BE905A1 User Manual

Rev. V1.2

Revision History

Version	Note	Date
Preliminary	Initial Version	2012/04/27
1.0	MP Version Released	2014/05/26
1.1	Modify OSupdate description	2015/03/06
1.2	Modify SD card	2017/10/18

Copyright

Safety Warning

WARNING: To avoid injury, please read all the following operating instructions and safety information in detail before using BE905A1 unit.

GENERAL

- When installing the BE905A1 in the vehicle, place the device securely so that it doesn't obstruct the driver's view of the road or interfere with vehicle operating controls, such as the steering wheel, car pedals or gear shift.
- The air bag in the vehicle will inflate with great force. Do not place this MDT and its accessories around the area over the air bag or in the air bag deployment area.
- Before using the suction cup mount on your windshield, check State and local laws and ordinances where you drive. Some State laws prohibit drivers from using suction mounts on their windshields while operating motor vehicles. Other State laws allow the suction mount to be located only in specific locations on the windshield. Many other States have enacted restrictions against placing "non-transparent material" on the windshield or placing objects on the windshield in locations that obstruct the driver's vision.
- Check and follow local laws regarding MDT device usage.

DRIVING

- Do not be distracted by this device when driving, and please be aware of all driving conditions always.
- For your safety, we recommend you NOT operating BE905A1 while driving. To avoid accident, please operate this device after the vehicle is stopped.

BATTERY

- Do not use a sharp object to remove the battery pack.
- Do not disassemble, puncture or damage the battery pack.
- If using an AC charger or external battery charger, suggest only use the accessory approved for this product.
- Only replace the battery pack with the same or equivalent replaceable battery. To purchase a replacement battery, please contact your distributor.

HEAT

- Avoid touching the surface of heat sink located at the back side of MDT with burns and scalds in your hand. Its function is cooling the device by dissipating heat into surrounding air so that it would be normal to get warm when using MDT.

WATER PROTECTION

Rubber Covers – For connector

BE905A1 has rubber covers that protects the SD card slot, headset Jack, USB host/device connectors, reset button, power-In jack, Multi I/O connector, battery pack from water and dust (for example, when the device is used in the portable mode out of a vehicle). You must close all covers in any of these conditions.

Limited Warranty Statement

This limited warranty shall apply to the **BE905A1** product. We warrant that the product is at the time of its original purchase free of defects in materials and workmanship ("**Limited Warranty**").

This Limited Warranty is subject to the following terms and conditions:

1. This Limited Warranty is given only to the original purchaser of the **BE905A1** ("**Customer**"). It shall neither exclude nor limit.
   a) Any statutory rights of the **Customer** or
   b) Any of the Customer's rights against the seller/dealer of the **BE905A1**.

2. This Limited Warranty shall last for twelve (12) months from the date of original purchase for **BE905A1** product and twelve (12) months for its accessories ("**Warranty Period**")
   Customer shall present the PROOF OF PURCHASE upon claiming this Limited Warranty.
   This Limited Warranty may not be given to any subsequent purchaser.

3. Throughout the **Warranty Period** or its authorized agent will, at their discretion, without charge and subject to Clause 7 repair or replace a defective **BE905A1**. Repair or replacement may involve the use of functionally equivalent reconditioned unit. We will return the repaired **BE905A1** to the **Customer** in good working condition. All replaced faulty parts or components will become our property.

4. This Limited Warranty applies only to the hardware components of the **BE905A1** as originally supplied and does not apply to any software or other equipment.

5. If we repair or replace the **BE905A1**, the repaired or replaced **BE905A1** shall continue to be warranted for the remaining time of the original **Warranty Period** or for ninety (90) days from the date of repair or replacement, whichever is longer.

6. Before returning any unit for service, be sure to back up data and 3 remove any confidential, proprietary, or personal information from the **BE905A1**. We are not responsible for the damage to or loss of any programs, data, or removable storage media.

7. THIS LIMITED WARRANTY SHALL NOT APPLY IF THE DEFECT WAS CAUSED THROUGH ANY OF THE FOLLOWING:
   a) The **BE905A1** serial number, the accessory date code the IMEI number or the warranty seal has been removed, erased, defaced, altered or is illegible; or
   b) Deterioration of the **BE905A1** due to normal wear and tear; or

c) use other than in accordance with the user manual, rough handling, exposure to moisture, dampness or extreme thermal or environmental conditions or a rapid change in such conditions, corrosion, oxidation, unauthorized modifications or connections, unauthorized opening or repair, repair by use of unauthorized spare parts, accidents, forces of nature, or other actions beyond the reasonable control (including but not limited to deficiencies in consumable parts) unless the defect was caused directly by defects in materials or workmanship. This Limited Warranty does not cover physical damage to the surface of the BE905A1 including but not limited to cracks or scratches on the LCD screen; or

d) The defects caused by the fact that the battery has been short-circuited or by the fact that the seals of the battery enclosure or the cells are broken or show evidence of tampering or by the fact that the battery has been used in equipment other than those for which it has been specified; or

e) The defect was caused by a defective function of the cellular network or other system; or

f) The **BE905A1's** software needs to be upgraded due to changes in cellular network parameters; or

g) The defect was caused by the fact that the **BE905A1** was used with or connected to an accessory not approved or provided by us or used in other than its intended use and where it can be shown by us that such defect is not the fault of the **BE905A1** itself.

8. In the event of **BE905A1** failure, the Customer should take the following actions:

a) Refer to the user manual in order to identify and possibly correct the problem.

b) If the problem cannot be resolved by reference to the user manual the Customer should then contact the dealer where such **BE905A1** was purchased or visit our website, or our sales for further information.

c) Before the **Customer** contacts our service agent, please ensure the following information is at hand, the model and serial number, IMEI/ESN number of the **BE905A1**. The Customer's full address and contact information. A copy of the **Customers** original invoice, receipt or bill of sale of the purchase of the **BE905A1**. We will provide the **Customer** with instructions regarding how and when the defective **BE905A1** should be returned. We will pay costs in connection with both the return of the defective **BE905A1** to us and the repaired **BE905A1** back to the **Customer** if the Defective **BE905A1** is within the Warranty Period.

9. THIS LIMITED WARRANTY STATES THE ENTIRE WARRANTY GIVEN BY US TO THE CUSTOMER. ALL IMPLIED WARRANTIES OF SATISFACTORY QUALITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE RELEVANT WARRANTY PERIOD. IN NO EVENT SHALL WE BE LIABLE FOR INCIDENTAL OR CONSEQUENTAL LOSSESOR DAMAGES OF ANY NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS OR COMMERCIAL LOSS, TO THE FULLEST EXTENT THAT THOSE LOSSES OR DAMAGES CAN BE DISCLAIMED BY LAW. IN ANY CASE WE AND ITS SUPPLIERS ENTIRE LIABILITY UNDER ANY PROVISION OF THIS LIMITED

WARRANTY SHALL BE LIMITED TO THE AMOUNT ACTUALLY PAID BY THE CUSTOMER FOR THE HARDWARE. We do not exclude or limit liability for personal injury or death resulting from its own negligence. Some countries do not allow exclusions or limitation of incidental or consequential loss or damage, or limitation of the duration of implied warranties, in those circumstances the preceding limitations or exclusions may not apply to such **Customers**. This warranty gives the **Customer** specific legal rights; the **Customer** may also have other rights, which may vary from country to country. This limited warranty does not affect the **Customers** statutory rights in law specific to the country of purchase, such rights remain protected. This Limited Warranty will be updated by us from time to time. Please visit our website to obtain the latest version of the Limited Warranty for the **BE905A1**.

Certifications

CE-ITE

QTK QuieTek Corporation

QTK No.: 137525R-ITCEP11V04

CE

Statement of Conformity

The certifies that the following designated product

Product	:	MDT
Model Number	:	BE905A11, BE905A12, BE905A13, BE905A14, BE905A21, BE905A22, BE905A23, BE905A24
Company Name	:	Bolymin, Inc.

This product is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility Directive (2004/108/EC). For the evaluation regarding EMC, the following standards were applied:

Emission:

EN 55022: 2010/AC: 2011 Class B	: Emission standard
EN 61000-3-2: 2006+A2: 2009	: Limits for harmonic current emission
EN 61000-3-3: 2008	: Limitation of voltage fluctuation and flicker in low-voltage supply system

Immunity:

EN 55024: 2010	: Immunity standard

TEST LABORATORY

Arthur Liu

Arthur Liu / Deputy Manager

The verification is based on a single evaluation of one sample of above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab. Logo.

QuieTek Corporation / No.75-1, Wang-Yeh Valley, Yang-Hsing, Chiang-Lin, Hsin-Chu County, Taiwan, R.O.C.
Tel: 886-3-5928858, Fax: 886-3-5928859, E-mail: service@quietek.com

CE-LVD

QTK

CE

Declaration of Conformity

Issued Date: Sep. 27.2013
Report No.: SN1308068

This is to certify that the following designated product

Product : MDT
Trade name : N/A
Model Number : BE906A11,BE906A12,BE906A13,BE906A14,BE906A21,BE906A22, BE906A23, BE906A24
Company Name : Bolymin, Inc.
Address : 6F, No. 38, Keya Rd., Daya Dist., Central Taiwan Science Park, Taichung City, 42881, Taiwan.

This product, which has been issued the test report listed as above in QuieTek Laboratory, is based on a single evaluation of one sample and confirmed to comply with the requirements of the following CE/LVD (Low-Voltage Directive; 2006/95/EC) standard.

EN 60950-1:2006+A11:2009+A1:2010+A12:2011

TEST LABORATORY

Ben Hung

Mr. Ben Hung / Senior Engineer
Safety Department

QuieTek 2F., No. 345, Xinhu 2nd Rd., Neihu District, Taipei City 114, Taiwan, R.O.C.
TEL:+886-2-8792-6808 FAX:+886-2-8792-9626 Email:service@quietek.com http://www.quietek.com

CE-RF

QuieTek Corporation

QTK No.: 137525R

CE

Statement of Conformity

The certifies that the following designated product

Product : MDT
Model Number : BE905A11,BE905A12, BE905A13,BE905A14, BE905A21,BE905A22, BE905A23, BE905A24
Company Name : Bolymin, Inc.

This product is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the laws of the Member States relating to Directive of 9 March 1999 of the European Parliament and of the Council on Radio Equipment and Telecommunications Terminal Equipment. For the evaluation regarding radio equipment, the following standards were applied:

RF
ETSI EN 300 440-1:V1.6.1 (2010-08)
ETSI EN 300 440-2:V1.4.1 (2010-08)
HP
ETSI EN 301 511: V9.0.2 (2003-03)
ETSI EN 301 908-1: V5.2.1 (2011-05)
EMC
ETSI EN 301 489-24: V1.5.1 (2010-10)
ETSI EN 301 489-7: V1.3.1 2005-11
ETSI EN 301 489-3: V1.4.1 2002-08
ETSI EN 301 489-1: V1.9.2 (2011-09)
EN 61000-3-2: 2006+A2: 2009 Class A
EN 61000-3-3: 2008

TEST LABORATORY

Roy Wang / Manager

The verification is based on a single evaluation of one sample of above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab. Logo.

QuieTek Corporation / No.75-1, Wang-Yeh Valley, Yung-Hsing, Chiang-Lin, Hsin-Chu County, Taiwan, R.O.C.
Tel: 886-3-5928858, Fax: 886-3-5928859, E-mail: service@quietek.com

NOTE: Only the host machine and accessories from Bolymin can be guaranteed to pass this certification.

FCC

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

The following equipment:

Product Name : MDT

Model Number : BE905A11, BE905A12, BE905A13, BE905A14, BE905A21, BE905A22, BE905A23, BE905A24

Company Name : Bolymin, Inc.

It's herewith confirmed to comply with the requirements of FCC Part 15 Rules. (Class B)
Operation is subject to the following two conditions:

(1)This device may not cause harmful interference, and
(2)This device must accept any interference received, including interference that may cause undesired operation.

The result of electromagnetic emission has been evaluated by QuieTek EMC laboratory (NVLAP Lab. Code: 200347-0) and showed in the test report.
(Report No.: QTK- 137525R-ITUSP02V02)

It is understood that each unit marketed is identical to the device as tested, and Any changes to the device that could adversely affect the emission Characteristics will require retest.
The following importer / manufacturer is responsible for this declaration:

Company Name _____

Company Address _____

Telephone _____ Facsimile : _____

Person is responsible for marking this declaration:

Name (Full name)	Position / Title
Date	Legal Signature

NOTE: Only the host machine and accessories from Bolymin can be guaranteed to pass this certification.

E-Mark

GRAND-DUCHÉ DE LUXEMBOURG

Ministère du Développement durable
et des Infrastructures
Département des Transports

L-2938 Luxembourg

SOCIÉTÉ NATIONALE DE
CERTIFICATION ET D'HOMOLOGATION
s.à r.l.

Registre de Commerce: B 27100

L-6201 Sandweiler

snch

Référence: E13*10R00*10R04*13128*00

Annexes: - Rapport Technique
- Fiche de Renseignements du constructeur

Sandweiler, le 28 novembre 2013

Communication concernant: (1)
Communication concerning:

E13

- **la délivrance d'une homologation**
approval granted
- ~~**l'extension d'homologation**~~
~~approval extended~~
- ~~**le refus d'homologation**~~
~~approval refused~~
- ~~**le retrait d'homologation**~~
~~approval withdrawn~~
- ~~**l'arrêt définitif de la production**~~
~~production definitively discontinued~~

d'un type de sous-ensemble ~~électrique~~/électronique (2) **en ce qui concerne le Règlement N° 10.**
of a type of ~~electrical~~/electronic sub-assembly with regard to Regulation N° 10.

Numéro d'homologation par type: E13*10R00*10R04*13128*00
Approval number:

Marque d'homologation: E13 10R - 04 13128
Approval mark:

1. **Fabricant (marque commerciale du constructeur):** BOLYMIN
Make (trade name of manufacturer):

2. **Type:** BE905A1
Type:

Dénomination(s) commerciale(s) générale(s): Mobile Data Terminal
General commercial description(s):

Variante(s)/Version(s): *Not applicable*
Variant(s)/Version(s):

Page 1 of 5

NOTE: Only the host machine and accessories from Bolymin can be guaranteed to pass this certification.

IP-54

METAL INDUSTRIES RESEARCH & DEVELOPMENT CENTRE

TAF Testing Laboratory 1090

REGIONAL R&D SREVICE DEPARTMENT (TAICHUNG)

NO. 25, 37TH ROAD INDUSTRIAL PARK, 407 TAICHUNG, TAIWAN, R.O.C.

TEL: +886-4-23502169 FAX: +886-4-23594799

DUST & WATER PROTECTION TEST REPORT

Page 2 of 2

1.Test according to :
IEC 60529:2003
Degrees of protection provided by enclosures (IP Code)

2.Test equipment :
(1) Dust Protection Test Equipment.
(2) Water Protection Test Equipment.

3.Test items & contents :
(1) IP5X Test: The enclosure was not connected to a vacuum pump, test time was 8 hours.
(2) IPX4 Test: Tests for protection against water- Diameter of holes 0.5, 121 holes, and duration of test is 5 minutes.

4.Results :
(1) IP5X Test: Pass.
(2) IPX4 Test: Pass.

Front view of BE905A1

Inside view of BE905A1

BE905A2

Note:(1) This report is responsible for designated samples only.
(2) Reproduction of all or parts of this report without a written approval is strictly prohibited

NOTE: Only the host machine and accessories from Bolymin can be guaranteed to pass this certification.

RoHS

SGS

Test Report

Report No.: CX/2013/C0101

BOLYMIN, INC.
5F., NO. 38, KEYA RD., DAYA DIST., CENTRAL TAIWAN SCIENCE PARK,
TAICHUNG CITY, 42881, TAIWAN

The following sample(s) was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By	:	BOLYMIN, INC.
Sample Description	:	MOBILE DATA TERMINAL
Style/Item No.	:	BE905A1 SERIES, BE905A2 SERIES
Sample Receiving Date	:	2013/12/05
Testing Period	:	2013/12/05 to 2013/12/19

==========

Test Result(s) : Please refer to next page(s).

Conclusion : Based upon the performed tests by submitted samples, the test results comply with the limits of R
materials below according to the declaration from applicant (Directive 2002/95/EC being recast b
1. GOLDEN COLORED METALLIC TUBE (No.1,6) in Table 1: Lead (Pb)
("6(c), Copper alloy containing up to 4% lead by weight" in Directive 2011/65/EU)

SGS TAIWAN LTD. SGS

Ellis Wei, Ph.D. / Supervisor
Signed for and on behalf of:
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

1/7

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ent. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

SGS Taiwan Ltd. 台灣檢驗科技股份有限公司 | 33, Wu Chuan Rd., New Taipei Industrial Park, New Taipei City, Taiwan / 新北市新北產業園區五權路33號 t

NOTE: Only the host machine and accessories from Bolymin can be guaranteed to pass this certification.

REACH

SGS

For Question,
Please Contact with SGS
www.tw.sgs.com

Test Report No. : CR/2013/C0034 Date : 2014/01/14 Page: 1 of 11

BOLYMIN, INC.
5F., NO. 38, KEYA RD., DAYA DIST., CENTRAL TAIWAN SCIENCE PARK, TAICHUNG CITY, 42881, TAIWAN

The following sample(s) was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By	:	BOLYMIN, INC.
Sample Description	:	MOBILE DATA TERMINAL
Style/Item No.	:	BE905A1, BE905A2
Sample Receiving Date	:	2013/12/10
Testing Period	:	2013/12/10 TO 2013/12/17

Test Requested : As requested by client, SVHC Screening of Candidate List (151 Items) was performed.

Test Method : SGS In-House method-RSTS-EE-SVHC-007. Analyzed by ICP-AES, UV-VIS, GC/MS, LC/MS, GC/FPD, LC/MS/DAD.

Test Result(s) : Please refer to next page(s).

Summary : According to the specified scope and analytical technique, SVHC concentrations of 117 items in the submitted product(s) are all below 0.1%. 【See note N/A*】

SGS TAIWAN LTD SGS TAIWAN

Edison

Edison Chang / Sr. Supervisor
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory – Taipei

NOTE: Only the host machine and accessories from Bolymin can be guaranteed to pass this certification.

WEEE

WEEE Directive Compliance Report

Report No.: HS1312020041A **Date: 2013/12/30**

Client： BOLYMIN, INC.
5F, No. 38, Keya Rd., Daya Dist., Central Taiwan Science Park,Taichung City, 42881, Taiwan.

Test Item：Mobile Data Terminal

Identification： BE905A1 series & BE905A2 series


Test Specification：WEEE Directive 2012/19/EU Article 11-Recovery t Targets

Test Result： All disassembling parts were fitted the requirements of WEEE Directive.

Test Laboratory：Integrated Service Technology Ltd.
Testing Location：1F, No.31, Pu-Ding Rd., Hsin-Chu City, 30072, Taiwan, R.O.C.

Jason Lee
Name of Analysis Institution

Wenston Lin
Report Review
On behalf of Integrated Service Technology

NOTE: Only the host machine and accessories from Bolymin can be guaranteed to pass this certification.

Table of Content

1 Product Overview

Thank you for choosing BE905A1, the Mobile Data Terminal (MDT) designed coming after the former BETA903A.In this new generation product, it carries more powerful CPU, larger memory capacity, more advanced and faster 3G telecom module and higher capacity battery. In addition to that, we add the water/dust proof grade of environment protection on mechanical design to endure harsh environment.

1.1 Package Content

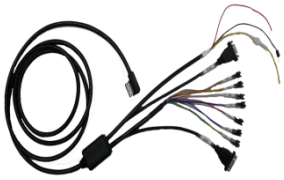
Please check your package content upon receiving the product parcels. Besides the BE905A1 unit, make sure your accessories are included as well. Note that all accessory contents in the parcel are depended on your purchase order. If it doesn't match, please contact your dealer.

NOTE: The term as "**KIT-XX**" is the serial number of all accessories. All kits could be ordered separated (optional), please contact with your dealer for further information.

	S/N : KIT-01	S/N : KIT-02
		
BE905A1	**SD Card**	**Bracket**

S/N : KIT-03	S/N : KIT-04	S/N : KIT-05
		
ActiveSync USB Cable (1.8m)	**Car Mount Holder (Glass Ver.)**	**Sun Shade**

S/N : KIT-06	S/N : KIT-07	S/N : KIT-08
		
Battery Pack	**Cigar Adapter (1.8m)**	**AC Adapter with Core**

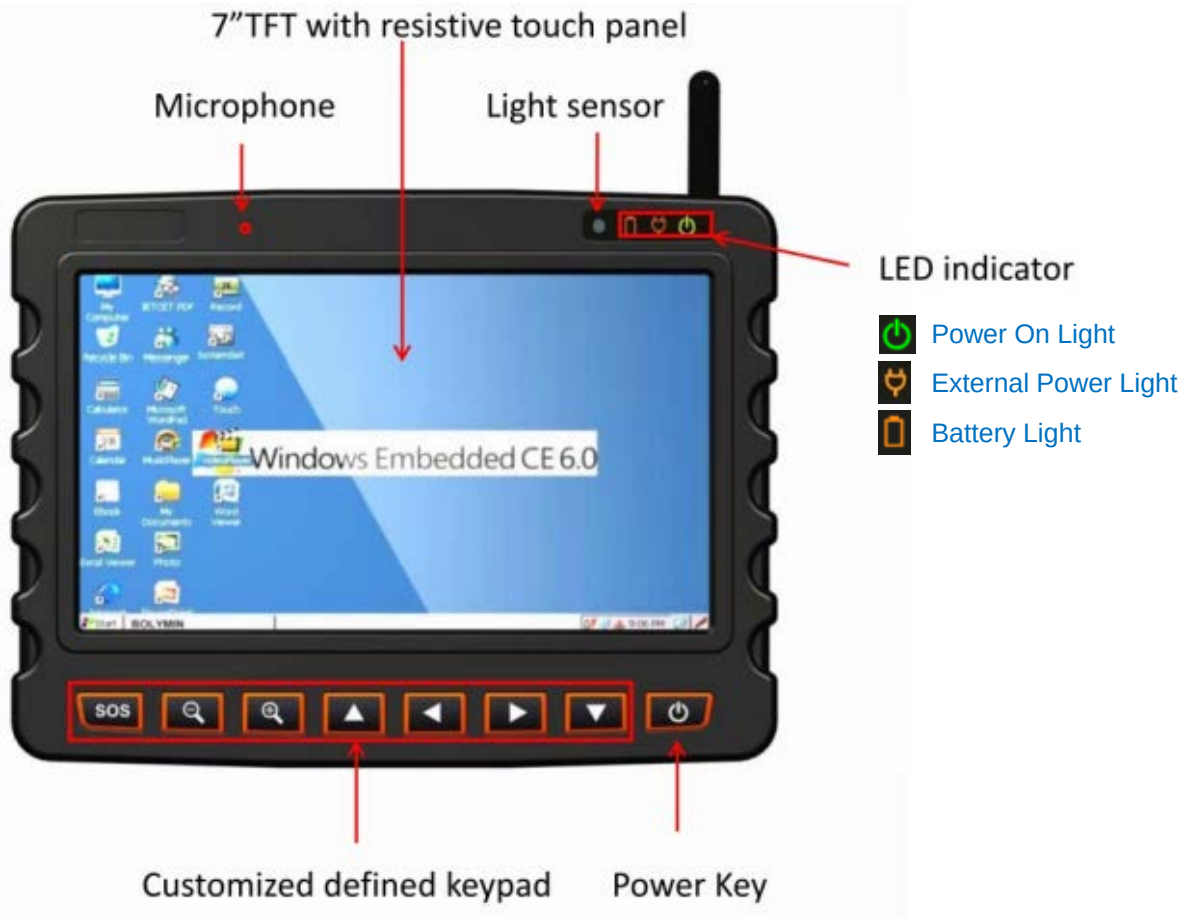
S/N : KIT-09	S/N : KIT-10	S/N : KIT-11
		
Multi I/O Cable Type 1 (2.4m)	**Multi I/O Cable Type 2 (2m) - Power Cable**	**3.5mm Single side Headset**

NOTE: Among the two product parcels you received, you should find the **SD card**、**2G/3G antenna**、**VESA75 four washers** for mounting and two **battery pack cover screws** for spare, all packed together with **BE905A1 unit** in one parcel and find the SD card storing booting OS image.

