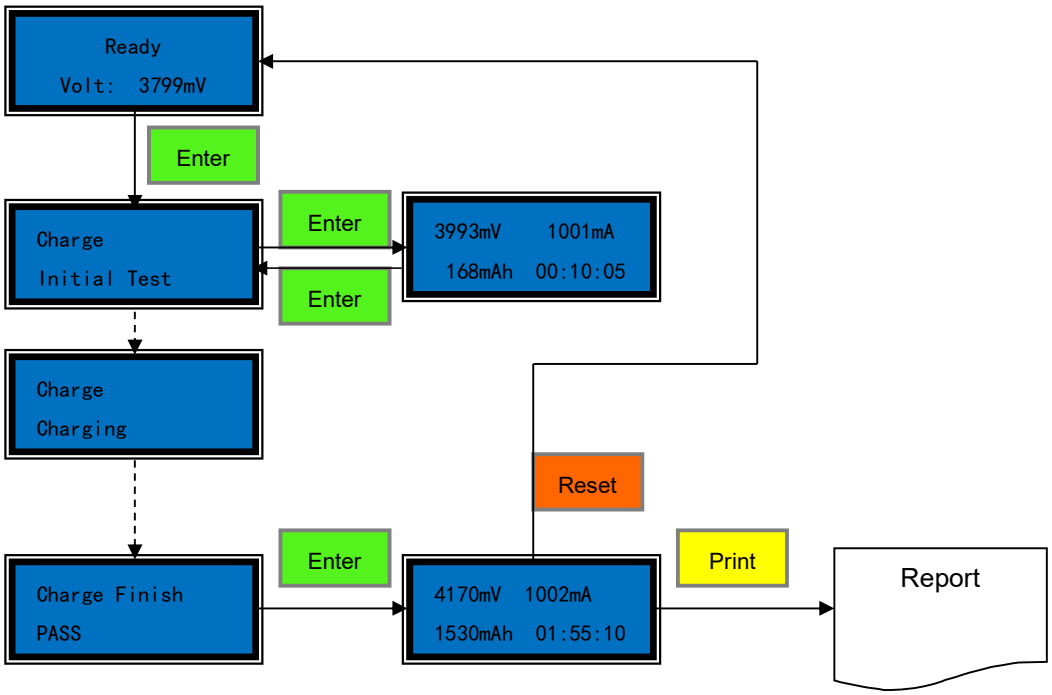
- ✓ GOOD: Battery is good.
- ✓ FAIR: Battery is not very well, but still can use.
- ✓ REPLACE: Battery age is too old, recommend replacement.

Procedure Flow Chart

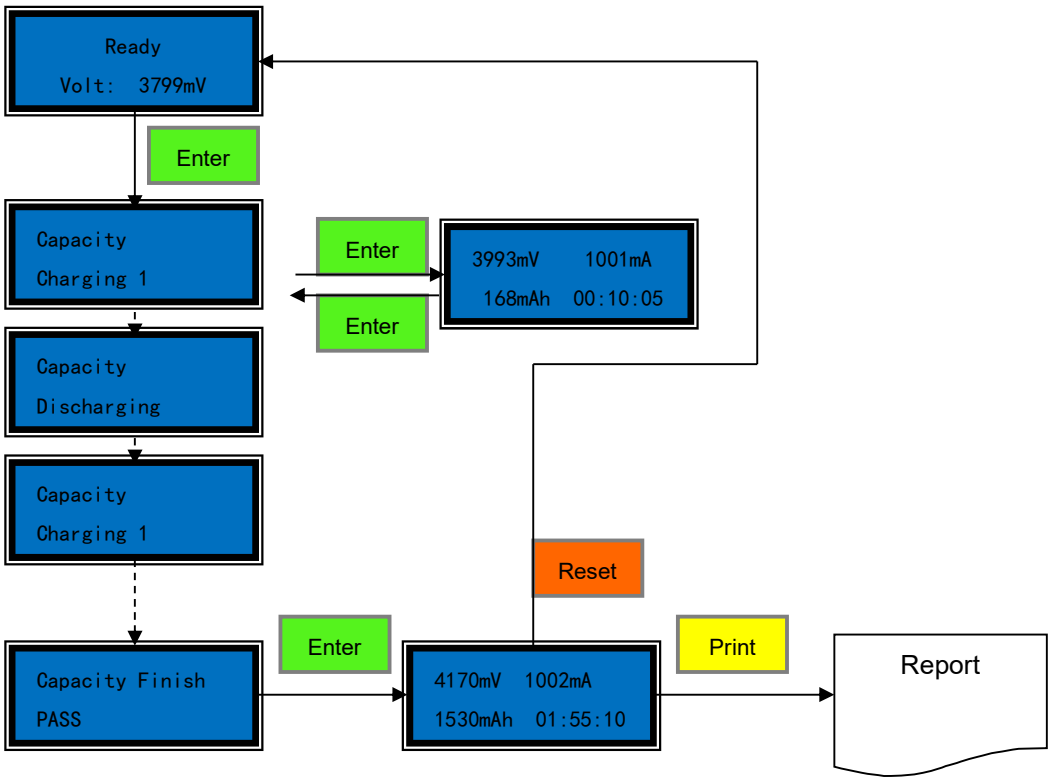
[Analyze]