1.2 Product Profile

Product Outline

FRONT

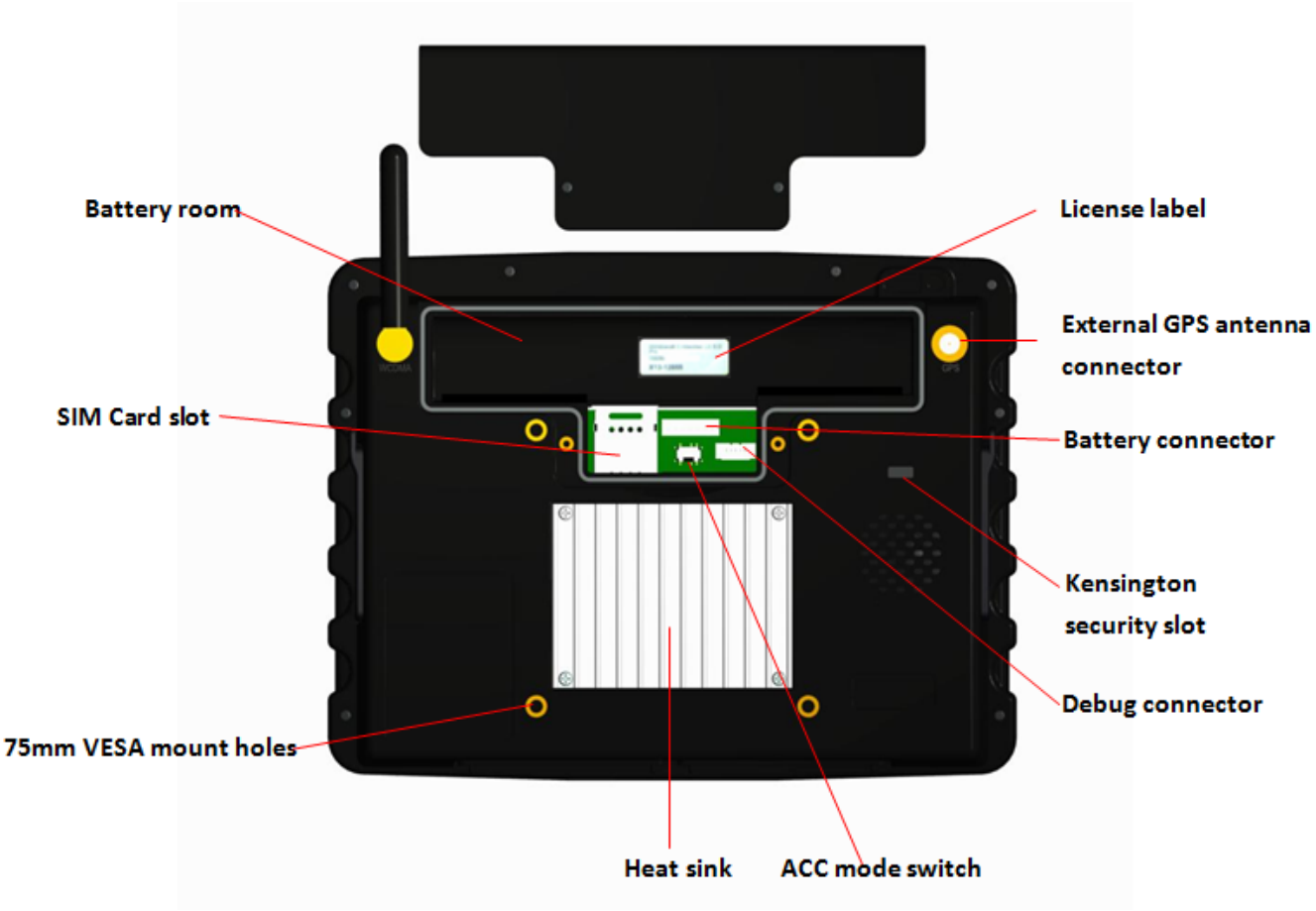


Item	Usage
Microphone	To support GSM voice communication
LED indicator	Please refer to below table for definition
Light sensor	To auto-adjust the LCD backlight
Custom keypad	7 user keys, to be defined by programming
Power key	To turn BE905A1 on/off ; To wake up OS from suspend mode by key press

The definition of LED indicator

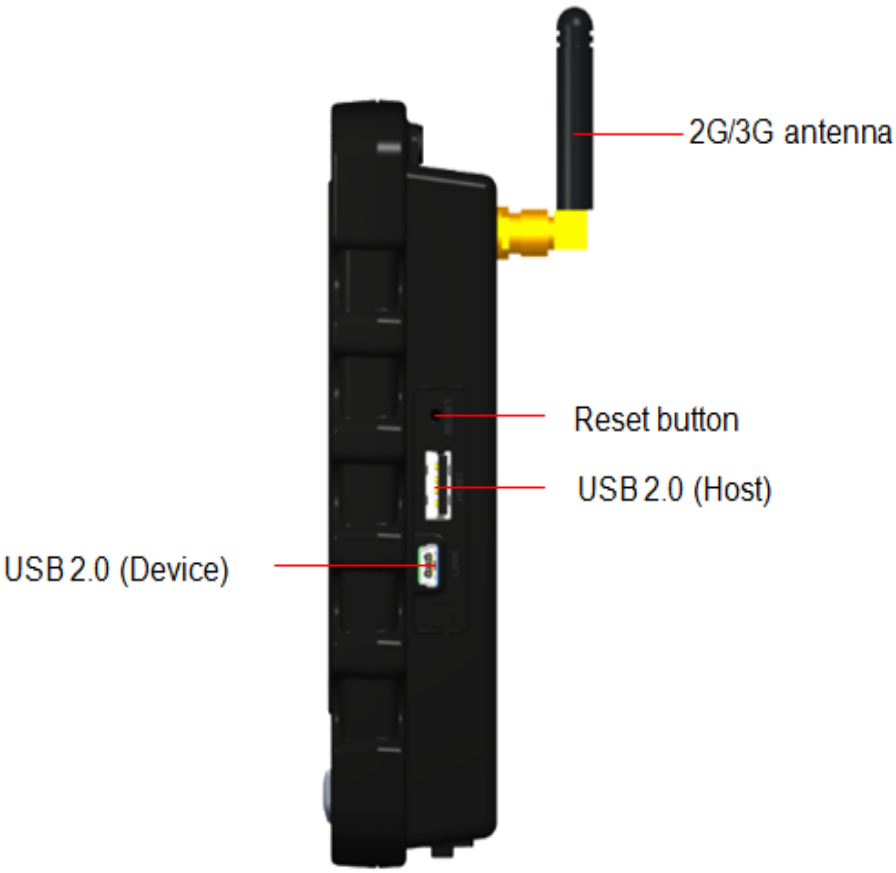
Power On Light	External Power Light	Battery Light
Green: power on **Off** : power off	**Orange** : plug-in external power **Off** : unplug external power	**Green** : battery charge completed **Orange** : battery charging **Off** : battery removed or damaged

BACK



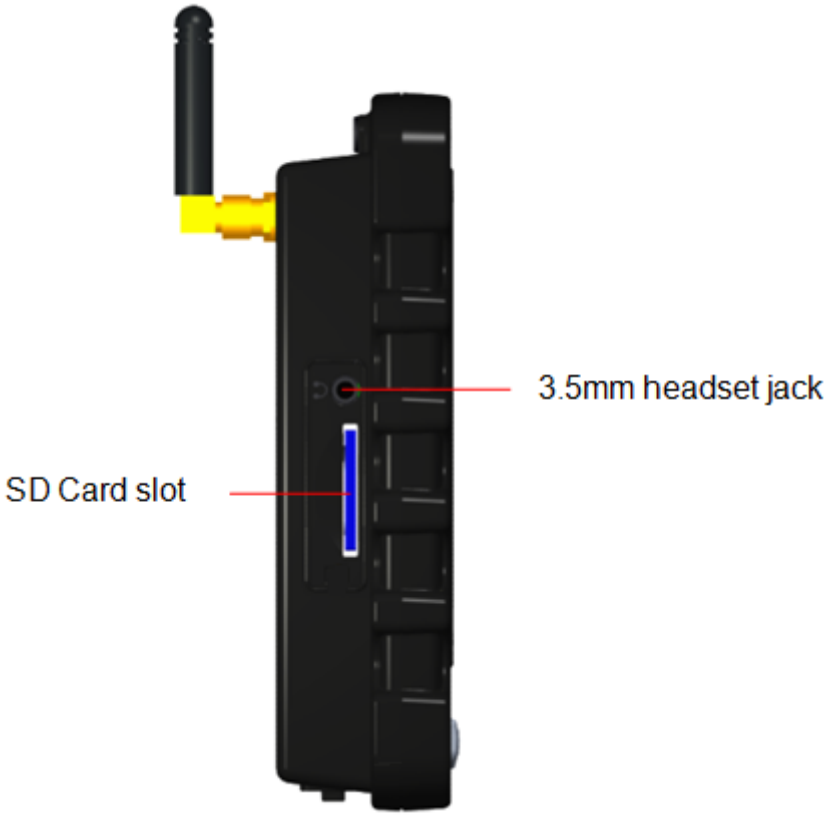
Item	Usage
Battery room	For Li-ion battery placement
Battery connector	To connect Li-ion battery and device
External GPS antenna connector	To connect external GPS antenna and device
SIM card slot	For SIM card placement
Debug connector	To connect RS232 debug kit and device
VESA mount holes	VESA75 (75mm x 75mm) holes, to screw product onto car mount or other external fixer
Heat sink	To cool the device by dissipating heat into surrounding air.
ACC mode switch	To switch ACC ignition mode to be on/off
Kensington security slot	Secured protection for anti-theft
License label	The license of Microsoft Windows Embedded CE 6.0

RIGHT SIDE



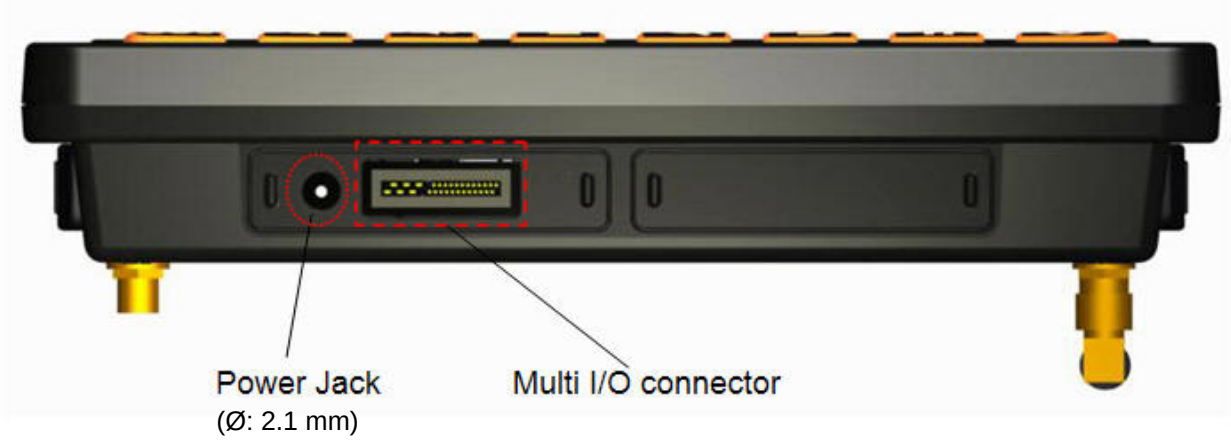
Item	Usage
2G/3G antenna	For enhancement of 2G/3G signal strength
Reset button	A hardware button to reset the device, when system hang-up or other unexpected situation occur or boot from bootable SD Card when you install a bootable SD card
USB 2.0 (Host)	To connect to peripherals such as mouse, keyboard, USB flash disk
USB 2.0 (Device)	To connect to PC for file transfer by synchronization software like Microsoft ActiveSync or Windows Mobile Device Center

LEFT SIDE



Item	Usage
SD Card slot	To accept SD/MMC card
Headset jack	To accept 3.5mm headset terminal

BOTTOM



Item	Usage
Power jack	To plug in the AC adapter or Cigar adapter, to supply power to device and charge the optional battery pack
Multi I/O connector	To connect multi I/O cable and device, for offering specific I/O ports like RS232、ADC、GPIO、CAN BUS and Power/ACC

1.3 Product Specification

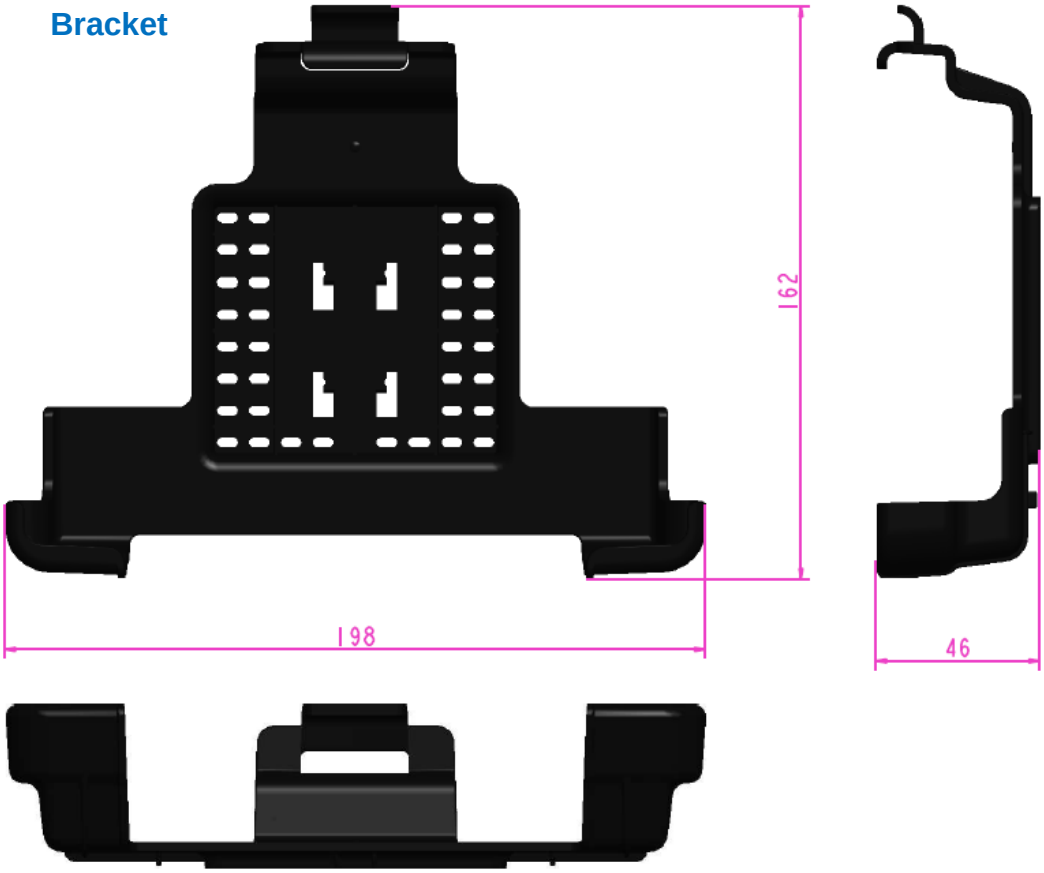
System Specification

Category	Description
Processor	1GHz 32-bit ARM Cortex-A8 Single Core CPU
System Memory	LPDDR-400 200MHz 512MB (256MB x2)
Storage Memory	eMMC 4.41 I/F 8GB
External Storage	Support SD/SDHC Push-Pull Card Slot up to 32GB
Operating System	Microsoft Windows Embedded CE 6.0
Display	● 7" Color TFT LCD 800x480 WVGA ● White LED Backlight Supported, 320 Nits Luminance ● 4-wired Resistive Touch Panel
Telecom Module	● Hexa-Band UMTS (800/850/900/1700/1900/2100 MHz) ● HSPA: HSUPA 5.76Mbps, HSDPA 7.2 Mbps ● Quad-band GSM (850/900/1800/1900 MHz) ● GPRS Class 33, CS1-CS4 107kbps ● EDGE Class 33, MCS1-MCS9 296kbps
GPS Module	50-channel Receiver Engine, -162 dBm of Sensitivity
USB	1 x USB 2.0 Host Standard Type A **/** 1 x USB 2.0 Device Mini-B
Serial Port	1x RS232C of 5-Wire UART (TX,RX,CTS,RTS,GND)
GPIO	2 x GP Input **/** 2x GP Output
ADC	2 Channel ADC of 10-bits Resolution, Voltage Ranged From 0~30V
Keypads	7 x User Defined Programmable Hotkey + 1 x Power Key
CAN Bus	1x CAN 2.0b with ISO 11898-1 protocol
Audio	● Internal 2 Watt Speaker (Mono) **/** Internal MIC ● External 3.5mm Stereo Headset Jack (Microphone/Earphone)
Power Supply	● DC 11~31V ● Internal Li-ion Battery of 2500mAh(18.5Wh)
Operation Temperature	● -20°C~+70°C(without battery)**/**-20°C~+60°C(with battery discharge) ● +2 °C~+33°C (with Internal Battery Charge Ambient)
Storage Temperature	-30 ℃ ~ +80 ℃
Humidity	90% ±5%RH, +40°C, Non-condensing
Chassis	Plastic Enclosure, Industrial Grade **/** VESA mount **/** Kensington Slot
Weight	795g (with battery) / 695g (without battery)
Dimension	190mm (W) x 144mm (H) x 35mm (D)

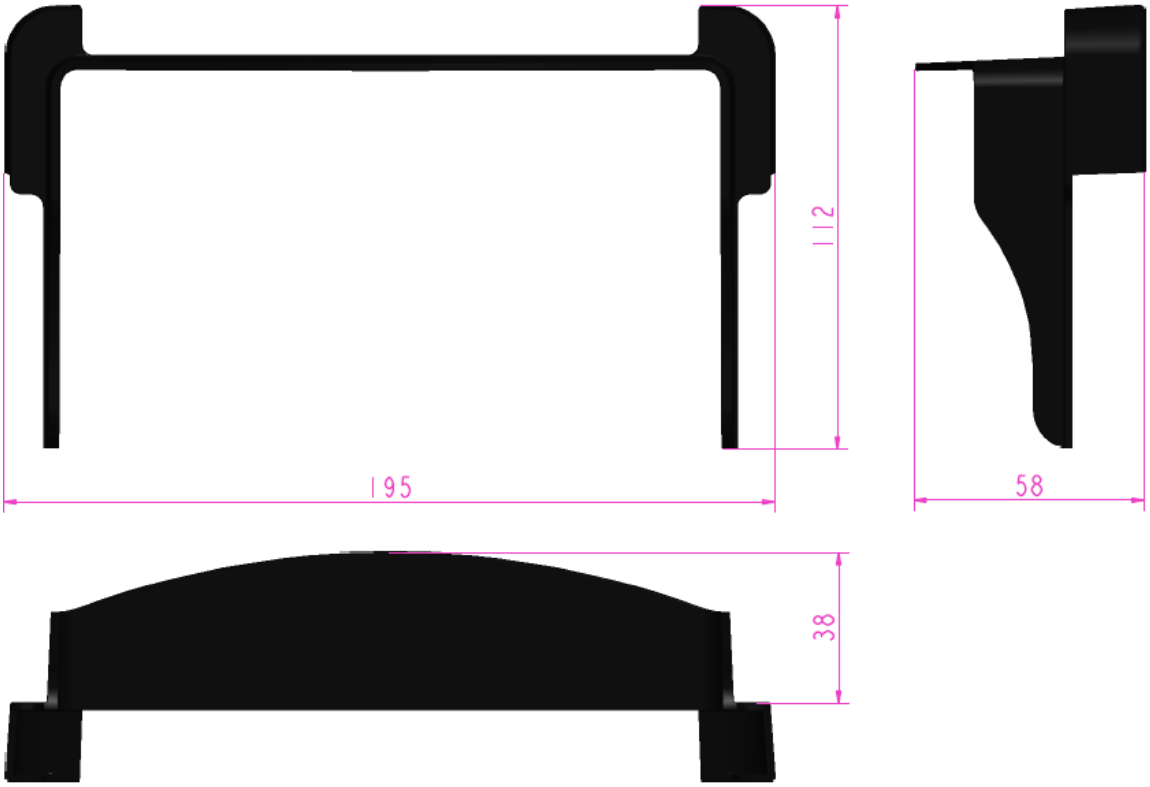
Mechanical Specification

BE905A1

Bracket



Sun Shade



1.4 Order Information

There are 4 SKUs available for your options.

SKU No.	3G module	GPS module	Remark
SKU 1	☆	☆	AGPS supported
SKU 2	☆		
SKU 3		☆	
SKU 4			

NOTE: Only SKU 1 model supports AGPS function and works well under the condition that the CN value of GPS signals must be greater than 38.

2 Getting Started

In this chapter, we'll introduce the way to power on BE905A1, attach the RF antenna to the device, install and use accessories that are available for this MDT device.

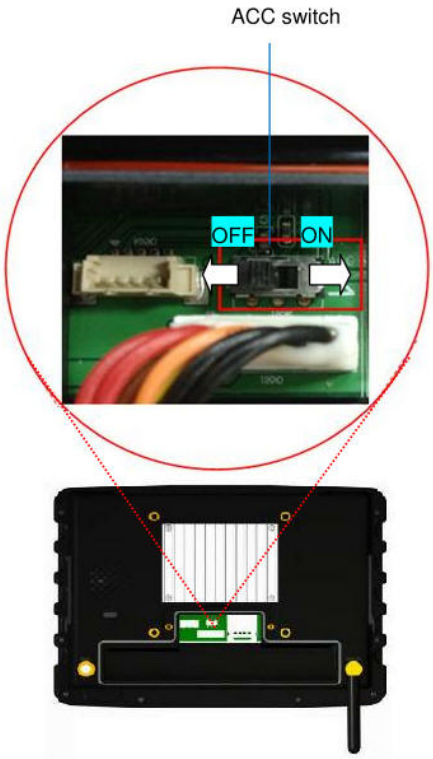
2.1 Power on BE905A1

The acceptable voltage range to power on BE905A1 is DC 11~31 Volts, so that this MDT could work almost in all kinds of vehicles. As shown in below table, there are multiple power modes available on BE905A1 from which the user can choose according to his requirement. Especially, this MDT has advanced power soft-start design so that there is no power drop when it is powered from ACC control.

Power Mode	Usage	ACC Mode
AC adapter	As illustrated on page 23. Plug in AC adapter to DC jack on BE905A1.	Switch to OFF
Cigar adapter	As illustrated on page 23. Plug in Cigar adapter to DC jack on BE905A1.	Switch to OFF
Li-ion battery	Install the battery into the battery room. See Section 2.2 for detailed description.	Switch to OFF
Car battery	By ACC ignition via Multi I/O cable. See Section 2.14 for detailed description.	ON: ignition by car key OFF: bypass car key

ACC Switch

ACC switch offers users an option to turn on/off BE905A1 by car key ignition or not.



1. **If you don't want to turn on/off the BE905A1 by car key ignition.**
   You should set the ACC switch, which is located in the battery room, to be in **OFF** position. Otherwise the device would NOT power on/off normally.
   In this option, you can supply power to BE905A1 by AC adapter, Cigar adapter or Li-ion battery.
   In this option, even if you connect car battery via Multi I/O cable, the car key ignition would bypass, that is, the device would be turned on/off only by power key.

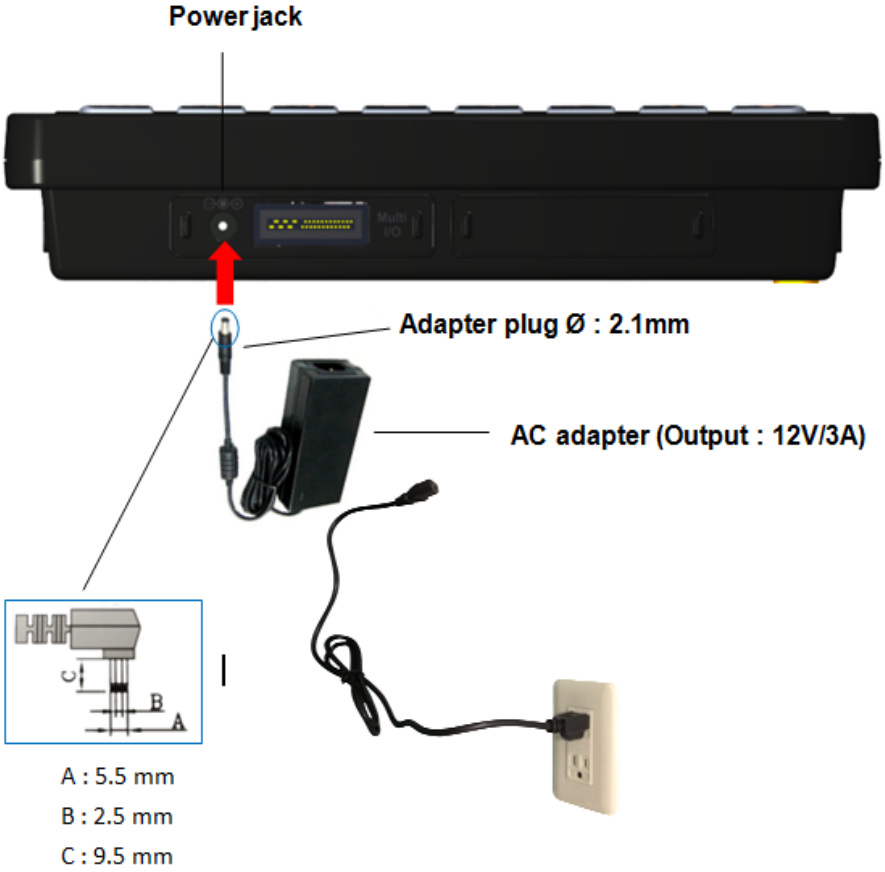
2. If you want to turn on/off BE905A1 by car key ignition

You should set the ACC switch to be in **ON** position, and supply power from car battery via Multi I/O cable. The device could then be turned on/off by car key ignition.

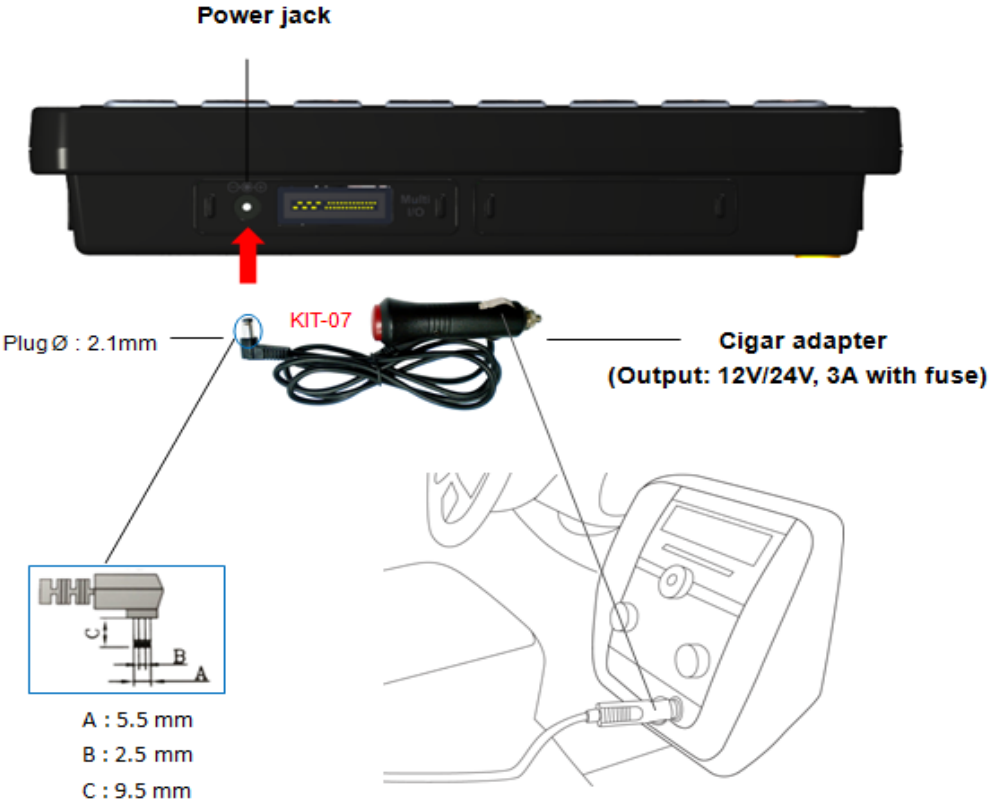
Below table shows how users can launch BE905A1 under all combinations of power source selections and ACC switch mode:

			Multi I/O Cable Used					
			YES			NO		
			Only Car BAT.	Only Li-ion BAT.	Car BAT. & Li-ion BAT.	Only DC JACK	Only Li-ion BAT.	DC JACK & Li-ion BAT.
ACC Switch ON mode	Car Key	ON	System on	System always on	1.System always on 2.Charging	System always off	System always on	System always on
		OFF	System off		1.System always on			
ACC Switch OFF mode	Power Button	ON	System on	System on	1.System on 2.Charging	System on	System on	1.System on 2.Charging
		OFF	System off	System off	1.System off 2.Charging	System off	System off	1.System off 2.Charging

Powered by AC adapter



Powered by Cigar adapter



Power Key

When you supply power to BE905A1 from DC jack via AC adapter、Cigar adapter or by Li-ion battery, the MDT will power on automatically without any key pressing at first time.

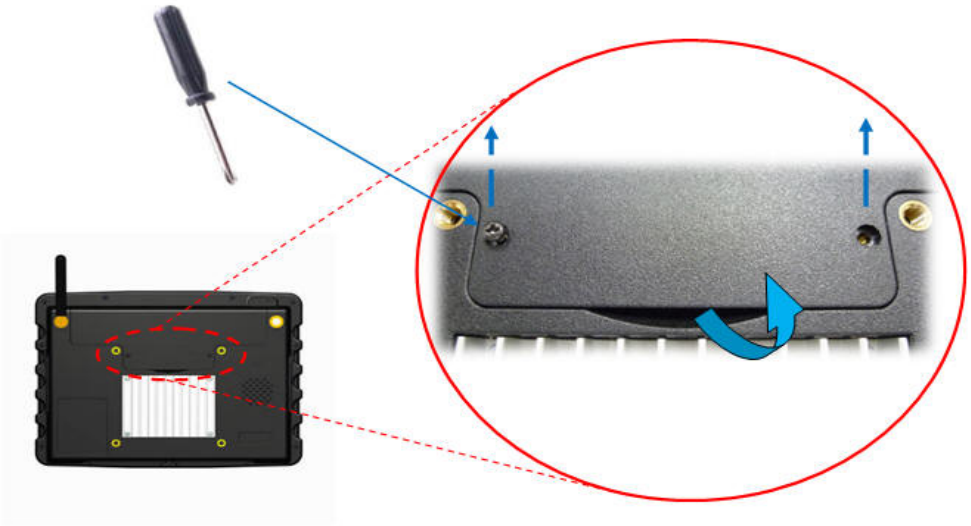
After that, **as long as the power source remains on the device**, users can turn on/off the device by the **Power Key** as illustrated below, which is the rightmost button among the Keypads at the front panel so that users don't need to remove/reinstall the power source to power off or power on the device respectively.

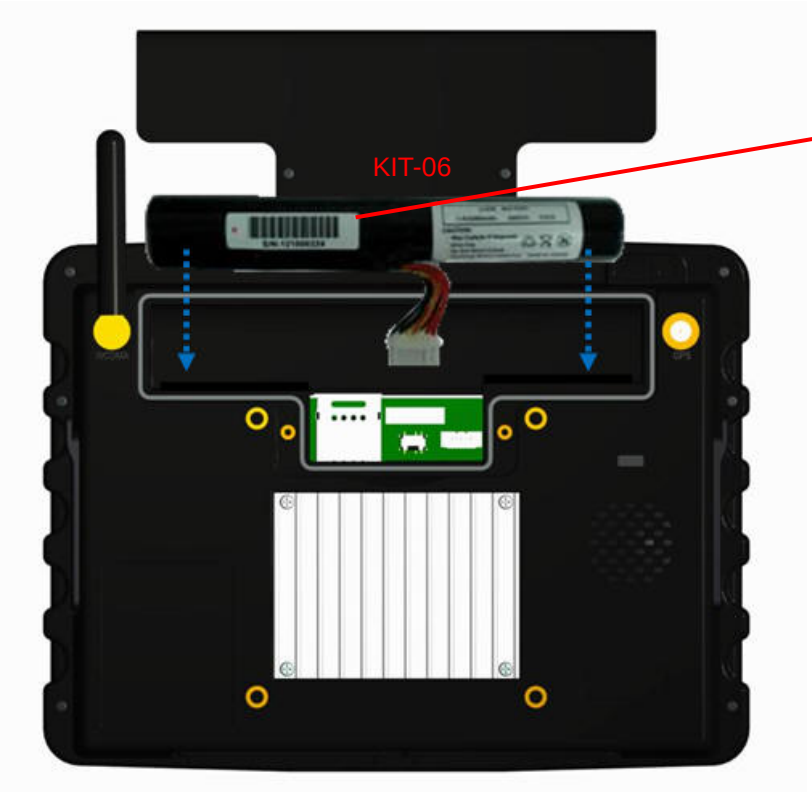
2.2 Battery Pack

Install the battery pack

To install the battery pack, first turn BE905A1 off and detach the cover of battery room on the back of the device by unscrewing the 2 screws on it, then lever the cover up from the groove. Next, attach the battery connector into the socket as indicated and place the battery pack as shown below. Place the cover back and screw it up to complete the battery installation.

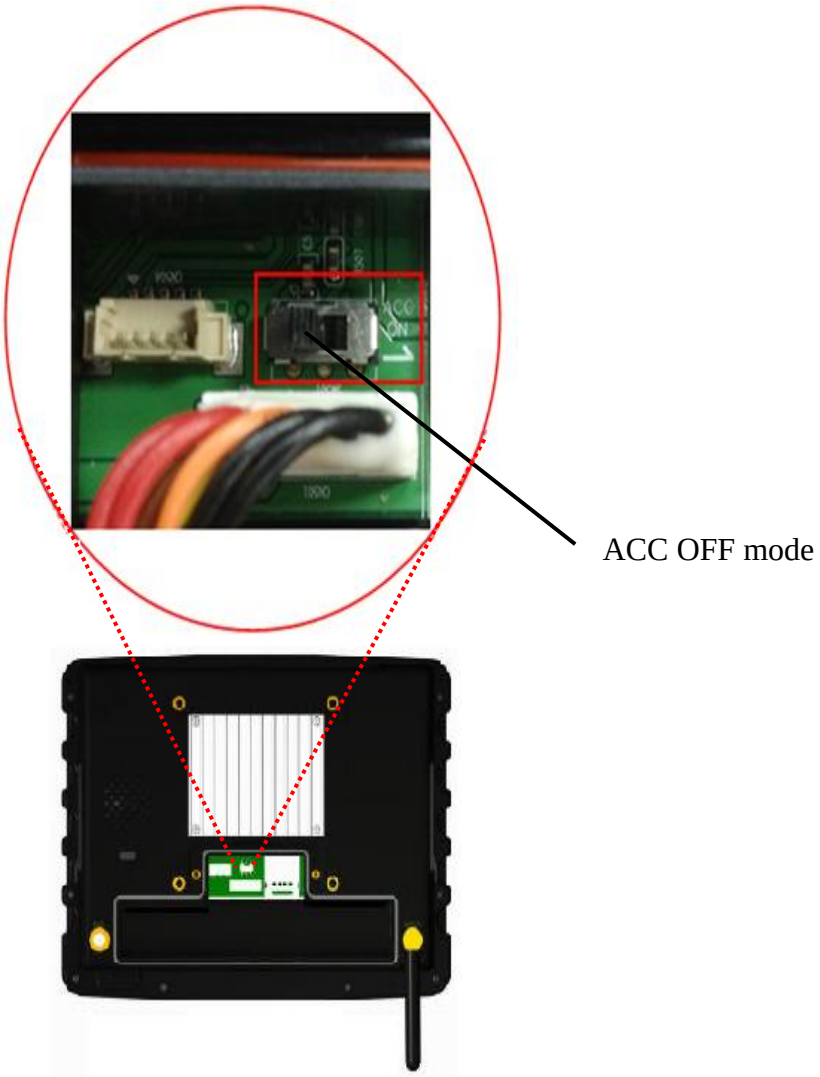
(Reminder: Please always put the barcode label face of battery pack toward the up direction and lay the battery in the battery room)





Put the barcode label side toward to the up direction

NOTE: After installing the battery pack, remember to check that you do **NOT** move the ACC switch to the **ON** position accidently during the installing process; otherwise the device would not be turned on/off normally.



Charging the battery

To charge the BE905A1, you can plug in an AC adapter into the power jack of the device and the other end into a wall outlet, or use the cigar adapter in a vehicle. When the battery is charging, the battery light indicator is orange; when the battery is fully charged, the battery light indicator is green.

NOTE: The battery cannot be charged via the USB port on BE905A1.

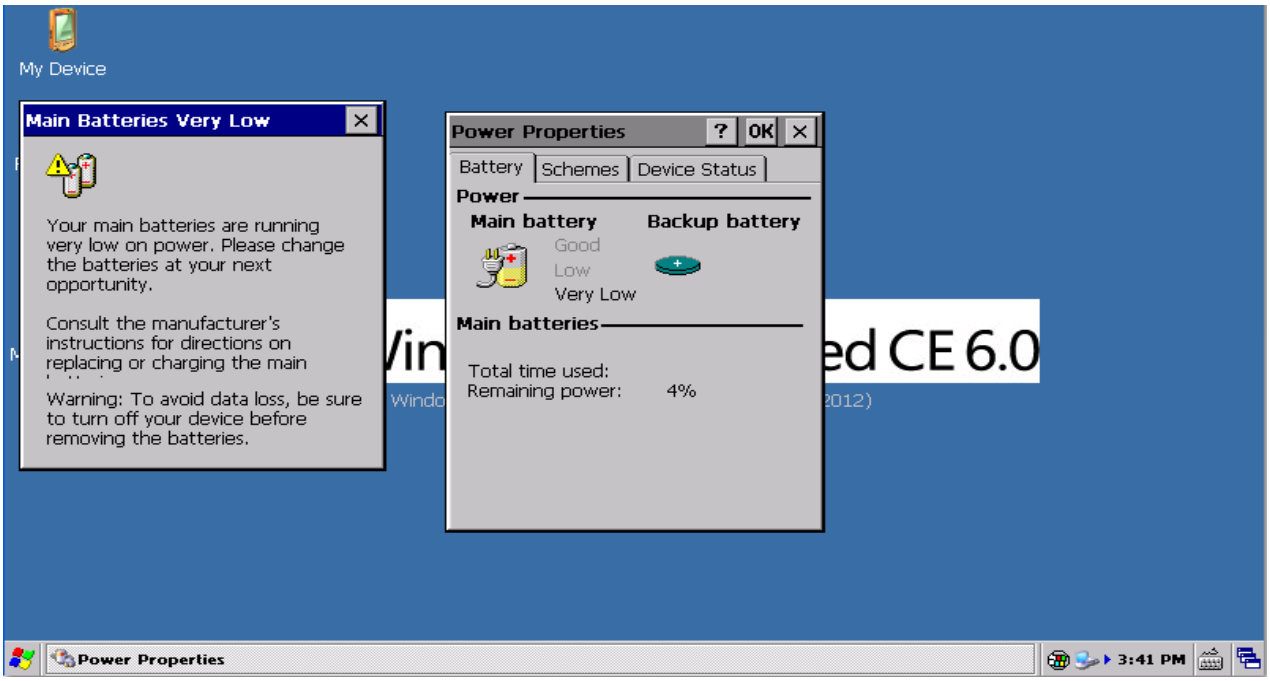
Battery Characteristics

Type	Li-ion	
Output	7.4V/2.0A	
Capacity	2500mAh (18.5Wh)	
Charger Time	About 2.5hr (from 0% to full)	
Battery Life	Full-run	1 hr
	Idle (power on)	2 hr
	Suspend	10 hr
	Shut down (power off)	480 hr
Weight	100g	

NOTE: The battery of BE905A1 should only be seen as backup in case main power fails. It's not suggested to regard it as a laptop or a smart phone battery with longer battery life.

Low-Power Alert of Battery

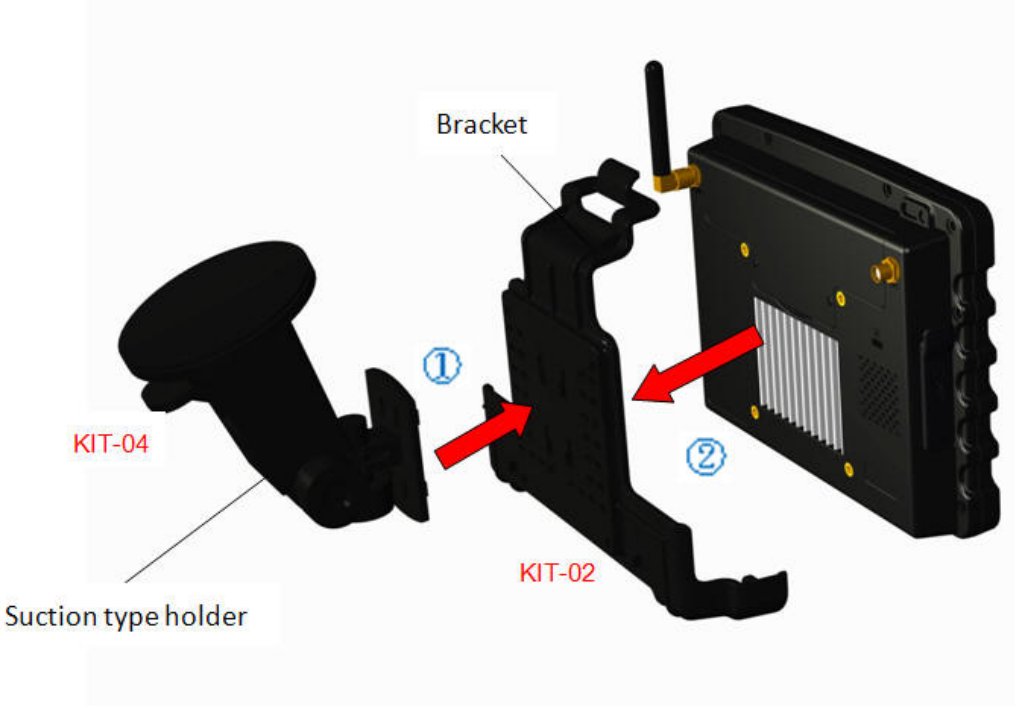
When your BE905A1 is powered only by battery, below alert will pop up, indicating to connect a charge. This alert will show up if the remaining battery power is less than **5%**.



2.3 Bracket and Car Mount

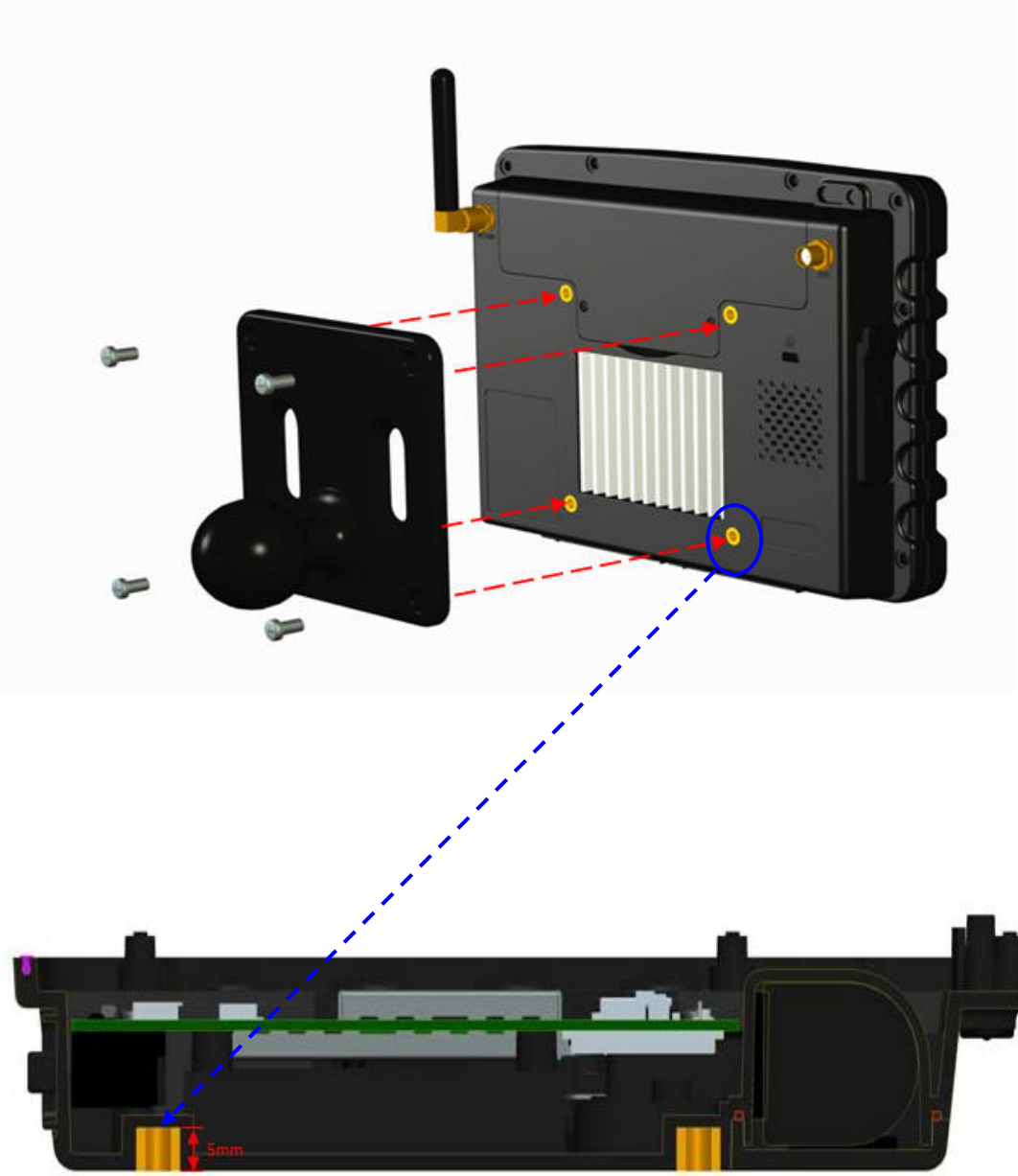
For mounting the mobile data terminal in the vehicles, users can optionally purchase the bracket and car mount, assemble BE905A1 with suction mount to the windshield or assemble BE905A1 with screw mount in center console up to user's need.

Car mount with suction version



Standard VESA mount

Besides the mounting solution as mentioned above, BE905A1 supports a standard VESA75 mount (MIS-D) 75mm x 75mm on the chassis of backplane so that users can combine their preferred VESA75 design bracket with MDT. Also, the depth of the screw hole is 5mm.



If the diameter of screw hole in your VESA mount holder is larger than the insert nut of BE905A1 VESA. You have to use these four washers attached in the parcel to prevent the insert nut to be pulled up to cause damage.

Place washer on the insert nut if needed

Here we provide the store information of mounts of VESA 75mm for your reference.

1. RAM MOUNTS: http://www.rammount.com
2. Related VESA 75mm mounts list:

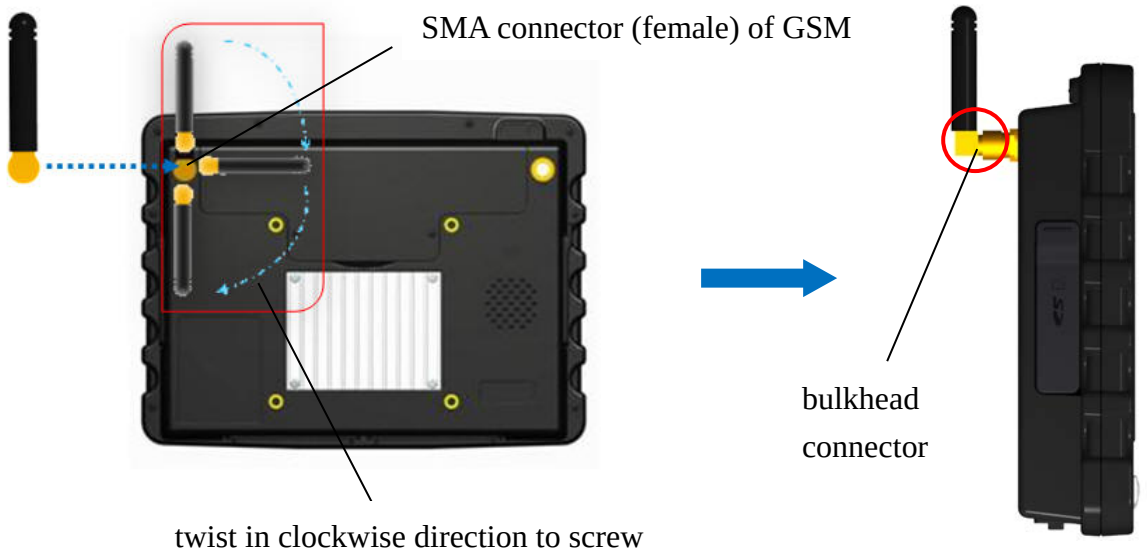
http://www.rammount.com/SearchResults/tabid/38/searchBy/description/criteria/0860690830650320550 53/Default.aspx

2.4 Sun Shade

The purpose of the sun shade is to reduce the glare of sunlight that may cause the LCD screen difficult to be read in the car. To install the sun shade, be noted to remove the bracket first if it's been attached.

2.5 2G/3G Antenna

To attach the 2G/3G antenna to the BE905A1 device, plug the antenna jack into the SMA connector on the device, then screw the antenna by twisting the base of antenna in a clockwise motion gently until it is tight and cannot be turned any further. To detach the antenna, grip the antenna bulkhead connector and twist smoothly counterclockwise to unscrew it from the device.



NOTE: The 3G signal quality may differ according to the cellular network of your mobile carrier.

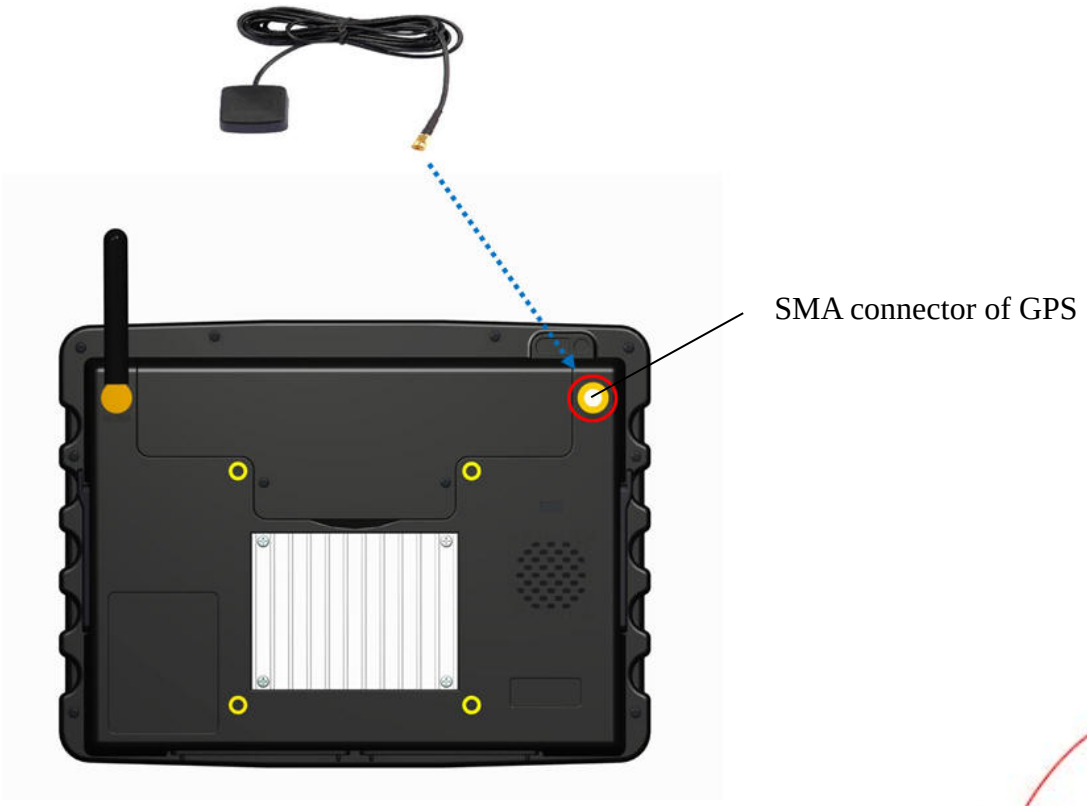
NOTE: The antenna connector of GSM and GPS is the same as SMA type. Please note that the left side is for GSM module and the right side is for GPS module from the back view.