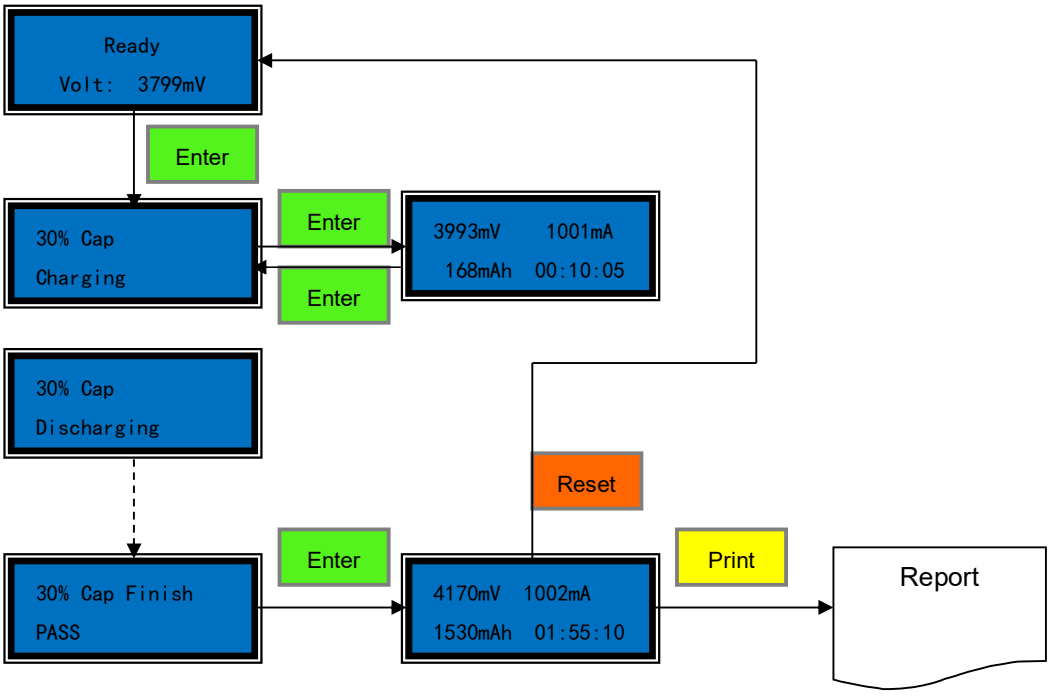
[Charge]



[Capacity]



[30% Cap]


Ready
Volt: 3799mV
Enter
30% Cap
Charging
Enter
Enter
3993mV 1001mA
168mAh 00:10:05
30% Cap
Discharging
Reset
Enter
Print
30% Cap Finish
PASS
4170mV 1002mA
1530mAh 01:55:10
Report

Report Printing

Analyze Report Format

```
RAYDON
RA-510 REPORT
==========================
Battery    : 1S(3.7V/3.8V)
Procedure: Analyze
==========================
Voltage          : 3.6  V
Temperature  : 20 ℃
Current          : 00  mA
Remaining Cap:  00  mAH
Charge State   :  50 %
==========================
        Initial Test  : PASS
==========================
Charge Current  : 200mA
DisChg  Current : 200mA
Test Capacity    : 500mAH
Test Time          : 00:00:00
==========================
        Functionality  :PASS
==========================
Design Capacity: 1500 mAH
Full charge cap  : 1400 mAH
Efficiently          :  93%
Cycle Count        :  10
==========================
          Usability     : GOOD

Operator:
Date       :
```

Charge Report Format

```
RAYDON
RA-510 REPORT
==========================
Battery    : 3S(11.1V)
Procedure: Change
==========================
Voltage          : 11.5  V
Temperature  :  20 ℃
Current          :  00  mA
Remaining Cap:  00  mAH
Charge State   :  50 %
==========================
        Initial Test  : PASS
==========================
Charge Current : 000mA
Test Capacity    : 500mAH
Test Time          : 00:10:00
==========================
        Functionality  :FAIL
==========================
Design Capacity: 1500 mAH
Full charge cap  : 1400 mAH
Efficiently          :  93%
Cycle Count        :  10
==========================
          Usability     : FAIL
                Under Current
Operator:
Date       :
```

Capacity Report Format

```
RAYDON
RA-510 REPORT
==========================
Battery    : 3S(11.1V)
Procedure: Capacity
==========================
Voltage          : 11.5  V
Temperature  :  20 ℃
Current          :  00  mA
Remaining Cap:  00  mAH
Charge State   :  50 %
==========================
        Initial Test  : PASS
==========================
Charge Current  : 200mA
DisChg  Current : 200mA
Test Capacity    : 500mAH
Test Time          : 00:00:00
==========================
        Functionality  :PASS
==========================
Design Capacity: 1500 mAH
Full charge cap  : 1000 mAH
Efficiently          :  67%
Cycle Count        :  100
==========================
          Usability     : PASS

Operator:
Date       :
```

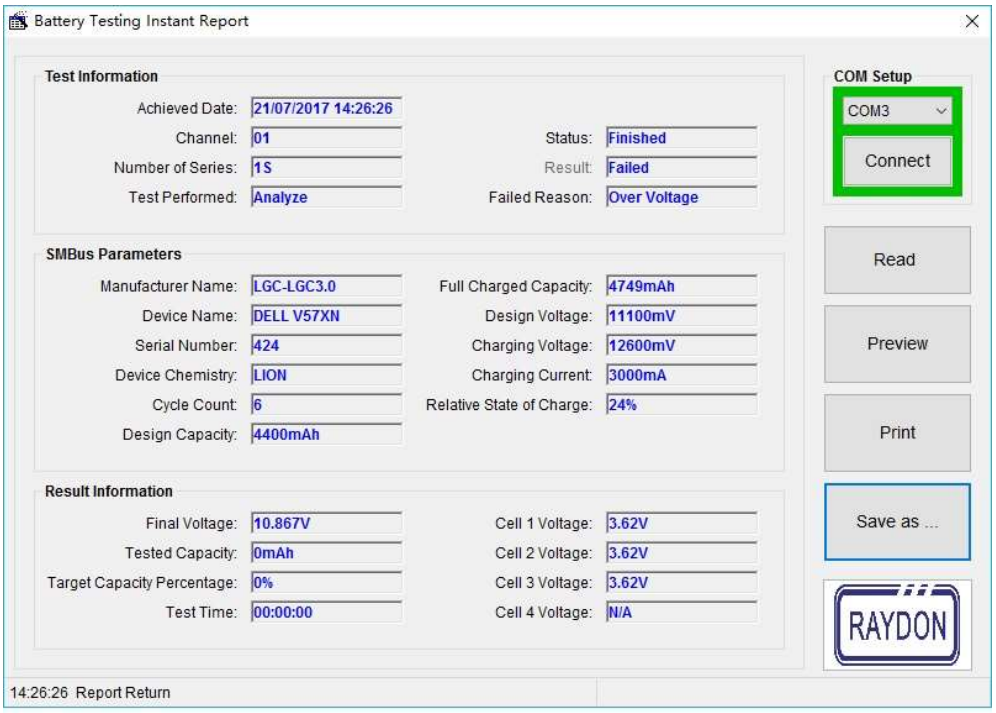
30% Cap Report Format

```
RAYDON
RA-510 REPORT
==========================
Battery    : 2S(8.4V)
Procedure: 30% CAP
==========================
Initial Voltage  : 8.2V
Charge State   :  50 %
==========================
        Initial Test  : PASS
==========================
Charge Current  : 2000mA
Test Capacity    : 500mAH
Test Time          : 00:00:00
==========================
        Functionality  :PASS


Operator:
Date       :
```

- Blue word only available with smart data in the battery, like iPhone and laptop battery.

Software interface



Appendix I

iPhone and other smart data battery connector list

Model	Connector
iPhone 4	RS001
iPhone 4S	RS002
iPhone 5	RS003
iPhone 5S/5C	RS004
iPhone 6	RS005
iPhone 6P/6S/6SP	RS006
iPhone 7/7P	RS007
iPad Mini 1/4	RS008
iPad Mini 2/3	RS009
Samsung S6/S7/S8	RS010
iPhone 8/X	RS012