NOTE: When screwing the antenna into the device, please force gently to prevent breaking it.

2.6 External GPS Antenna

In case better GPS signal reception is required or the solar window film is used in vehicle, an external GPS antenna with SMA connector will be required. Please connect it to BE905A1 as indicated. Please do stretch the antenna outside the car or outdoors with clear line of sight.

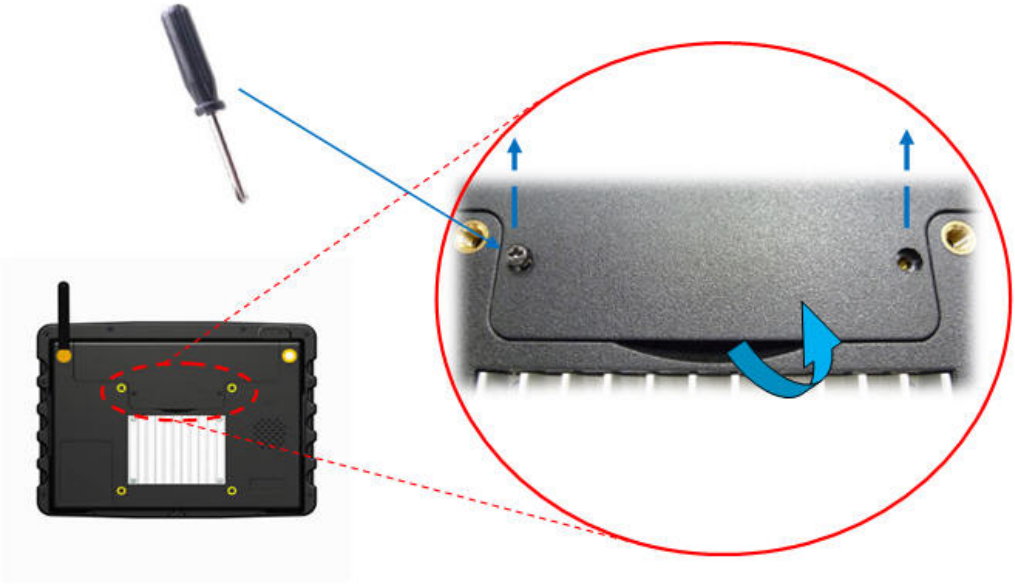
To install the antenna, just plug the antenna jack with force into the SMA connector on the device.

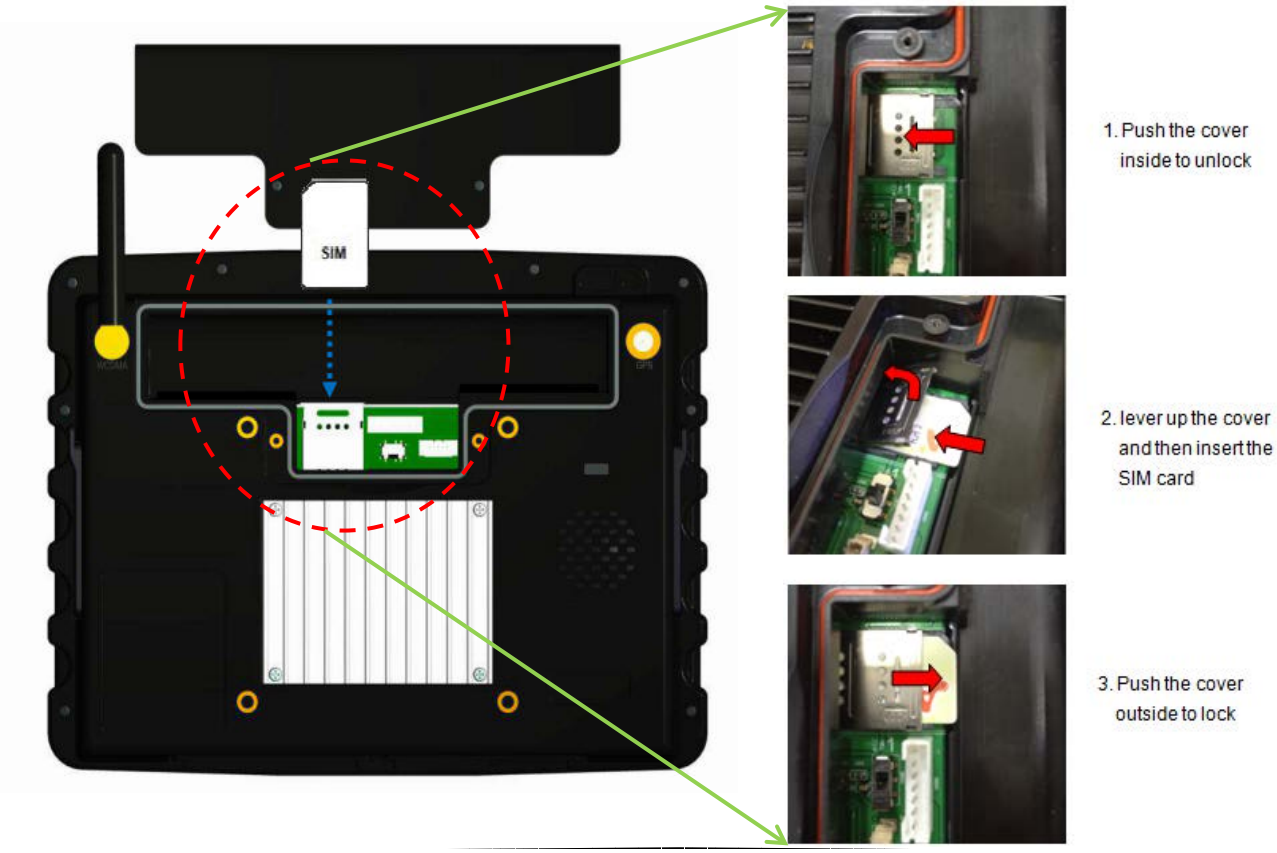


2.7 SIM Card

IMPORTANT: To install a SIM card, please turn your BE905A1off first and then remove battery pack in advance.

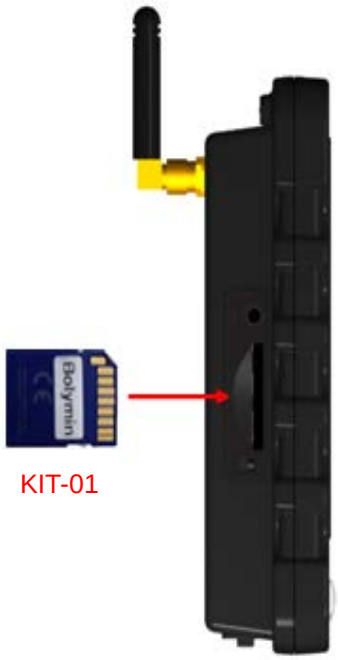
To install the SIM card, firstly detach the cover of battery room on the back of the device by unscrewing the 2 screws on it, and then lever the cover up from the groove. Secondly, gently push the SIM holder outwardly to loose it, slide the SIM card into the slot by aligning the notch of SIM card with that on the SIM slot to match corners. Thirdly, push the SIM holder inwardly to tighten it. Finally, place the cover back and screw it on to complete the SIM card installation.





2.8 SD Card

As illustrated below, plug the SD card into the slot after lifting the rubber cover. Users can see a card icon on the rubber cover showing the correct position to put the SD card to the slot. Also be noted, to remove the SD card, first make sure the SD card is not in the process of reading/writing, then press a firm push on the card to pull it out.



IMPORTANT: Below table lists the SD card that has been verified OK for BE905A1 prior to this user manual release.

BE905A1 SD Card QVL	
Brand	**Specification**
KINGMAX	● 16GB class 6
KINGSTON	● 32GB class 10
PRETEC	● 8GB class 10
SANDISK	● 1GB ● 4GB class 4 ● 8GB SDHC class 4
TOSHIBA	● 16GB class 10
TRANSCEND	● 2GB ● 4GB class 2 ● 16GB class 4

2.9 Reset Button

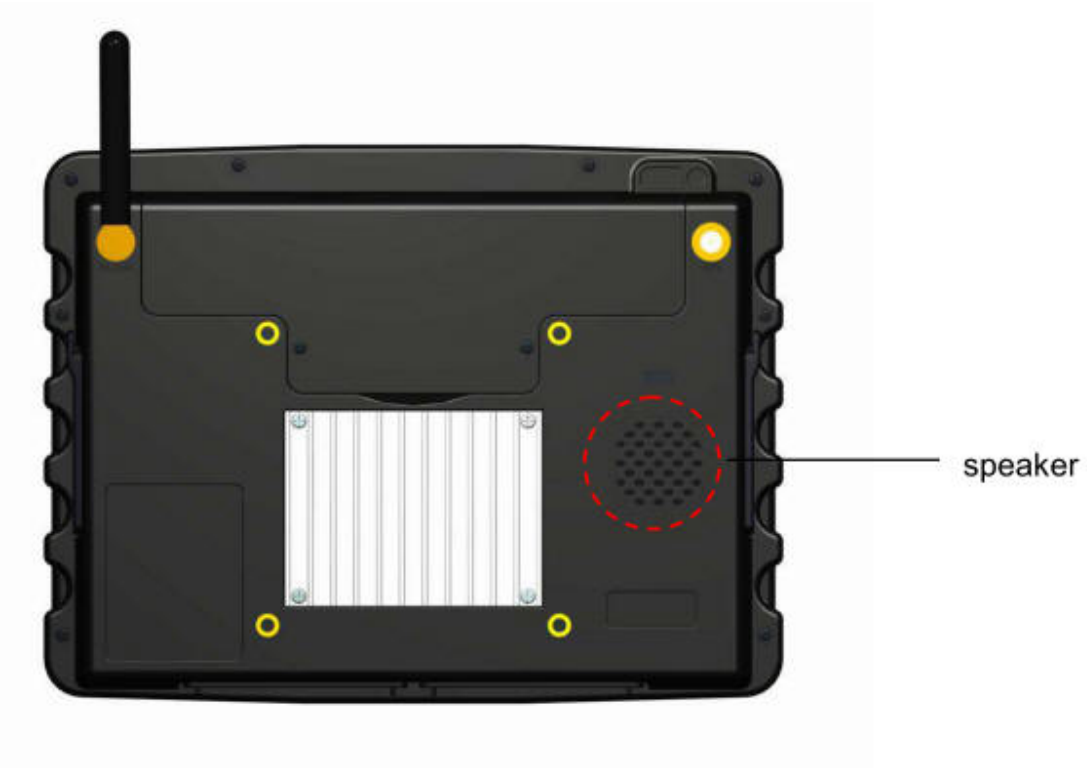
The reset button is used to reset the BE905A1 in case the device is halted somehow or boot from bootable SD Card when you install a bootable SD card.

To enable this function, please find a pin-like object or straightened paper clip, push into the reset hole, then press gently and remove it.

2.10 Audio

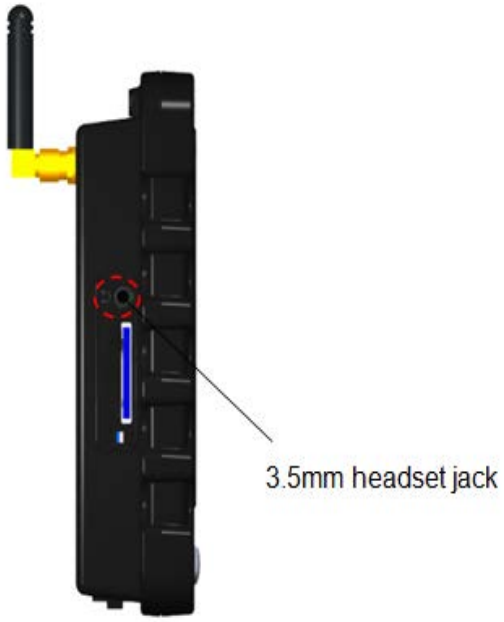
Internal speaker and microphone

The BE905A1 provides an integrated 2 Watt mono. speaker located on the back of the device. The speaker is connected to the platform audio CODEC that can output a maximum volume of 88dB. Also on the top of the front, there is a built-in mono. microphone which can be used to support hands-free voice communication.



Headset jack

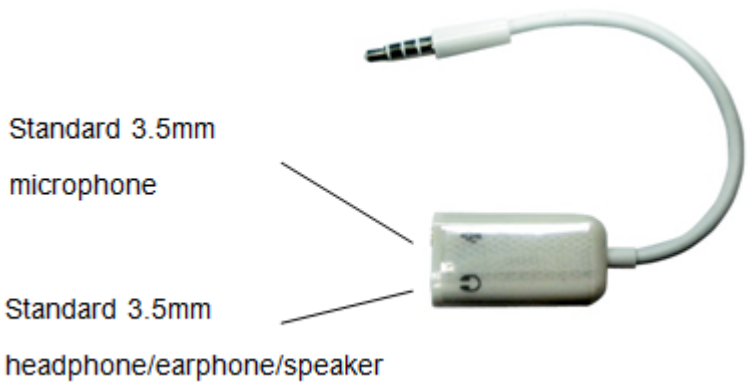
One 3.5mm headset jack is designed on the left side of the device for plugging a wired headset to use in privacy. Once a headset is plugged into the jack, the audio output path will automatically switch to the headset by default. For developers, they can programmably change the output path via API. (Please refer to the section "**Description of GPIO control functions**" in the BE905A1 programming guide).

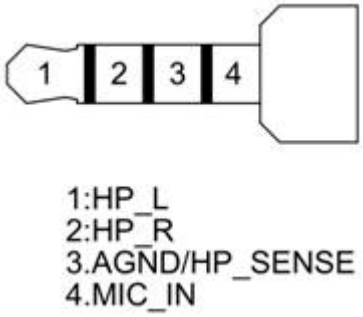


KIT-11

Headset splitter cable

If users use headsets (KIT 11) to connect to BE905A1, some of them may encounter the performance works inappropriately for hand-free voice communication. In this case, we suggest using the headset splitter cable and your favorite headset to solve the problem.





Here list the recommended microphone specification when you try to find other one in BE905A1:

- Microphone Sensitivity: -58±3dB (0Db=1V/ubar)
- Speaker Normal Impedance: 32Ω±15% at 1K Hz
- Output S.P.L. :120dB±3dB
- Input Power: Rated - 2mW, Maximum -10mW
- Frequency Response: 20~20,000Hz

2.11 Multimedia

In Windows CE 6.0 core version, no multimedia player related software is included by default. To verify the executable audio/video format supported on BE905A1 platform, you could use the 3rd party media player to test it. Here we suggest to uses **TCPMP**(The Core Pocket Media Player) to run some multimedia files. Below table shows the file formats verified.

Below table lists the supported audio/video file formats that can run on **TCPMP** player.

Type	Supported File Format
Audio	AAC-HE, AAC-LC, G.711, MP3, WMA
Video	H.264, JPEG, MPEG2, MPEG4

In Windows CE 6.0 profession version, the built-in Windows Media Player supports following codec (extracted from MSDN website).

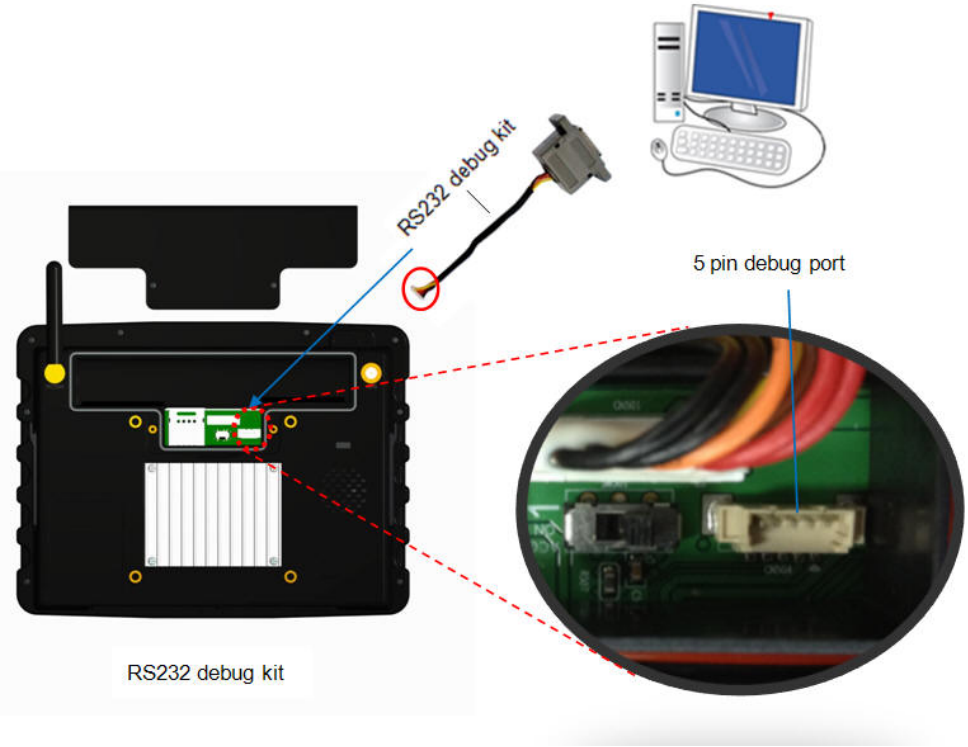
Type	Supported File Format
Audio	• Microsoft Pulse Code Modulation (PCM) • Microsoft GSM 6.10 Audio (GSM 610) • Microsoft CCITT G.711 A-Law and u-Law • Microsoft Adaptive Differential Pulse Code Modulation (MS ADPCM) • Fraunhofer MPEG-1 Layer 3 (MP3) • Interactive Multimedia Association Adaptive Differential Pulse

	Code Modulation (IMA ADPCM) • Microsoft MPEG-1 Layer 1 • Microsoft MPEG-1 Layer 2 • MPEG-1 Layer 3 (MP3) (sampling rates of 32 kHz, 44.1 kHz, and 48 kHz) • MPEG-2 Layer 3 (MP3) (sampling rates of 16 kHz, 22.05 kHz, and 24 kHz) • Fraunhofer Extension MPEG-2.5 (MP2.5) (sampling rates of 8 kHz, 11.025 kHz, and 12 kHz) • Windows Media Audio (WMA) v2, v7, v8, v9 The following table shows the specific levels of support for Windows Media 9 Series audio decoders.
Video	• Microsoft MPEG-1 (MS MPEG-1) • Microsoft RLE8 • Microsoft MPEG-4 v2, v3, ISO v1 • Windows Media Video (WMV) v7, v8, v9 (including Windows Media Video 9 Image) The following table shows the specific levels of support for Windows Media 9 Series video decoders

2.12 RS232 Debug Kit

About debug kit

What if you fail to start the BE905A1 system while power is on? It may be hardware problems or OS problems. We offer a debug port on the device for developers to connect it to your PC via a RS232 debug kit in order to dump the boot messages to your PC to diagnose the root cause. On PC side, you can directly connect this RS232 debug kit to PC COM port or connect to each other by a USB-to-R232 cable. Please refer to the below pin assignment table of debug board to ensure the opposite connector at PC side to make the connection work normally.



DB9 Female Pin Assignment of Debug Board

PORT	No	Description
Debug Port Female	1	NC
	2	TX
	3	RX
	4	NC
	5	GND
	6	NC
	7	NC
	8	NC
	9	NC

Dumping boot message of BE905A1

When connecting BE905A1 to PC via debug kit, you should run a terminal emulation program (e.g. Hyper Terminal or Putty) on PC side to show the boot message from BE905A1.

As to the related setting and usage, please refer to Appendix A - Dump Boot Message from BE905A1 for more details.

IMPORTANT: If your BE905A1 fails to start normally, you can capture the boot messages and forward boot messages to technical support for diagnosis.

2.13 USB Interface

BE905A1 offers two USB 2.0 interfaces - USB Host port and USB Device port, located on the right side of the device. The USB Host port by standard type A receptacle, compatible with USB 2.0/1.1 device, can be used to connect mouse, keyboard or USB flash disk. As to the USB Device port by type mini-B receptacle, it can be used to connect to PC with Windows OS to transfer files between each other. For communication with PC, please refer to Section 3.4 for more descriptions.

NOTE: If you want to connect external USB camera to BE905A1, please use USB Host. But it's required to install corresponding USB camera driver, released from the camera vendor, compatible for Windows CE 6.0.

IMPORTANT: Below table lists some USB I/F peripherals that has been verified OK for BE905A1 prior to this user manual release.

BE905A1 USB I/F Peripherals QVL	
Peripheral Devices	**Brand/Model**
Wired Keyboard	ACER KU-0760
Wired Keyboard	Logitech Y-UR83
Wired Optical Mouse	ACER SM-9020B
Keyboard + Mouse	Logitech Wireless Combo MK260

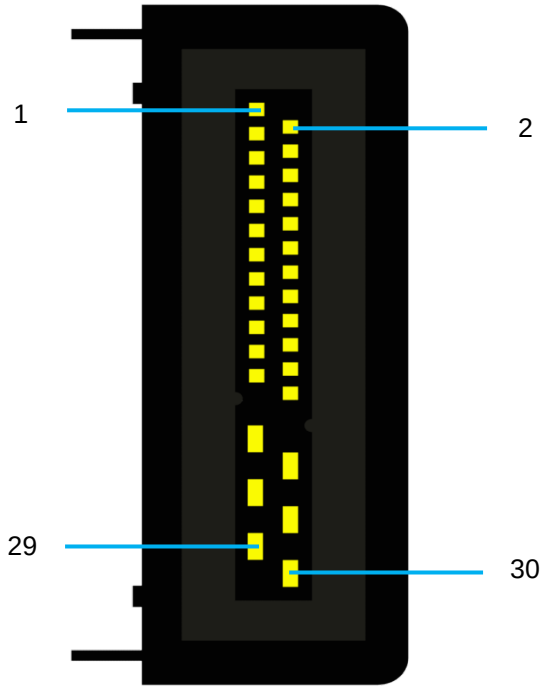
2.14 Multi I/O Connector and Cable

In order to provide a variety of featured interfaces that can lead to specific applications on BE905A1, one 30-pin multi I/O connector is offered on the bottom side of the device. By attaching a multi I/O cable of around 2.4 meter length to the connector could extend the connectivity to other peripheral devices for this MDT.

From below pictures, users can see the multi I/O connector and cable that are combined with power cable, RS232 cable, ADC、GPIO interfaces and CAN BUS port.

Multi I/O Female Connector

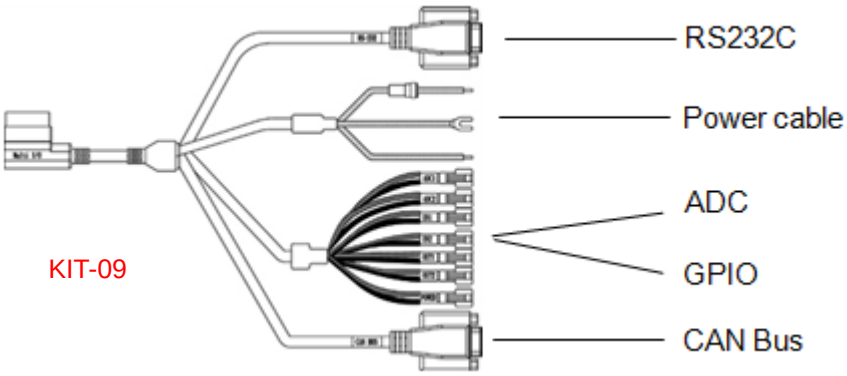
Pin Assignment of Multi I/O Female Connector



1	CTS3	2	RTS3
3	TXD3	4	RXD3
5	GND	6	GND
7	ADC_IN1	8	GND
9	ADC_IN2	10	GND
11	GND	12	GND
13	CANH	14	CANL
15	GND	16	GND
17	IN1	18	GND_GPIO
19	IN2	20	GND_GPIO
21	OUT1	22	GND_GPIO
23	OUT2	24	GND_GPIO
25	+30VAL_GPIO	26	ACC
27	+DCIN	28	+DCIN
29	GND_+DCIN	30	GND_+DCIN

UART ADC CAN GPIO Power

Multi I/O Cable Connector

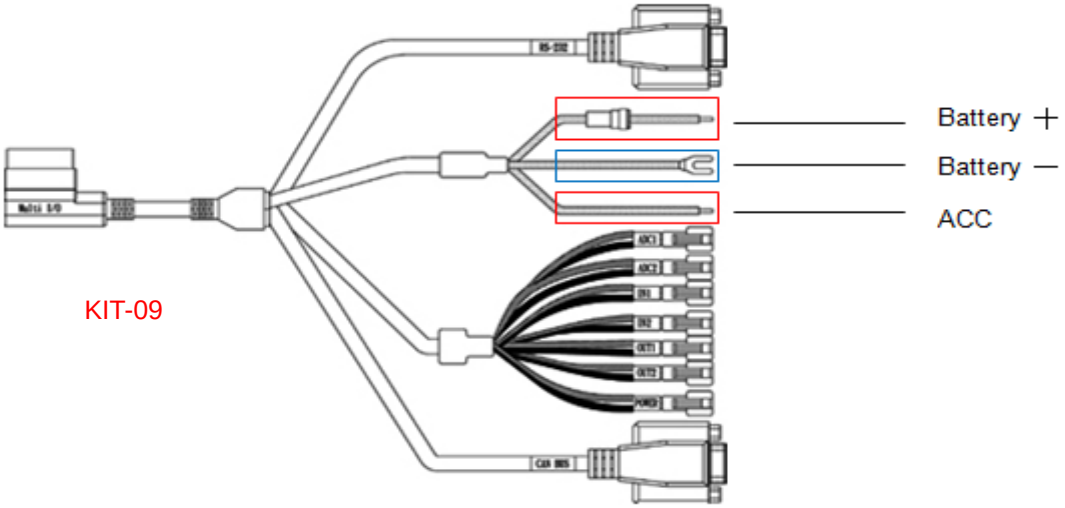


Pin Assignment of Multi I/O Cable Connector

MULTI-IO PIN TABLE			
PORT		No	Description
RS-232 Male		1	NC
		2	RX
		3	TX
		4	NC
		5	GND
		6	NC
		7	RTS
		8	CTS
		9	NC
CAN BUS Male		1	NC
		2	CANL
		3	GND
		4	NC
		5	NC
		6	NC
		7	CANH
		8	NC
		9	NC
ADC	ADC1	1	ADC IN (DC 0~30V)
		2	GND
	ADC2	1	ADC IN (DC 0~30V)
		2	GND
GPIO	GPIO IN1	1	IN1
		2	GND
	GPIO IN2	1	IN2
		2	GND
	GPIO OUT1	1	OUT1
		2	GND
	GPIO OUT2	1	OUT2
		2	GND
	GPIO POWER	1	GPIO POWER (DC 5~30V)
		2	GND
Car Power	ACC	Red	ACC
	POWER+	Yellow	POWER INPUT +12V/+24V
	POWER-	Black	POWER GND

Power Cable

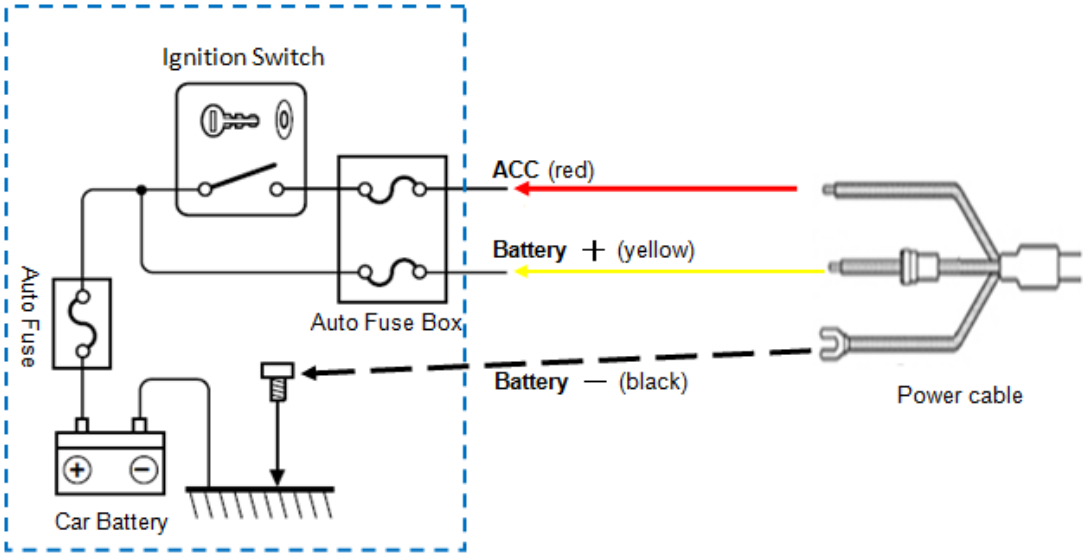
As illustrated below, they are the power cables among the multi I/O cable where the yellow wire is "**Battery ＋**", the black wire is "**Battery －**" and the red one is "**ACC**".



MULTI-IO PIN TABLE			
PORT		No	Description
Car Power	ACC	Red	ACC
	POWER+	Yellow	POWER INPUT +12V/+24V
	POWER-	Black	POWER GND

Connect Power Cable to Car Battery

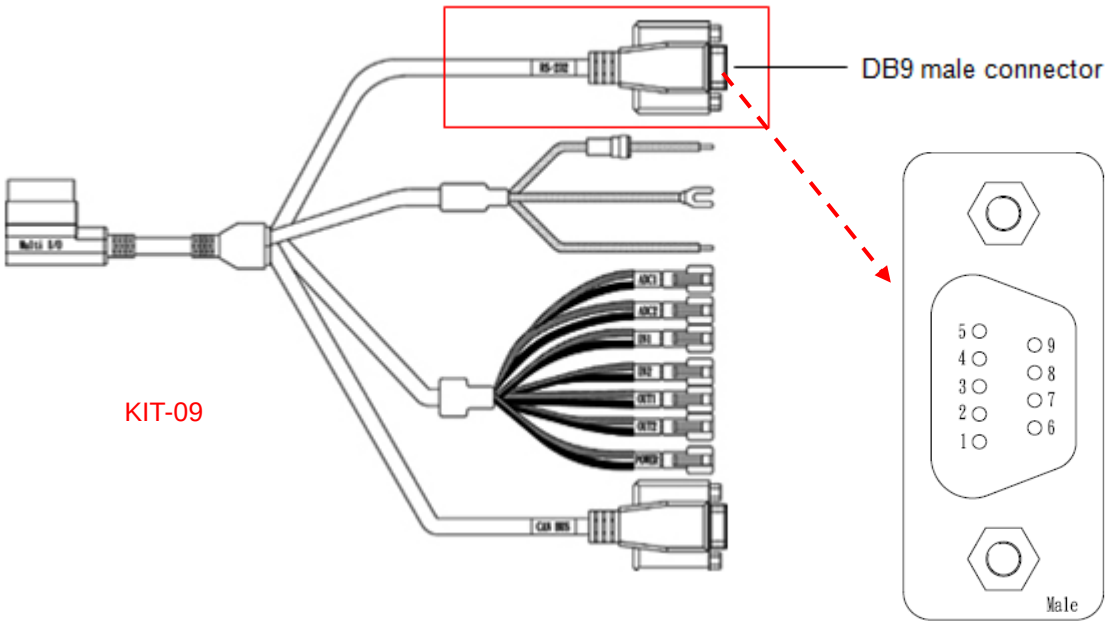
Below diagram illustrates the principle to connect power cable to the car battery.



NOTE: If you want to connect power supply from the Auto Fuse Box of your vehicle via the power cable, please consult your automaker or car dealers about the correct usage on Auto Fuse Box.

RS232 Cable

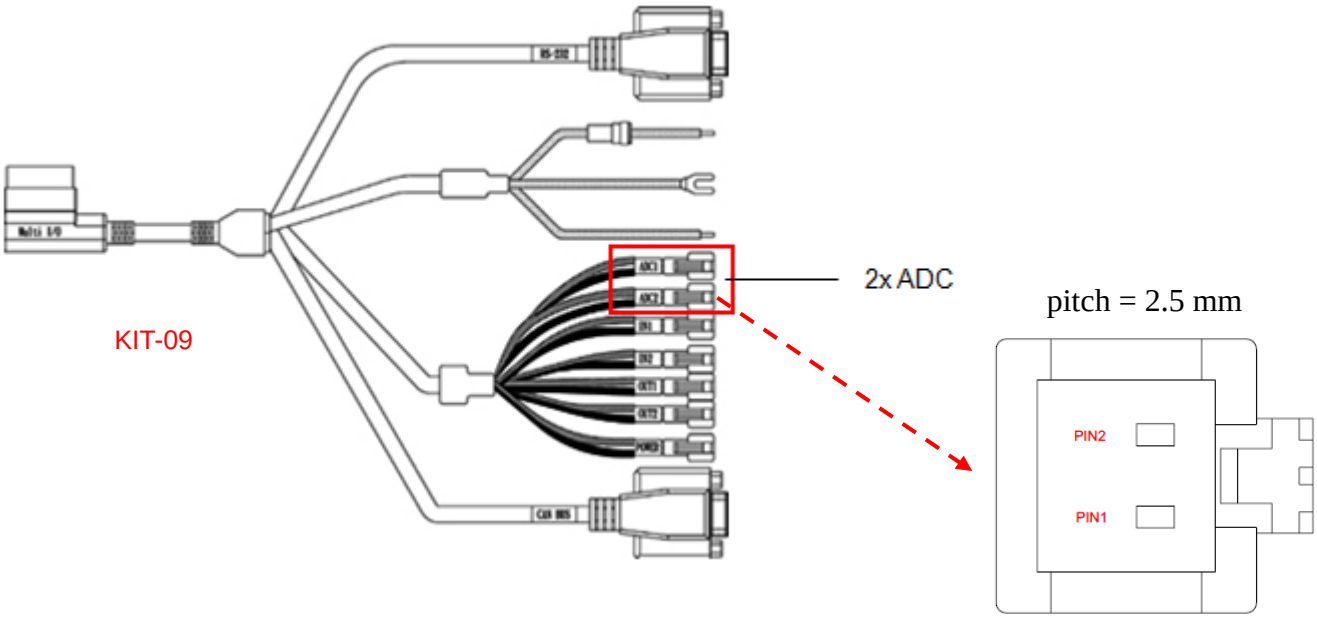
A cable marked RS232 can be used to connect from BE905A1 to peripheral devices with serial port interface like barcode reader or sensor modules with URT from BE905A1. Below table lists the pin-out definitions of this RS232 interface. To verify the functionality of this interface, we provides a test utility for developers. Please refer to Section 4.1 for more details.



PORT	No	Description
RS-232 Male	1	NC
	2	RX
	3	TX
	4	NC
	5	GND
	6	NC
	7	RTS
	8	CTS
	9	NC

ADC Interface

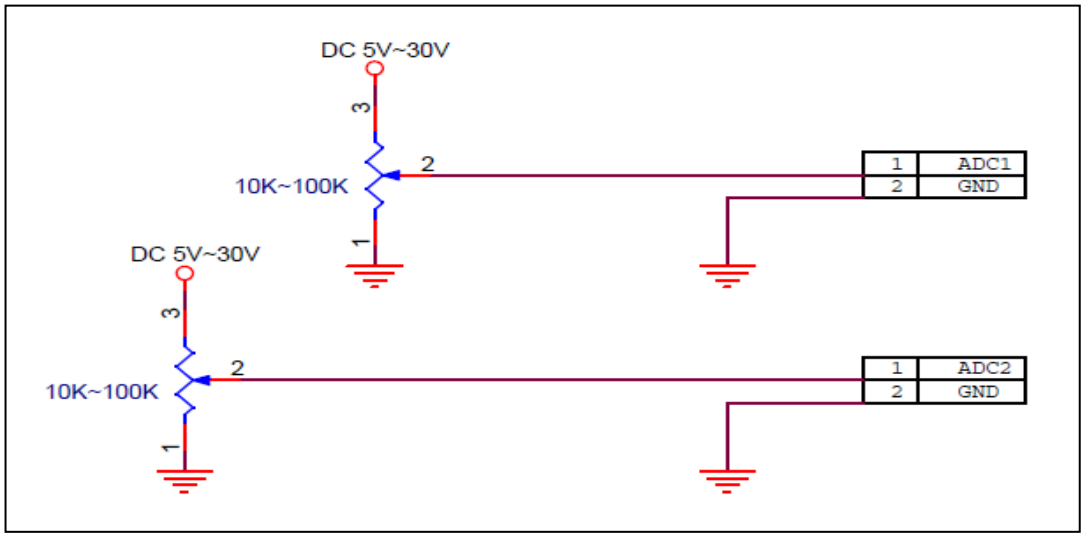
BE905A1 offers 2 ADC channels as illustrated below. Below table lists the pin-out definitions of this interface. To verify the functionality of this interface, we provide a test utility for developers. Please refer to Section 4.6 for more details.



MULTI-IO PIN TABLE			
PORT		No	Description
ADC	ADC1	1	ADC IN (DC 0~30V)
		2	GND
	ADC2	1	ADC IN (DC 0~30V)
		2	GND

Please also be noted that, before the testing you need to make a hardware ADC board by yourself and connect it to the JST male connector (**JST SMR-02V-B**). Below is the circuit diagram for your reference.

ADC Test Schematic

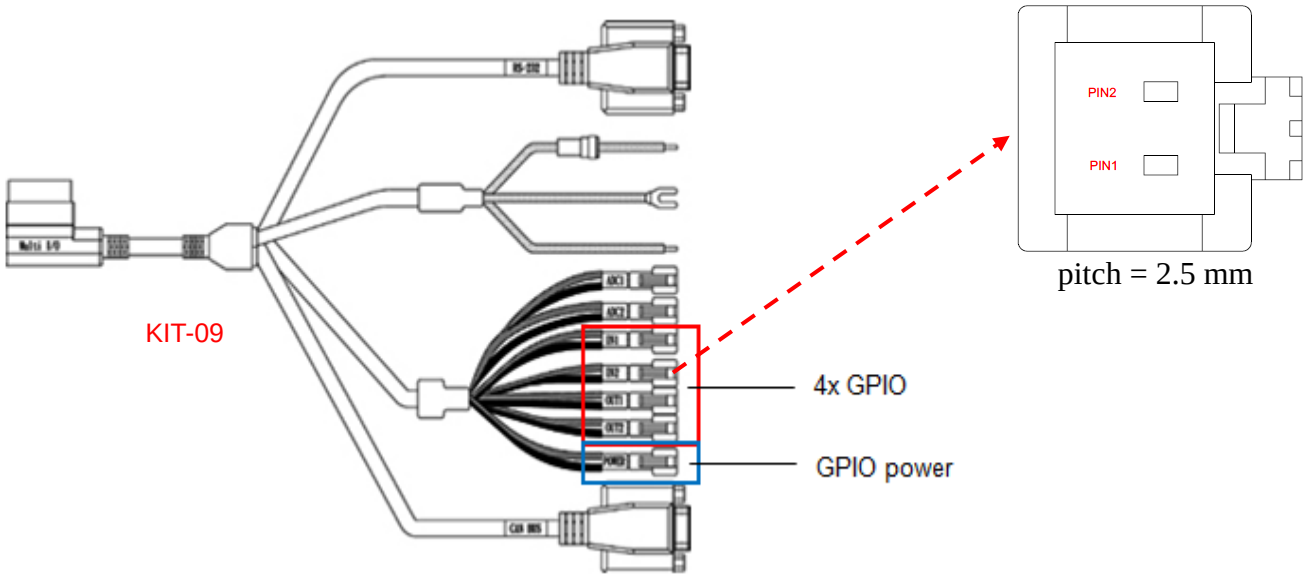


The tolerance range of accuracy of ADC

Channel	Tolerance Range of Accuracy
CH1	+0.1V
CH2	+0.1~0.3V

GPIO Interface

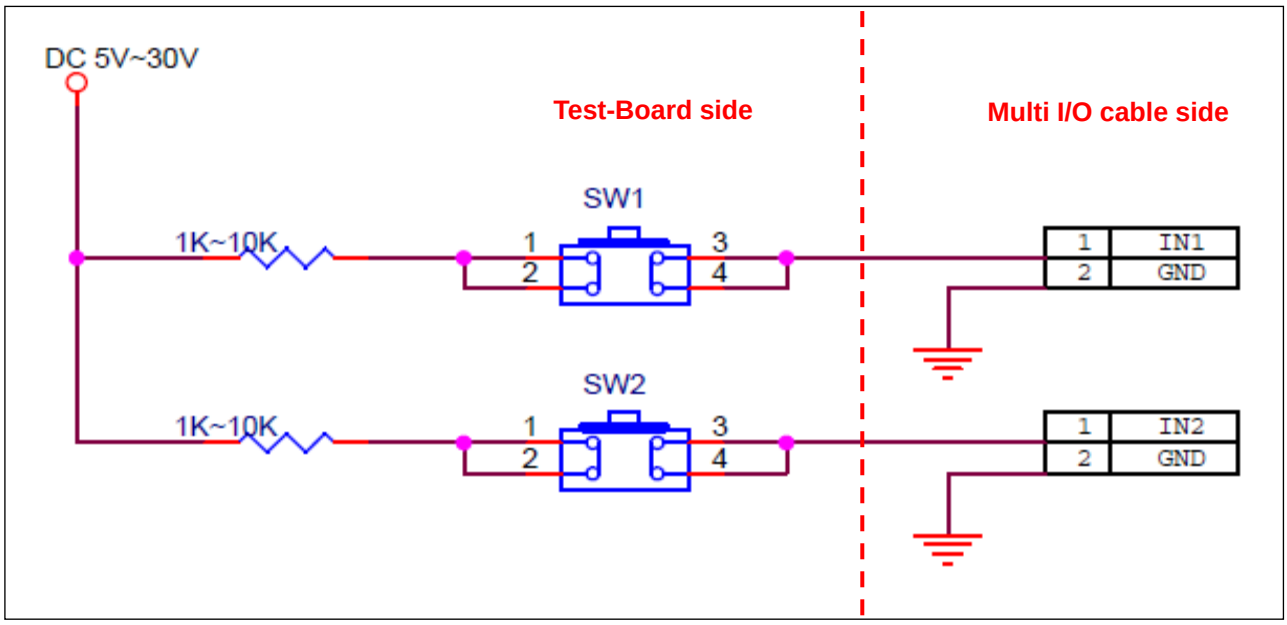
BE905A1 offers 4 GPIO programmable ports (2x Inputs and 2x outputs), as illustrated below. The following table lists the pin-out definitions of this interface. To verify the functionality of this interface, we provide a test utility for developers. Please refer to Section 4.5 for more details.



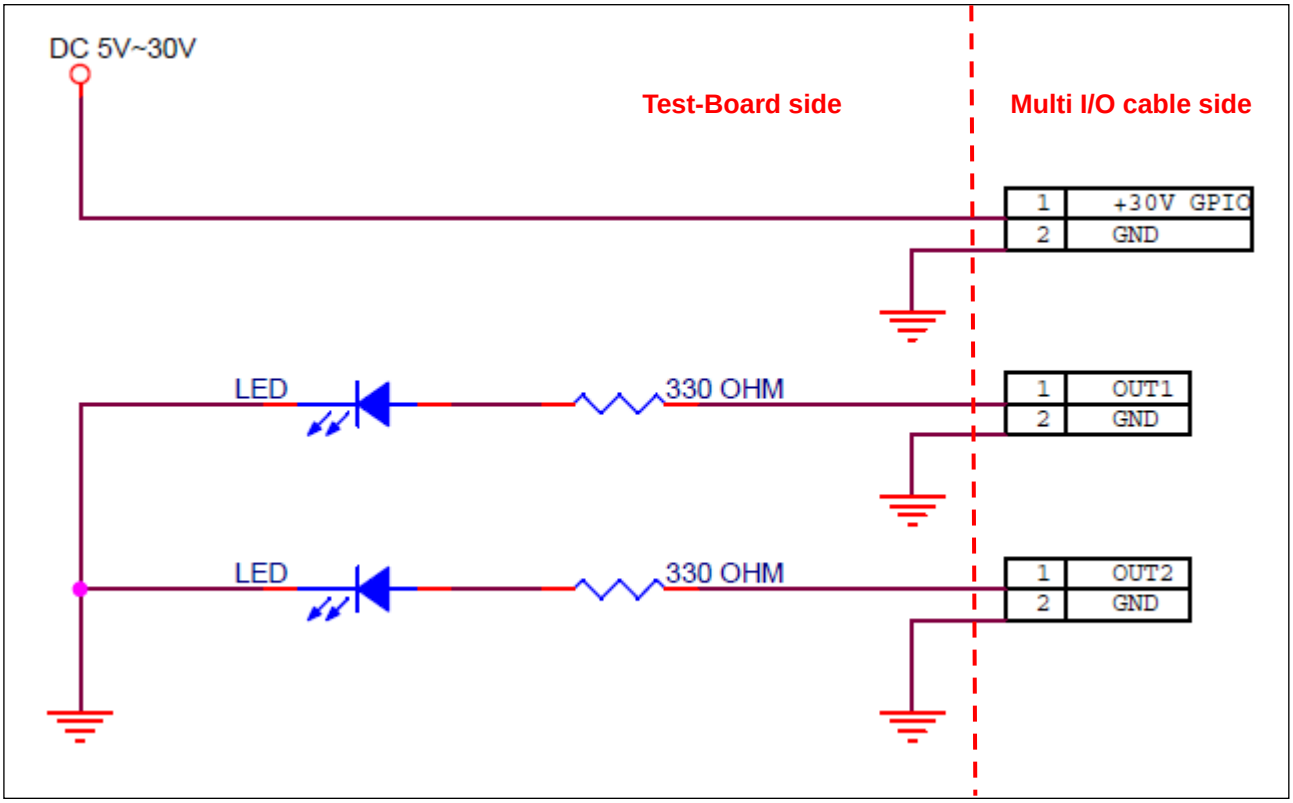
PORT		No	Description
GPIO	GPIO IN1	1	IN1
		2	GND
	GPIO IN2	1	IN2
		2	GND
	GPIO OUT1	1	OUT1
		2	GND
	GPIO OUT2	1	OUT2
		2	GND
	GPIO POWER	1	GPIO POWER (DC 5~30V)
		2	GND

Please also be noted that, before the testing you need to make a hardware GPIO test board by yourself and connect it to the GPIO JST male connector (**JST SMR-02V-B**). In addition, the logic high voltage of GPIO OUT1 and GPIO OUT2 are dependent on GPIO POWER supply voltage, which ranges from 5V to 30V. Below is the circuit diagram for your reference.

GPIO Input Test Schematic (for reference)

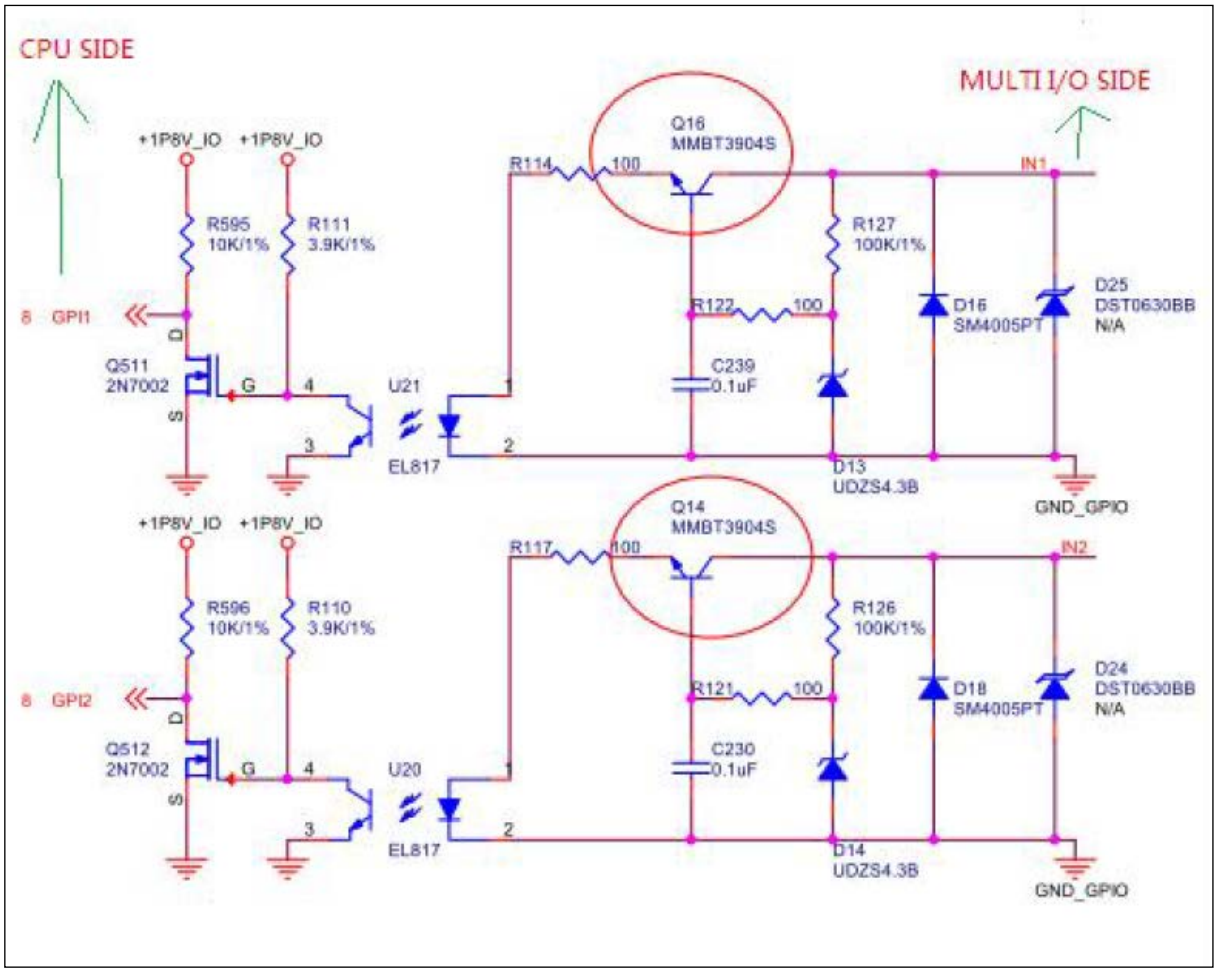


GPIO Output Test Schematic (for reference)

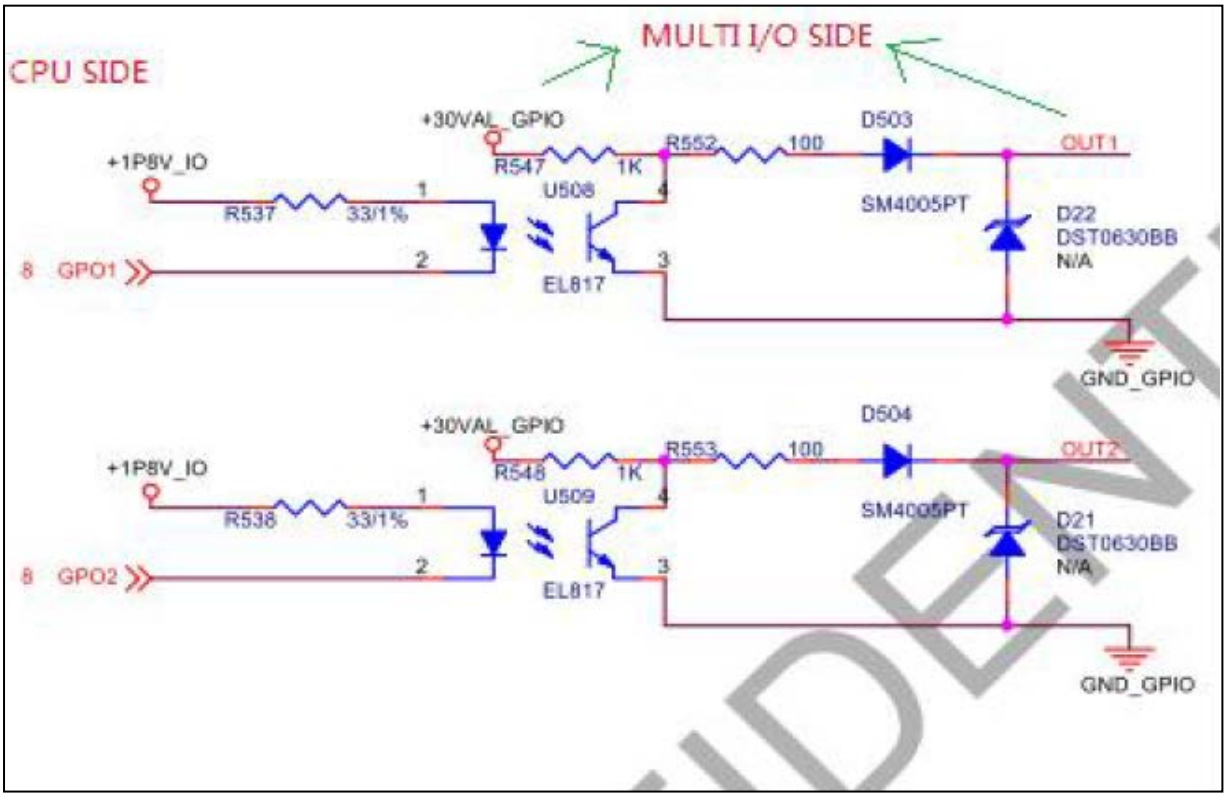


GPIO Internal Circuit Diagrams in BE905A1

1. GPI



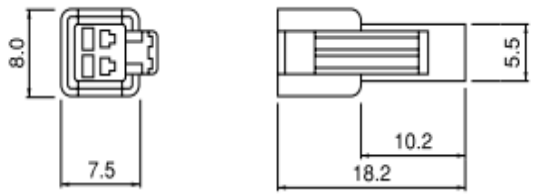
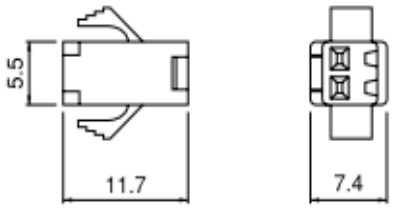
2. GPO



Q: How fast does it work on external GPIO pin via the Multi-IO Cable?
A: Sometimes it is handy to use some GPIO pins to implement a second or third port, such as I2C, SPI, UART or PWM etc., called software I2C, software SPI, software UART, software PWM for software real-time requirement application, even if running at low speed. BE905A1 also can support this application. However, The toggle switch speed of GPIO pin is 200Hz (max), so we don't suggest using it on simulate I2C application. The reason is the maximum physical speed is lower than standard I2C's speed. Even though, you still can use it on low PWM control application, but please note that his speed is 200Hz (max). For reference: The official I2C bus protocol supports three modes of transfer rates: ● Standard Mode — Up to 100 Kbps ● Fast Mode — Up to 400 Kbps ● High-Speed Mode — Up to 3.4 Mbps

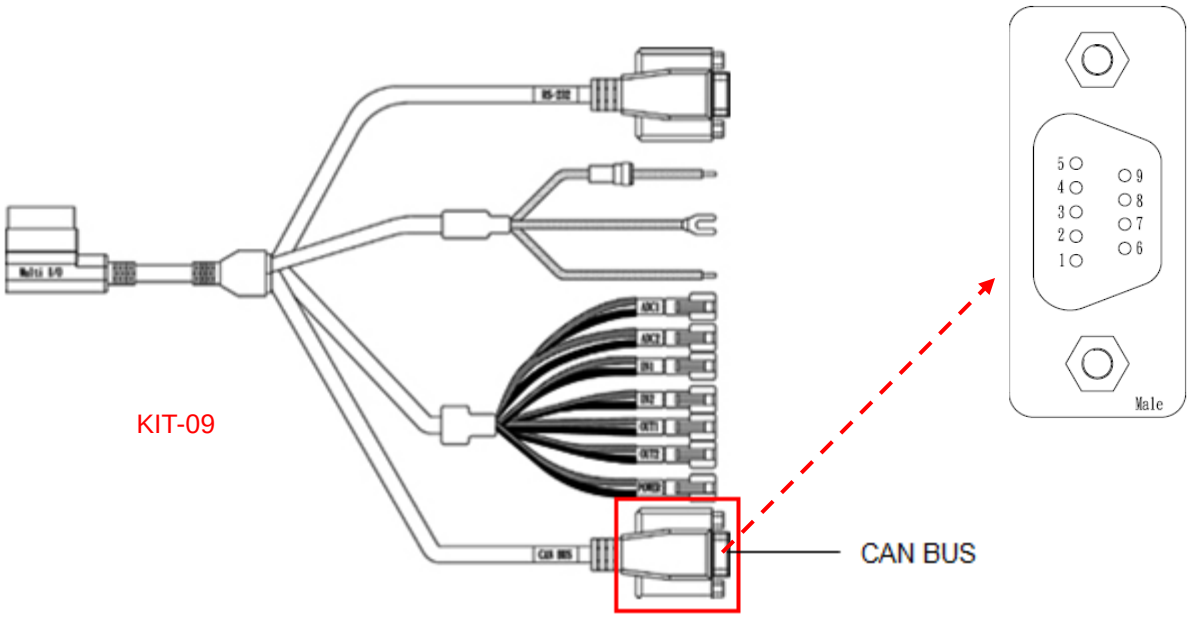
Connector type of ADC and GPIO

Since the connector type of both GPIO and ADC on the Multi I/O cable is the JST male connector (it's the **JST SMR-02V-B** precisely), users should look for the corresponding plug-in connector (the **JST SMP-02V-BC**) for their oppositely connected devices. Please refer to below table for the details. It is suggested to use **JST SMP-02V-BC** to connect to **JST SMR-02V-B,** which is the connector used for GPIO and ADC among the Multi I/O cable.

Receptacle housing (for pin contact)	Plug housing (for socket contact)
SMR-02V-B, black **SMR-02V-N,** white (natural) 	**SMP-02V-BC,** black **SMP-02V-NC,** white (natural) 
	

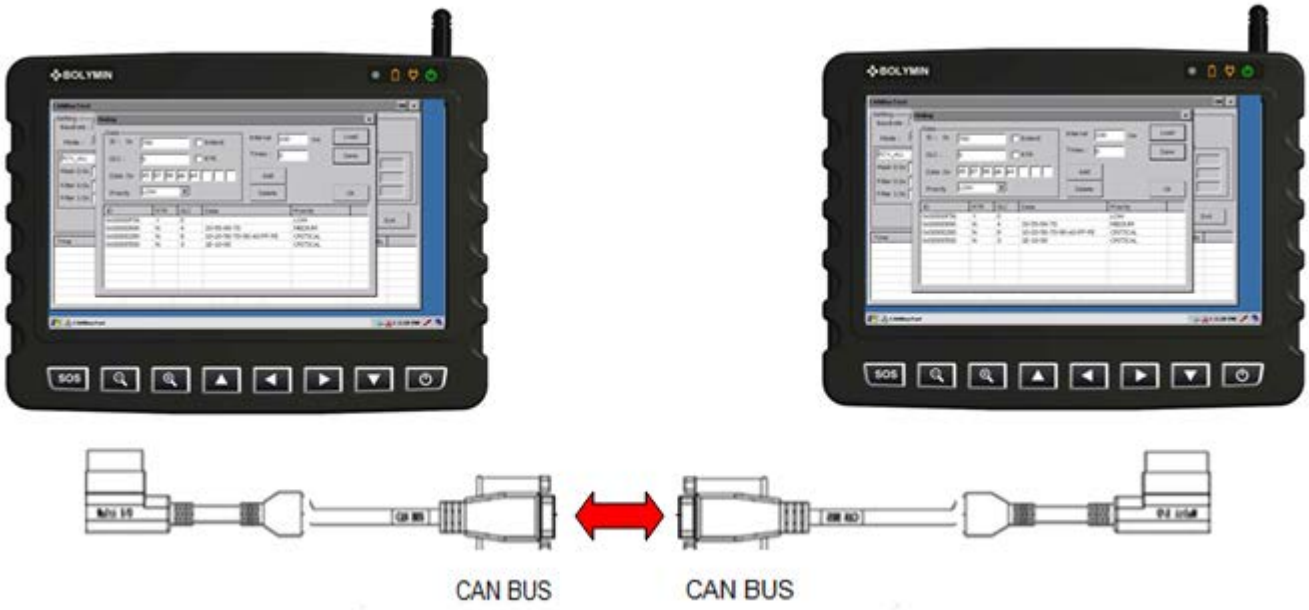
CAN BUS

There is another DB-9 male connector marked "**CAN BUS**" among the multi I/O cable. The table below lists the pin-out definitions of this interface. To verify the functionality of this interface, we provide a test utility for developers. Please refer to Section 4.9 for more details.



PORT	No	Description
CAN BUS Male	1	NC
	2	CANL
	3	GND
	4	NC
	5	NC
	6	NC
	7	CANH
	8	NC
	9	NC

A reference test for users to test the CAN Bus data transmission via the CAN Bus utility (please refer to Section 4.9) can be carried out by connecting two BE905A1 devices. If you only have one(1) MDT, you should find another CAN Bus device to complete test.



Physical Measured valid transmitted distance of all interfaces of Multi I/O cable and USB port

Interface	Max Data Transmission Distance (meter) With Additional Cable
RS232	15
CAN Bus	35
GPIO	2.3
ADC	2.3
USB	5

2.15 Kensington Security Slot

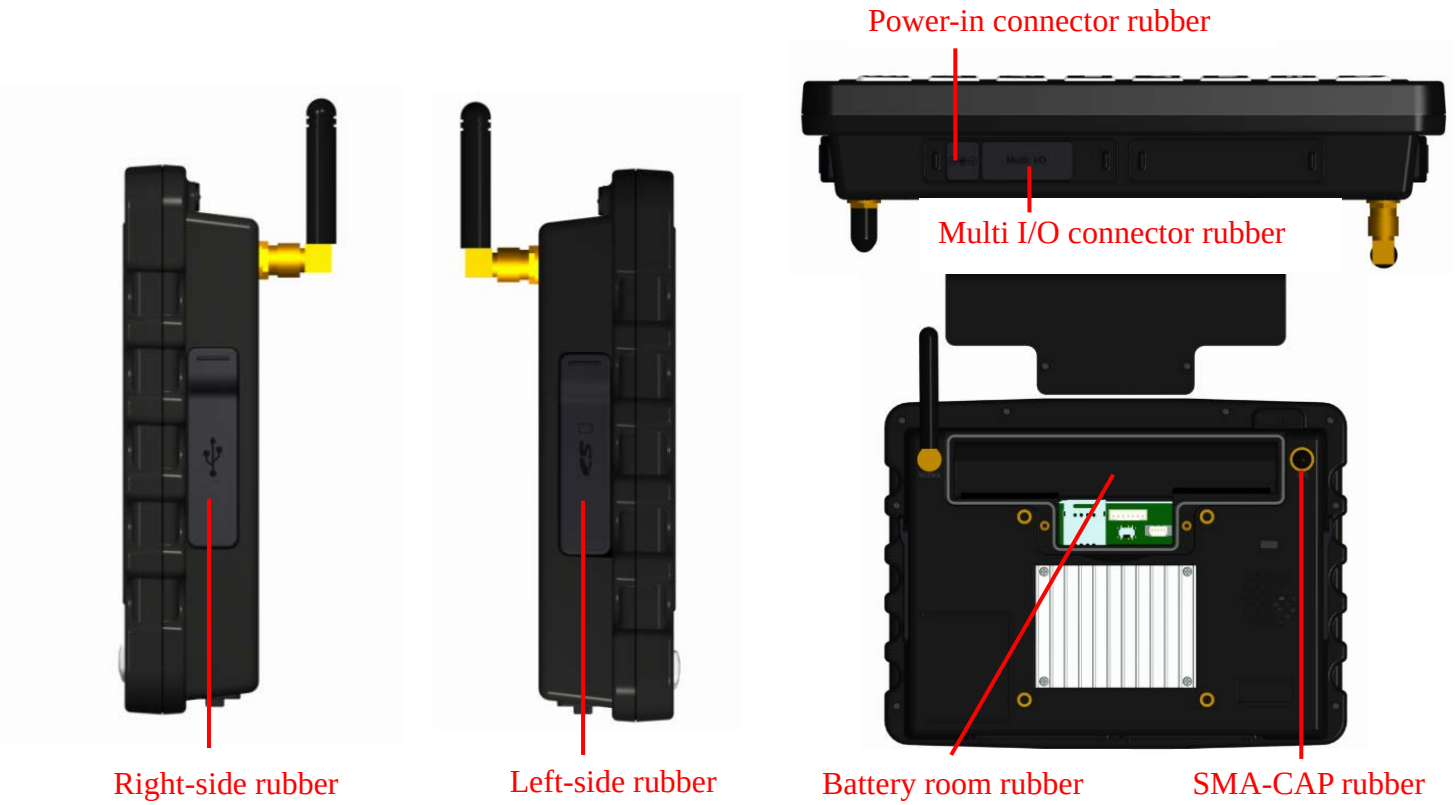
On the right side of back panel of BE905A1, you would find a slot of Kensington lock to provide a deterrent to theft. This slot is compatible with all kinds of Kensington locks. When using this lock in the vehicle, you can attach it around the steering wheel or other suitable position.

2.16 Rubber Cover

BE905A1 is waterproof and dust resistant in compliance with the Ingress Protection (IP) ratings IP54, which means it has undergone certified tests to measure its resistance levels to both dust and water. IP54 ratings mean that BE905A1 is dust resistant to limited ingress (no harmful deposit) and is protected against splashing water.

IPX4. Protected against splashing water
IP5X. Protected against dust; limited ingress (no harmful deposit)

To ensure the water resistance in BE905A1, all rubber covers, including the right side and left side rubber covers, battery-room rubber cover, SMA-CAP for unused antenna connector, power-in connector rubber cover and Multi-IO connector rubber cover, must be firmly closed.



You can use BE905A1:

- In dusty environments, for example, on a construction site.
- When your fingers are wet.

Even if BE905A1 is resistant to dust and water, you should avoid exposing it unnecessarily to environments with excessive dust, sand and mud or to moist environments with extreme high or low temperatures. The waterproof ability of all rubber covers cannot be guaranteed in all environment or conditions.

Never immerse BE905A1 in salt water or let all metal connectors in contact with salt water. Never expose BE905A1 to any liquid chemicals. For example, if you’re washing windshield or dashboard by hand using liquid detergent, avoid bringing BE905A1 in contact with the detergent. After exposure to non-fresh water, wipe BE905A1 using fresh water.

Normal wear and tear along with damage to BE905A1 can reduce its ability to resist dust or moisture. After using BE905A1 in water, dry off the areas around all rubber covers. If all connectors get wet, their function may be impacted until the water has completely dried. All compatible accessories, including batteries, chargers, and hands free devices and micro USB cables, are not waterproof and dust resistant on their own.

Your warranty does not cover damage or defects caused by abuse or improper use of BE905A1 (including use in environments where the relevant IP rating limitations are exceeded). If you have any further questions about the use under IP rating of BE905A1, please call our sales for help.

3 Basic Setting on Windows CE 6.0

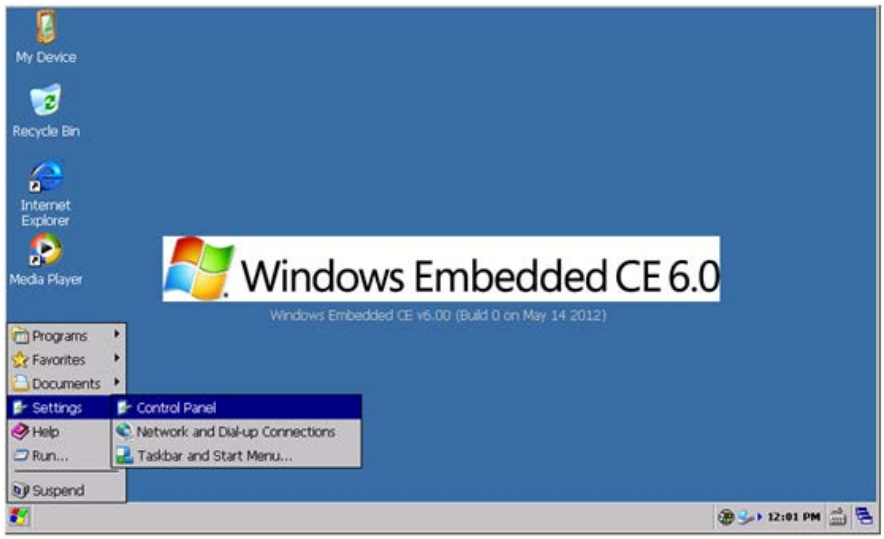
In this chapter, we will illustrate the basic settings on BE905A1 MDT with Windows CE 6.0.

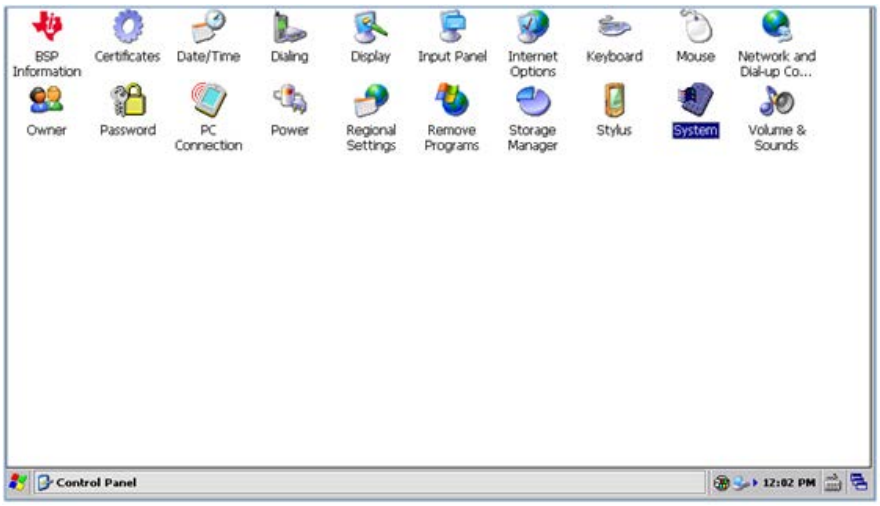
3.1 Windows CE 6.0 Overview

Windows Embedded CE 6.0 R3 is an operating system for a wide range of small-footprint consumer and enterprise devices. Development tools like Visual Studio 2005/2008 provide an integrated development environment (IDE) that enables you to build applications and Windows Embedded CE operating system software in a familiar environment.

3.2 System Properties

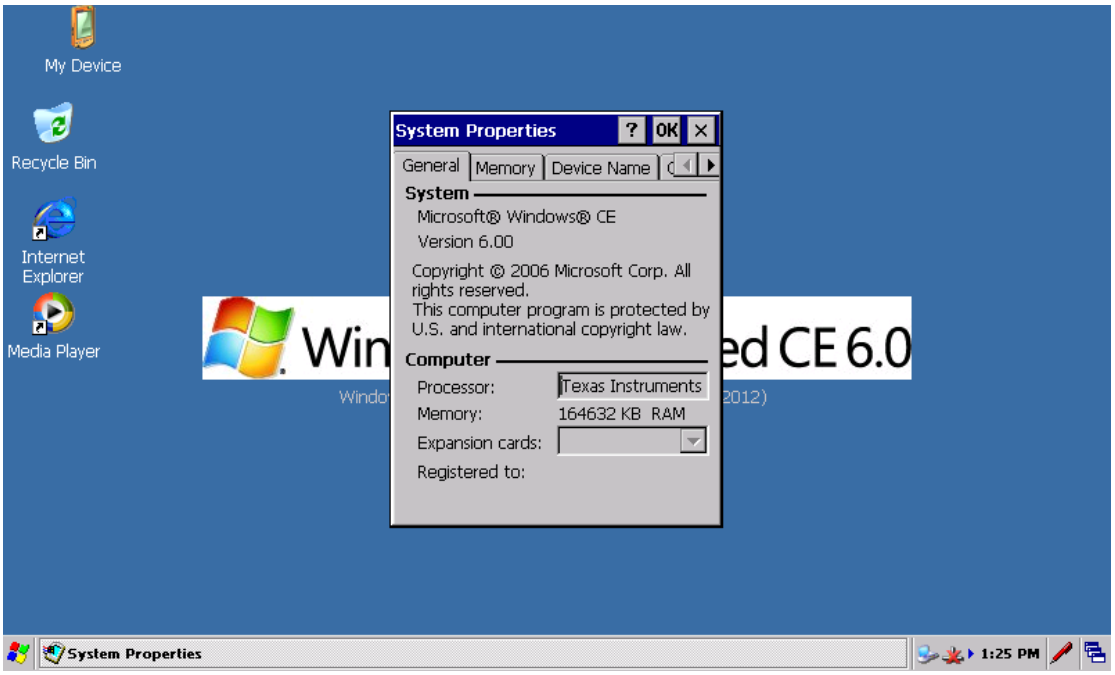
Users can see the basic system information from **Control Panel > System** in Windows CE 6.0.





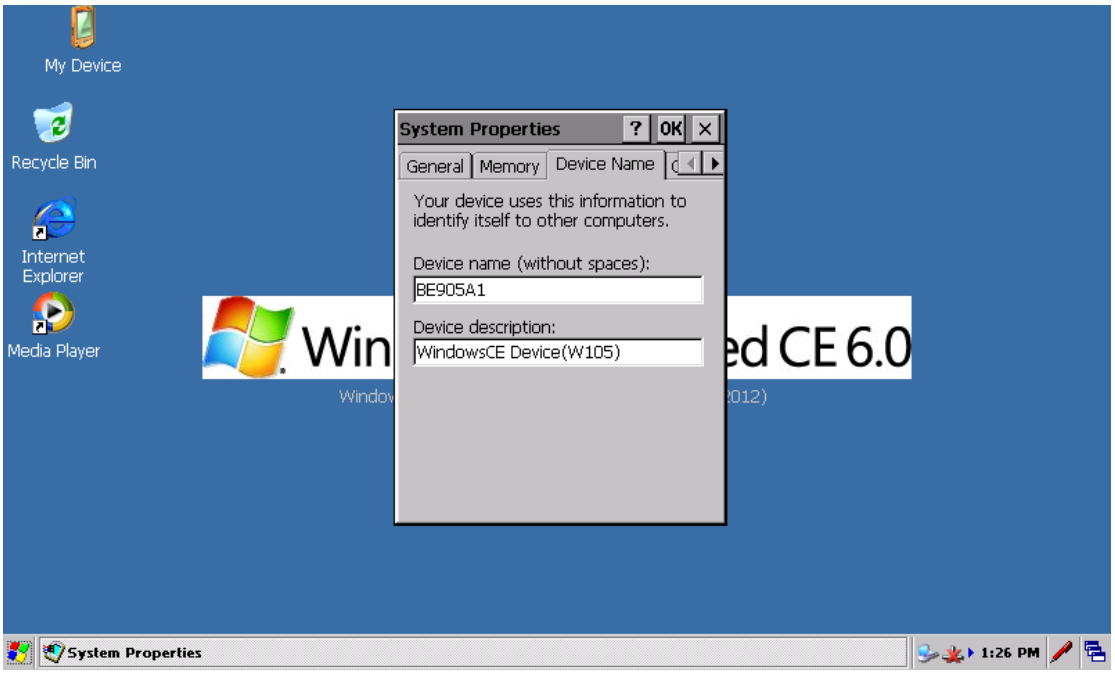
General information

The device's system information like CPU, memory are shown in the General tab page .



Device name

The device name and description that are pre-configured are shown in the Device Name tab page. The device name is used to identify this BE905A1 device to others computers and the string in the parentheses contained in the Device description field is the released revision of OS image from OEM.

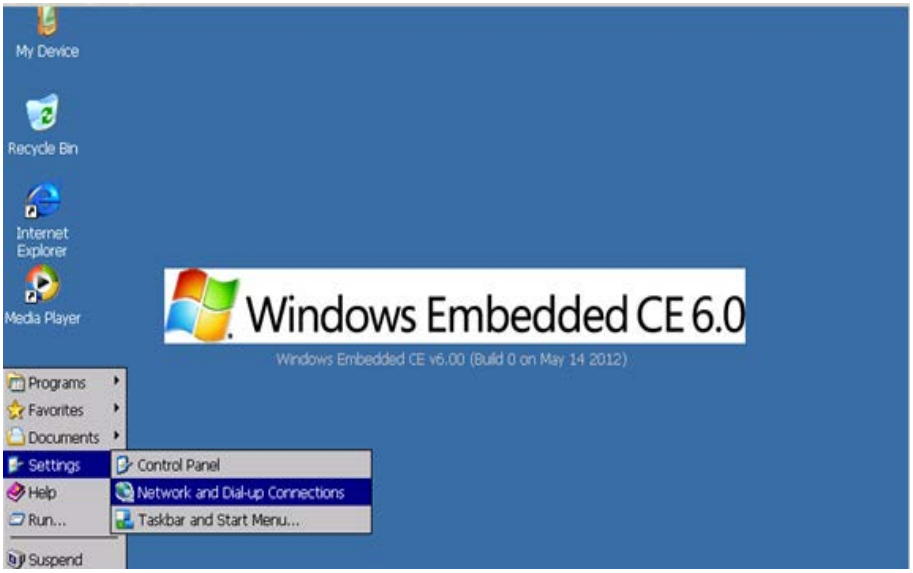


3.3 Network and Dial-up Connection

Dial-up Connection To The Internet

The BE905A1 can connect to the Internet via the built-in 2G/3G cellular data network module. Windows CE 6.0 provides a Dial-up Connection for related parameters configuration regulated from your mobile network provider.

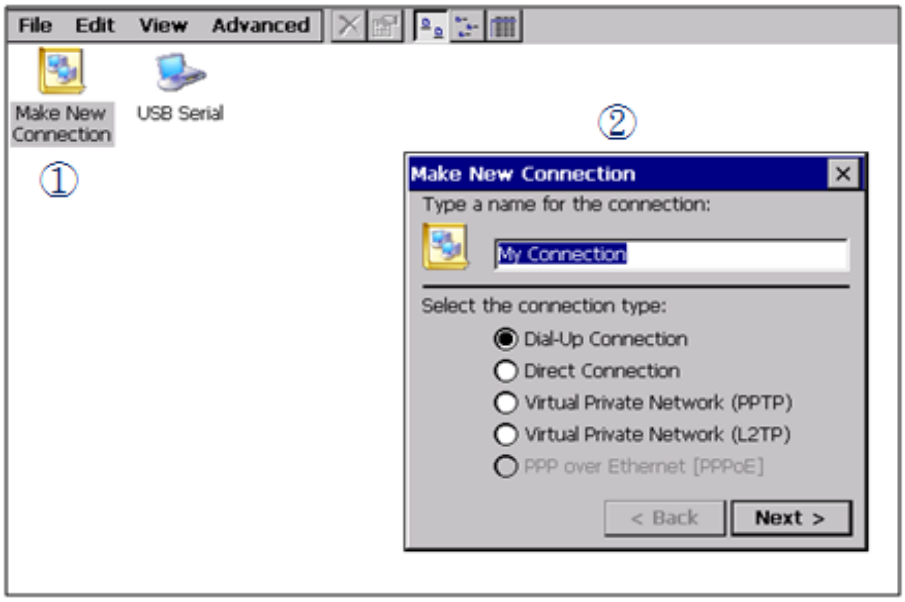
Please be sure to insert the SIM card into BE905A1 before using this function and then go to **Settings**, click **Network and Dial-up Connections** to start.



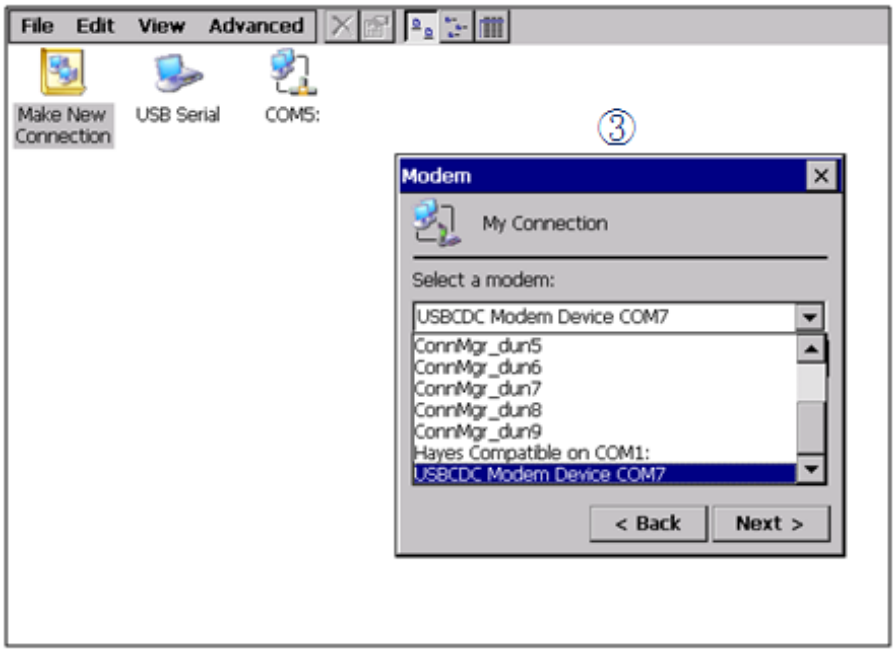
Create A Dial-up Connection

1. Make a new connection.

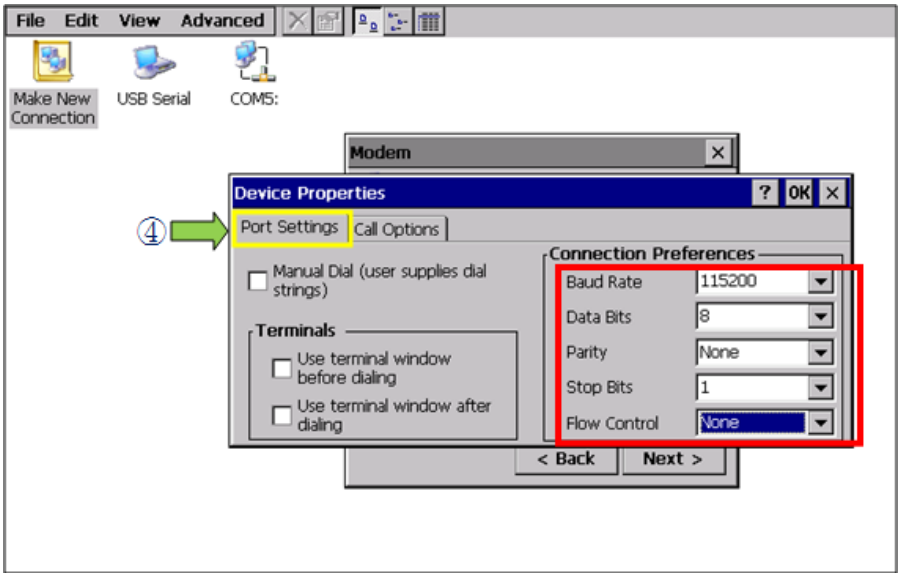
2. Type your own connection name and choose "**Dial-up Connection**", then click "**Next**" button.



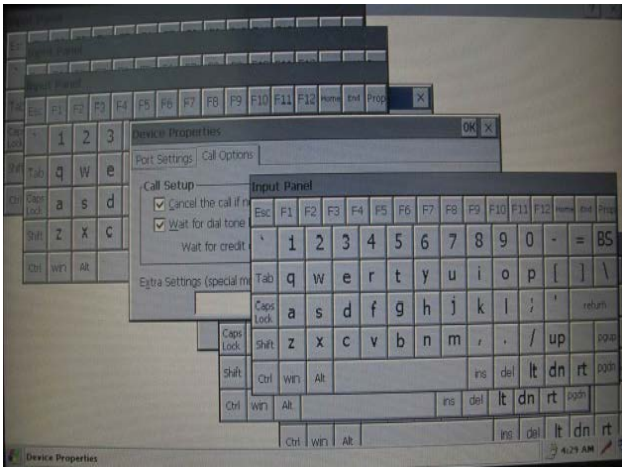
3. Select COM7 port as illustrated below and then click "**Next**" button.



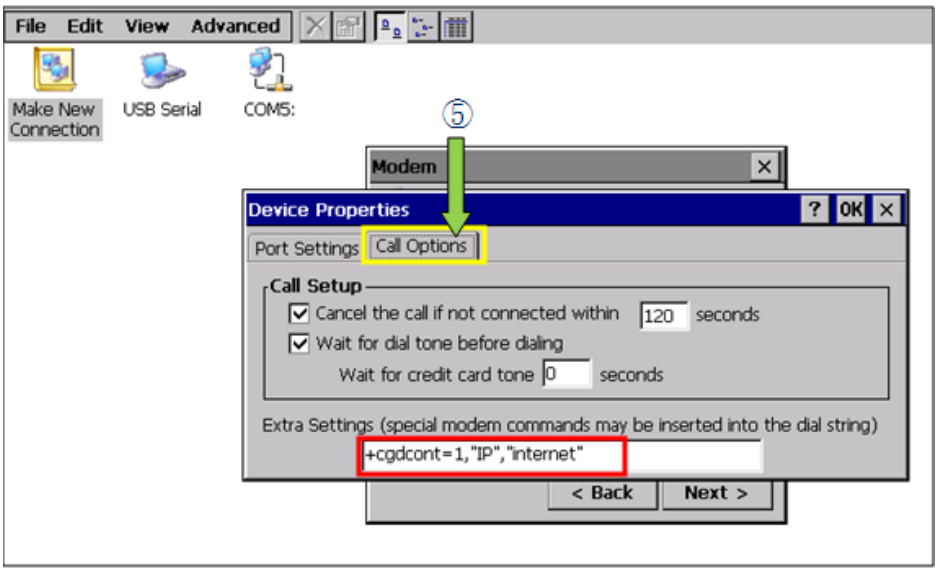
4. In "**Port Settings**" page, set setting as illustrated below.

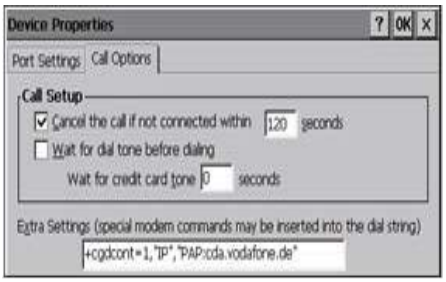


NOTE: In this step, you may encounter a weird situation as right screenshot while inputting text via virtual keyboard, that is, several virtual keyboard dialogs duplicated at the same time.
It will not affect the normal operation of dial-up connection and users can just close the setting dialog so that the duplicated virtual keyboard would all disappear.

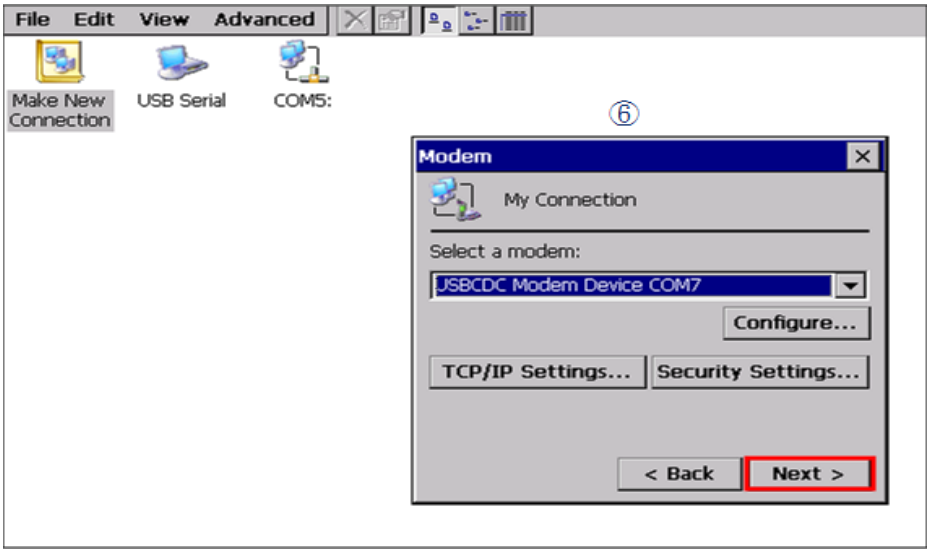


5. In "**Call Options**" page, input the command string in the red rectangle field. Please note that, the last double quoted string (e.g. "**internet**" as illustrated below) is the APN offered from your mobile network provider and add the PAP string by case. You should modify it accordingly.

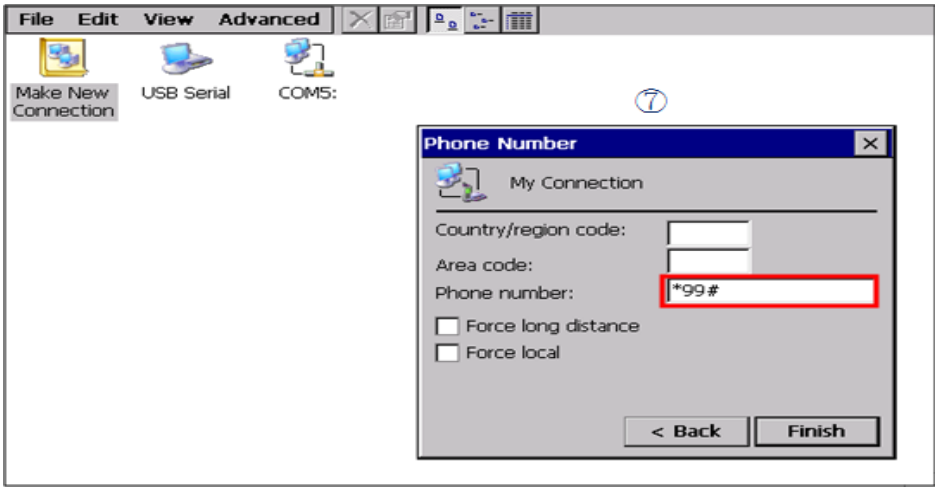




6. Click "**Next**" button to continue.

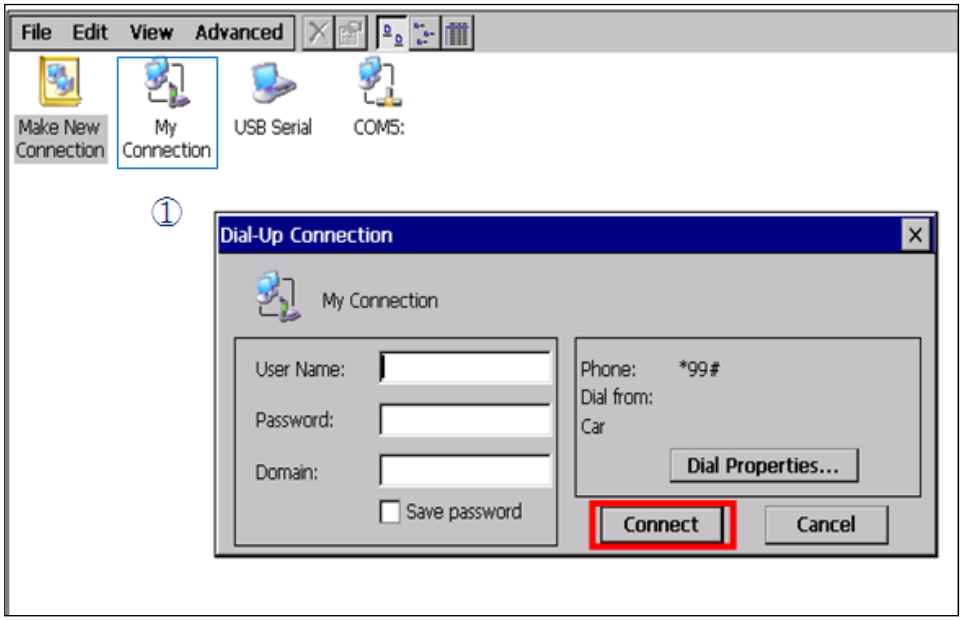


7. Input "***99#**" string in the Phone number field to finish the setup.

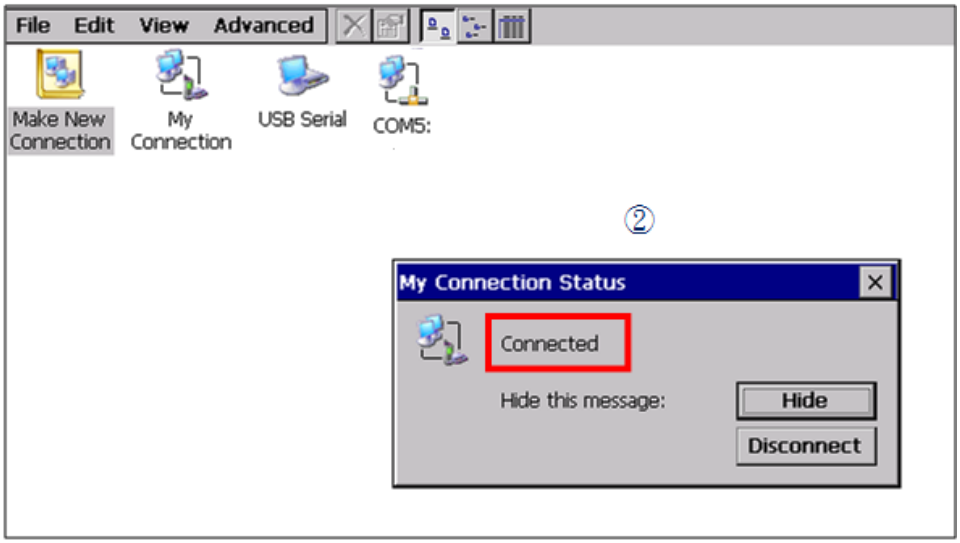


Activate The Dial-up Connection

1. Double click the connection item you've created in previous configuration and then tap "**Connect**" button. Note that the "**User Name**", "**Password**", "**Domain**" fields are not necessary parameters and depend on your mobile network provider. Please contact your ISP for confirmation.



2. The connection status would be "**Connected**" if successful. Then you can use the web browser like IE or other browsers of 3rd party to access web.

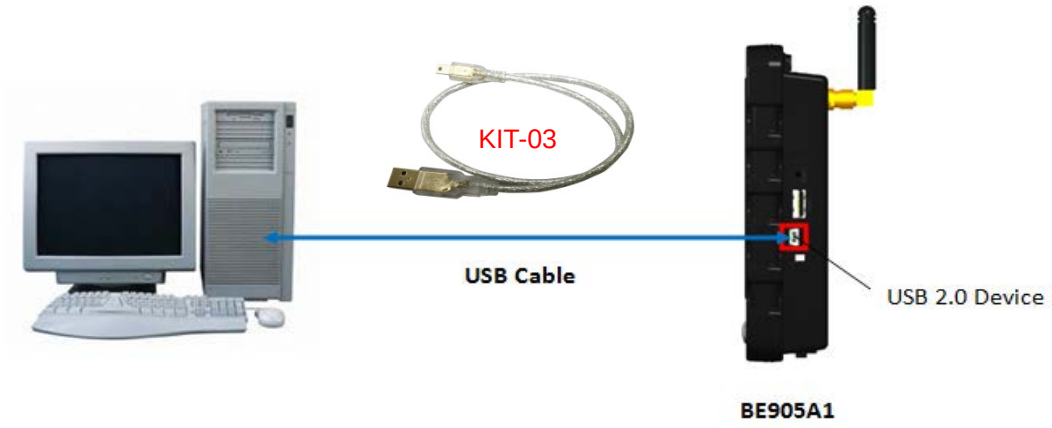


NOTE: When using a dial-up connection to transfer/receive data over your carrier's cellular network, additional fees may result. For more information, please contact your carrier for your cellular data plan.

3.4 Communication with PC

Connect To PC

As illustrated below, please connect BE905A1 to your PC by an USB cable.
Note that on the BE9051 side, you have to use USB 2.0 Device port by mini-B type.



Install USB Driver

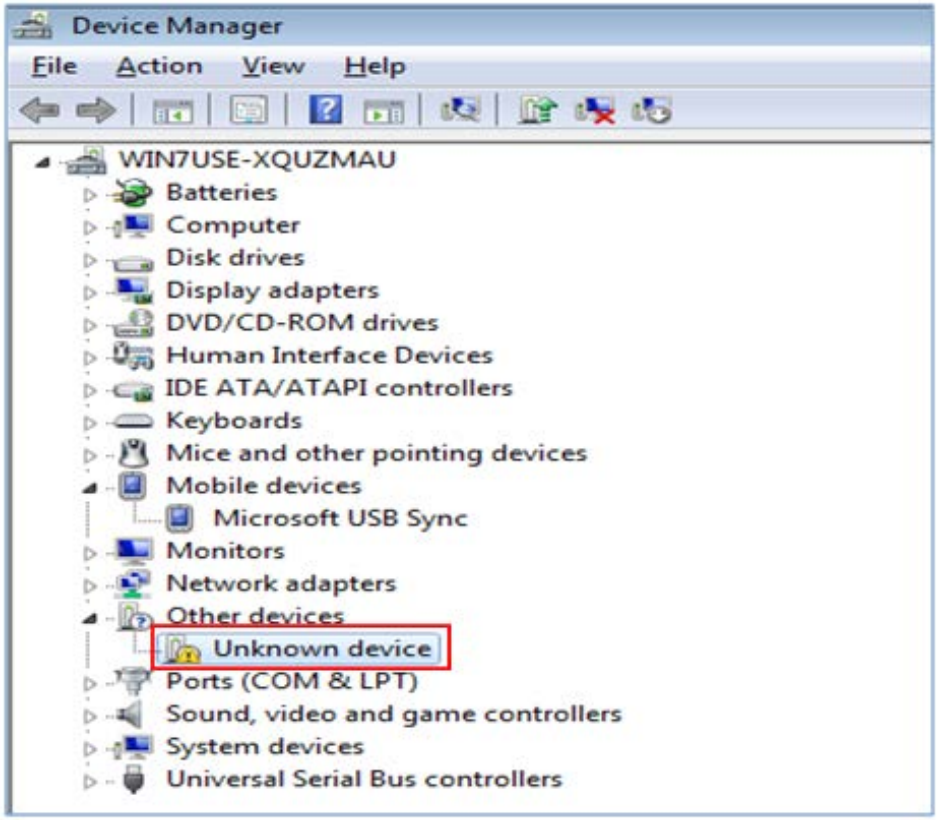
Windows XP

On Windows XP system, there is no need to install extra USB driver. Once you connect BE905A1 to PC and power on BE905A1, Windows system will recognize BE905A1 normally.

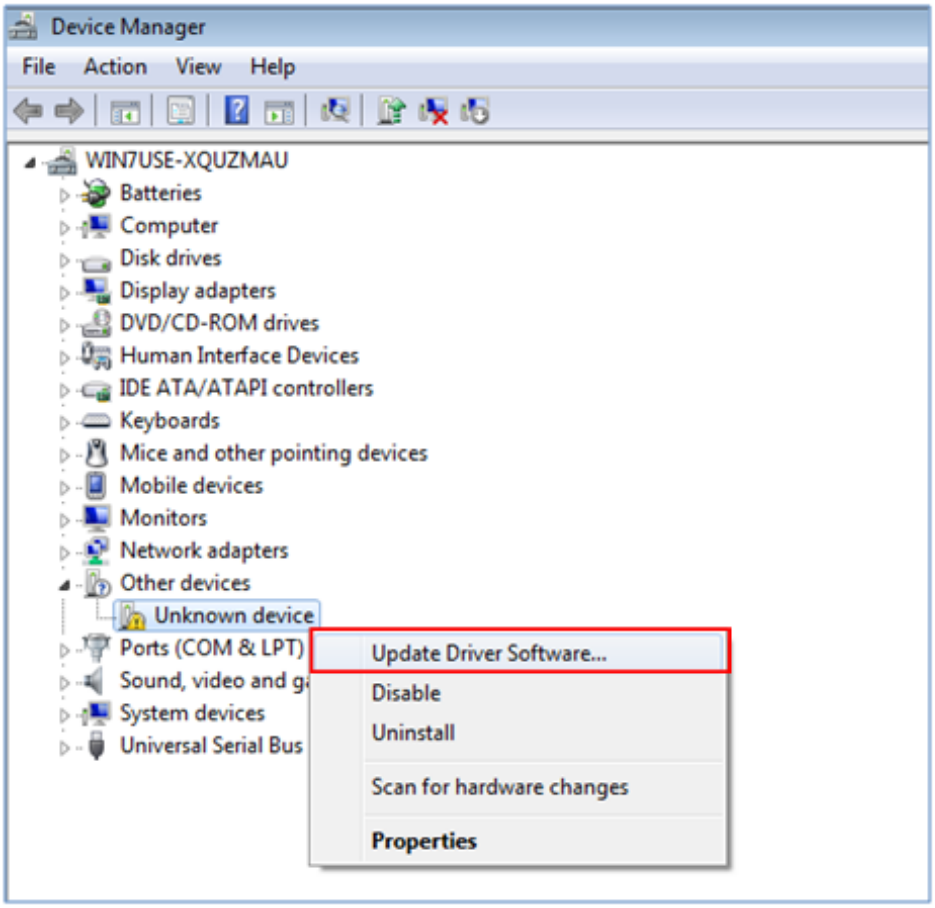
Windows 7 (32-bit/64-bit)

On Windows 7 system, you NEED to install USB drivers while connecting BE905A1 to your PC at first time. Please use the compressed files named **BE905A1_USB_Driver_Win7(32-bit).rar** or **BE905A1_USB_Driver_Win7(64-bit).rar** attached in the SD card according to your Windows 7 version.

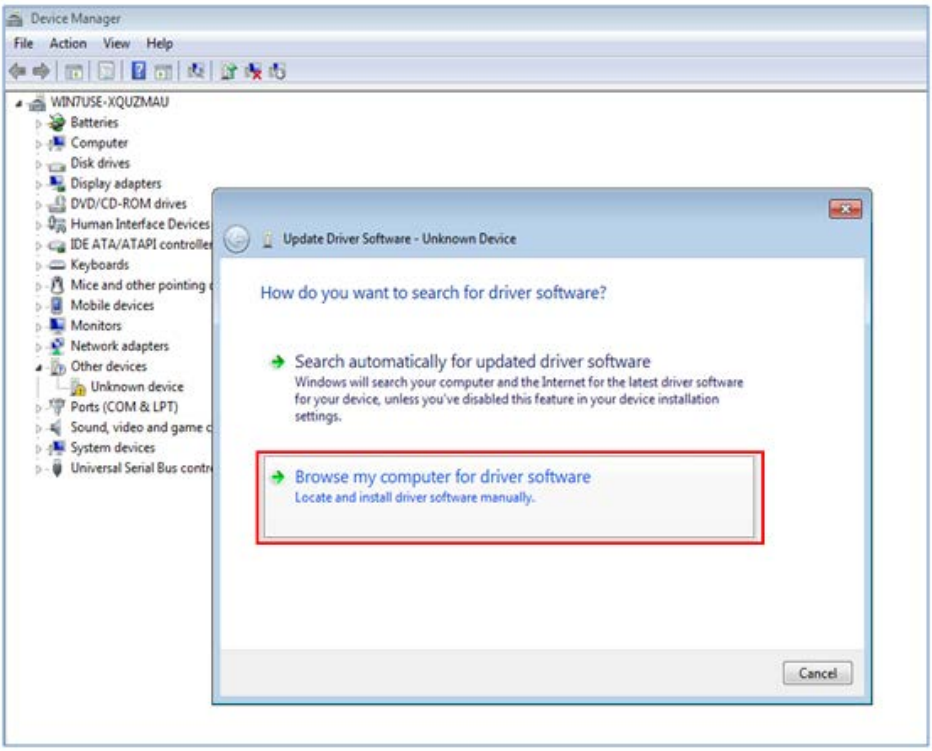
1. Go to **Device Manager**, you should see **Unknown device** item shown in the list.



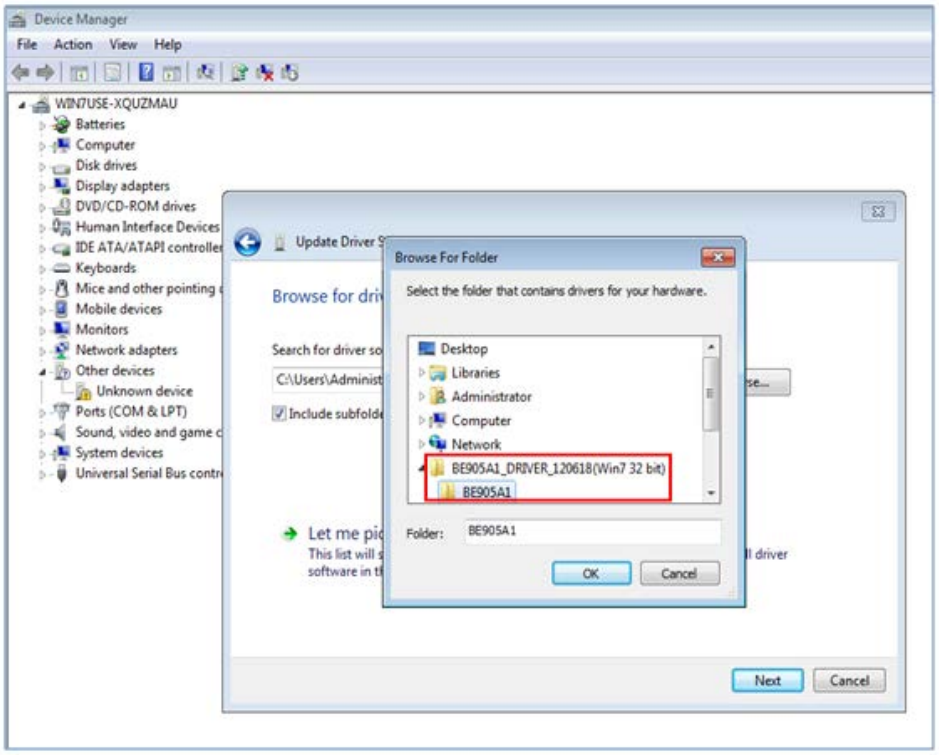
2. Right click mouse on the **Unknown device** item and click **Update Driver Software...**



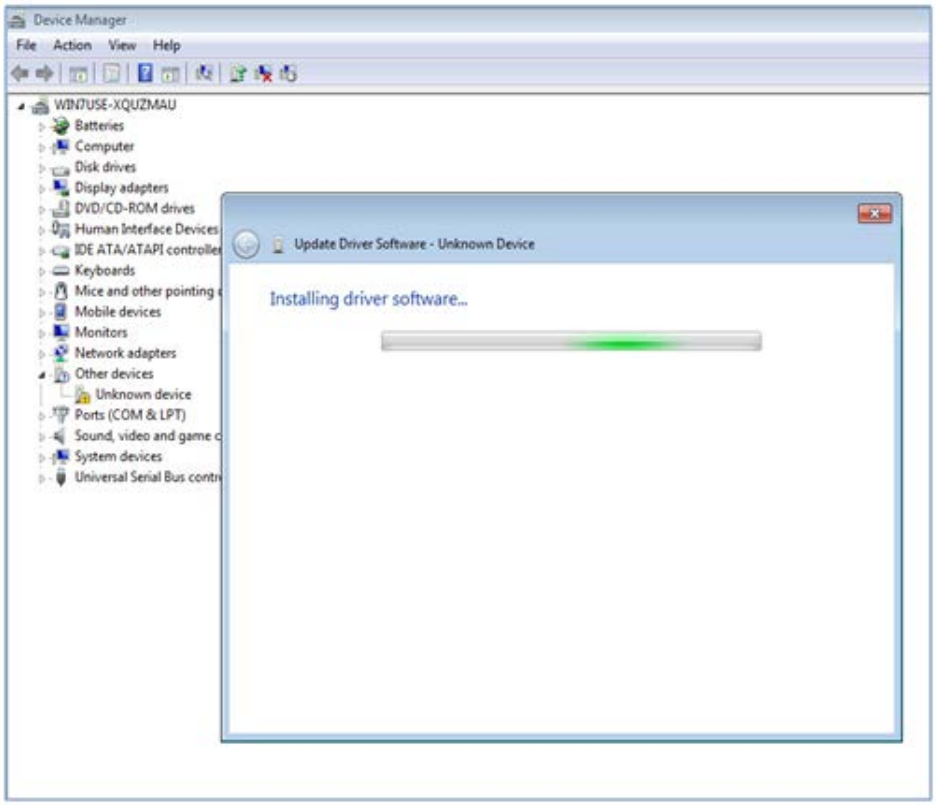
3. Click to enter **Browser my computer for driver software** item.



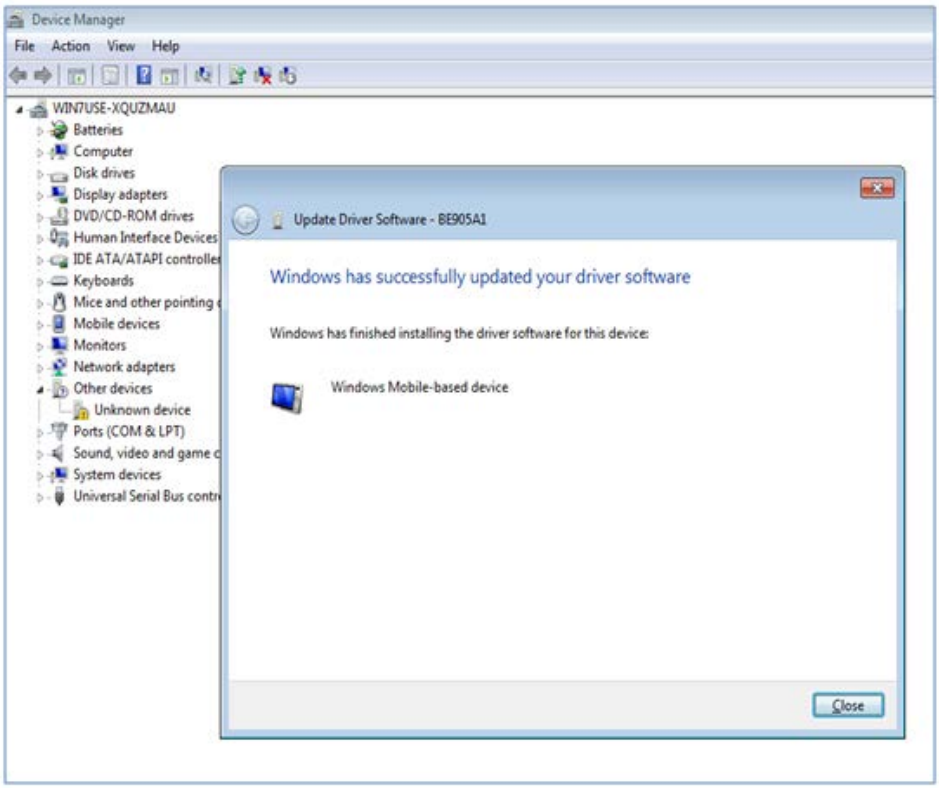
4. Browse the folder containing required USB driver files which you stored on your PC.



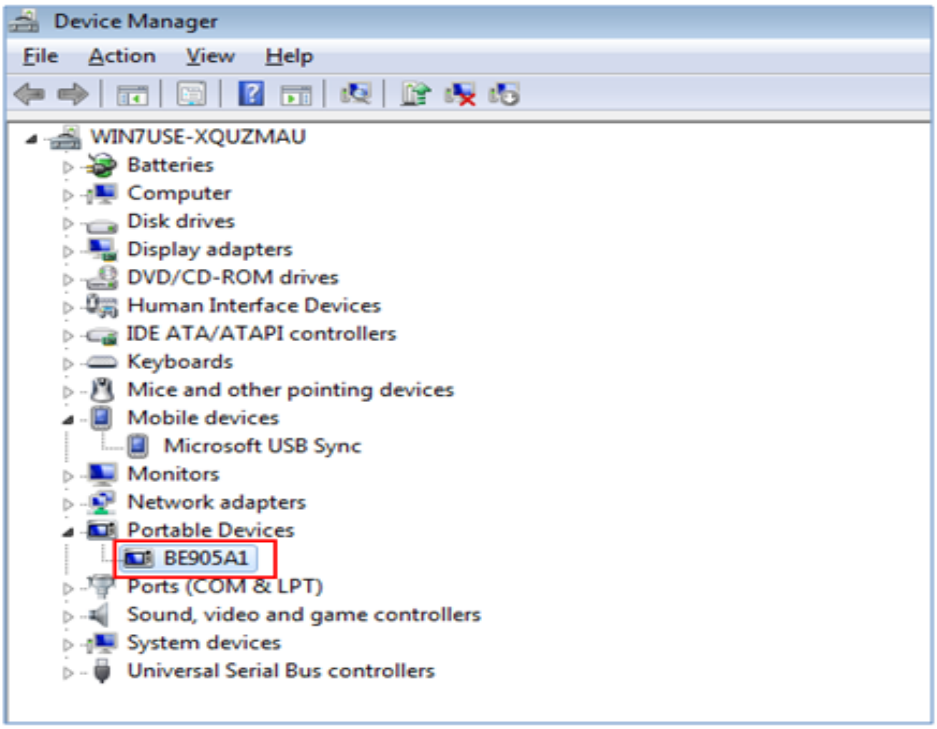
5. Start installing...



6. Installation finished



7. You'll see the **BE905A1** item appears, indicating the driver has been installed successfully.

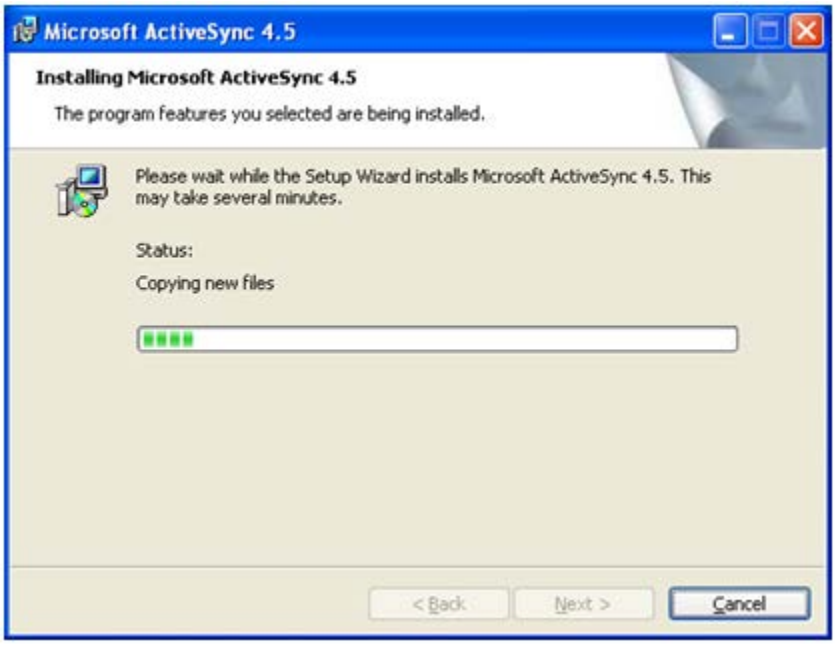


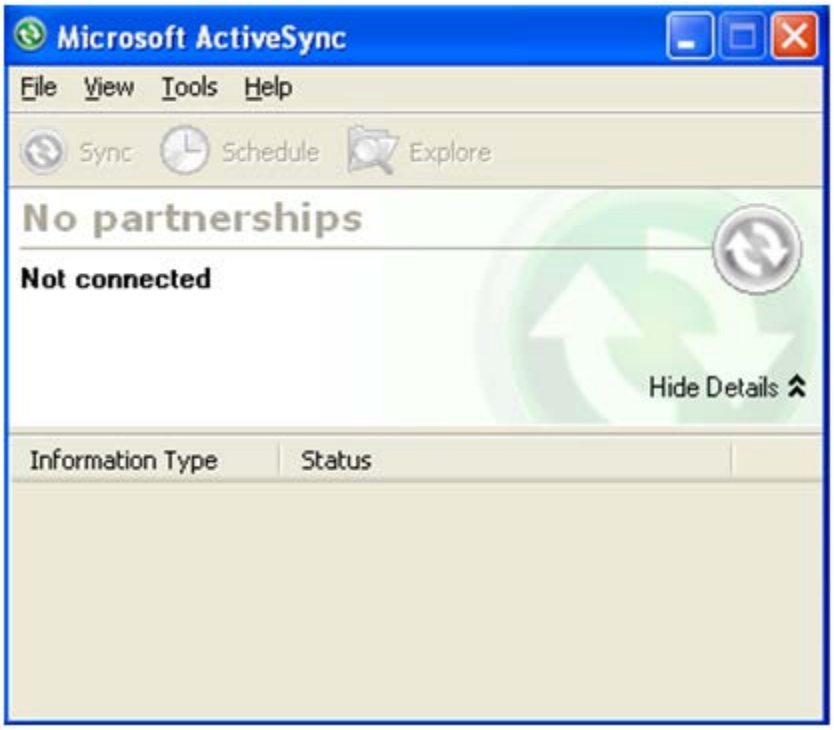
Install Synchronization Software

Windows XP

On Windows XP, Microsoft provides a desktop ActiveSync program to allow a Windows CE based device to be synchronized with PC. Please download ActiveSync 4.5 from http://www.microsoft.com/downloads/details.aspx?familyid=9e641c34-6f7f-404d-a04b-dc09f8141141&displaylang=en&tm or find this program from SD card.

Then launch and install on your desktop PC.

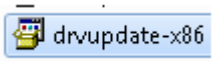




Windows 7 (32-bit/64-bit)

On Windows 7 systems, you need to use Windows Mobile Device Center, a synchronization software program developed by Microsoft, to synchronize Windows CE based devices.

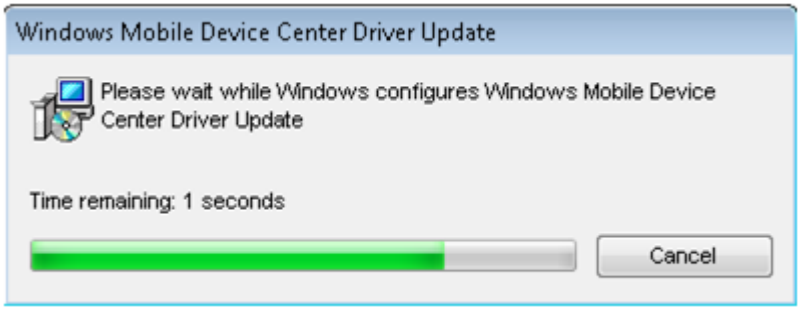
For Windows 7 32-bit version, Please download Windows Mobile Device Center 6.1 from http://www.microsoft.com/en-us/download/details.aspx?id=14.

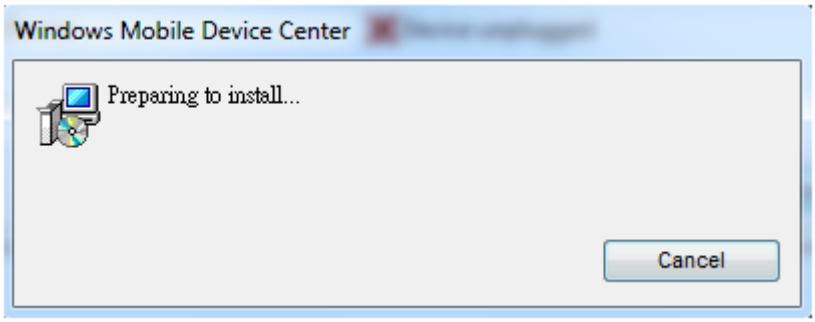
Then launch and install 

on your desktop PC.

For Windows 7 64-bit version, Please download Windows Mobile Device Center 6.1 from http://www.microsoft.com/en-us/download/details.aspx?id=3182.

Then launch and install drvupdate-amd64 on your desktop PC.





NOTE: The software download link is maintained by Microsoft. If you fail to download from above URL, please visit Microsoft Download Center for further search. On the other hand, you can still get the above 2 software installer from the SD card.

File Transfer

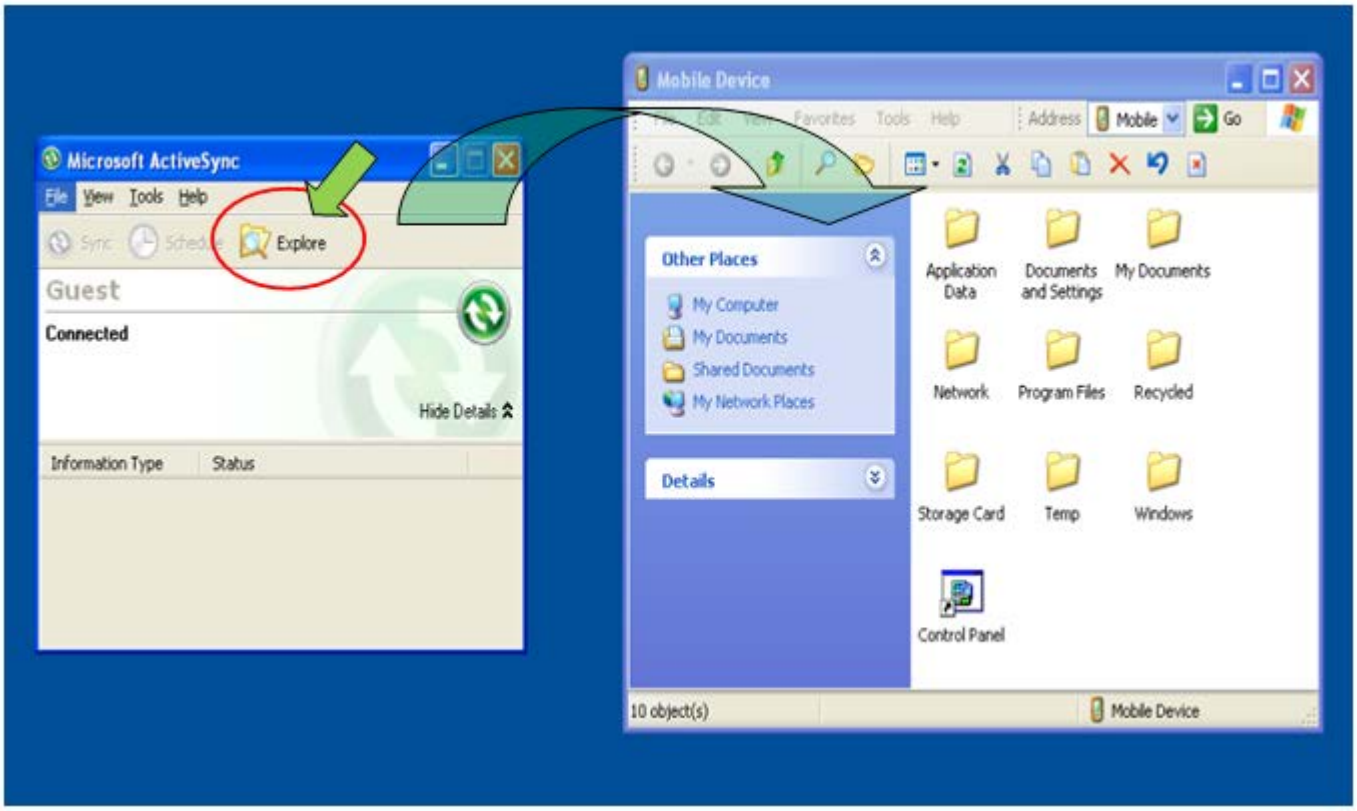
Once you can connect BE905A1 to PC successfully, you can transfer files between each other by synchronization software.

Windows XP

1. This dialog of ActiveSync will pop up automatically if you power on BE905A1 when connecting to PC. Then Select **No** and click **Next** button.

2. Once the USB connection is established, your ActiveSync will show a **Connected** status. The green circle means the connection between PC and BE905A1 is done successfully.

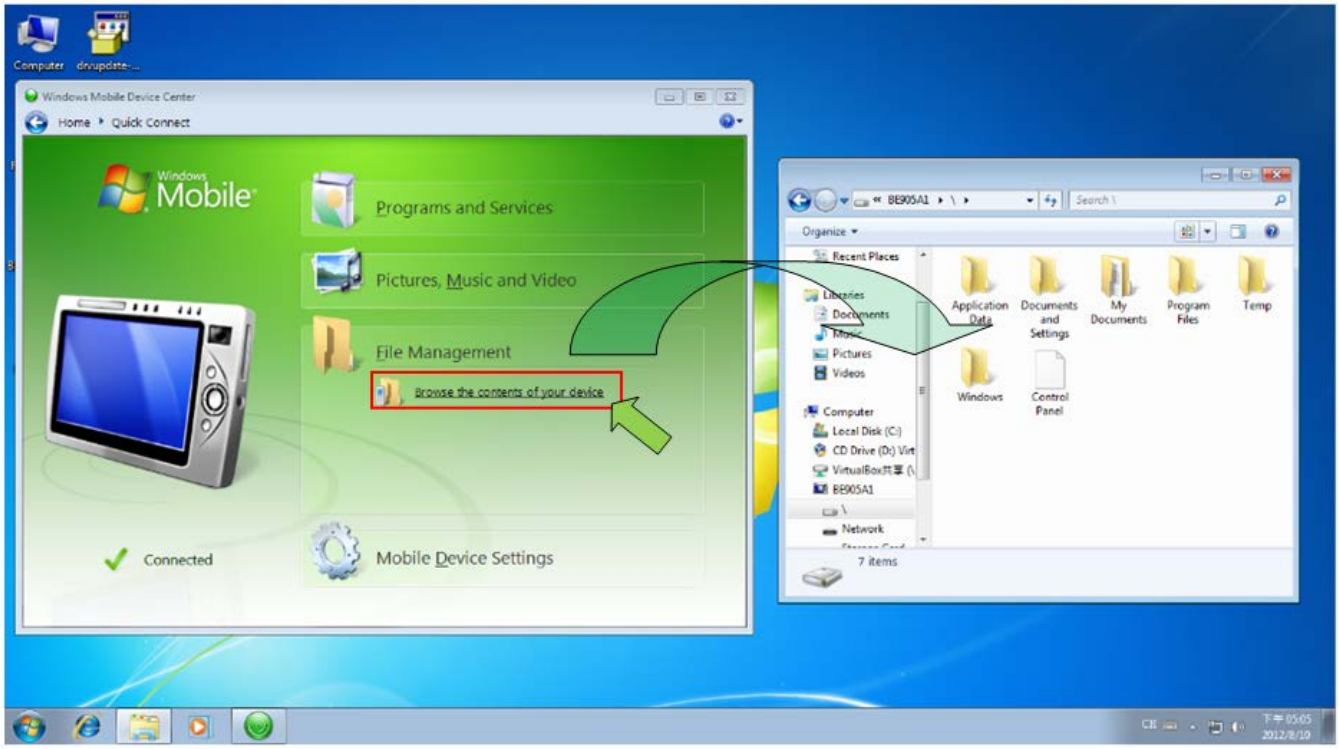
3. Click **Explore** and browse into the folder of BE905A1. You can easily transfer files between PC and BE905A1 now.



Windows 7 (32-bit/64-bit)

1. Once the USB connection is established, your Windows Mobile Device Center will show a **Connected** status. Then select **Connect without setting up your device**.

2. Select **Browse the contents of your device**, then you can transfer files between PC and BE905A1.



3.5 Auto Startup Application

Developers who want to launch specific applications after system boot up can follow the Auto Run procedure as below.

Auto Run

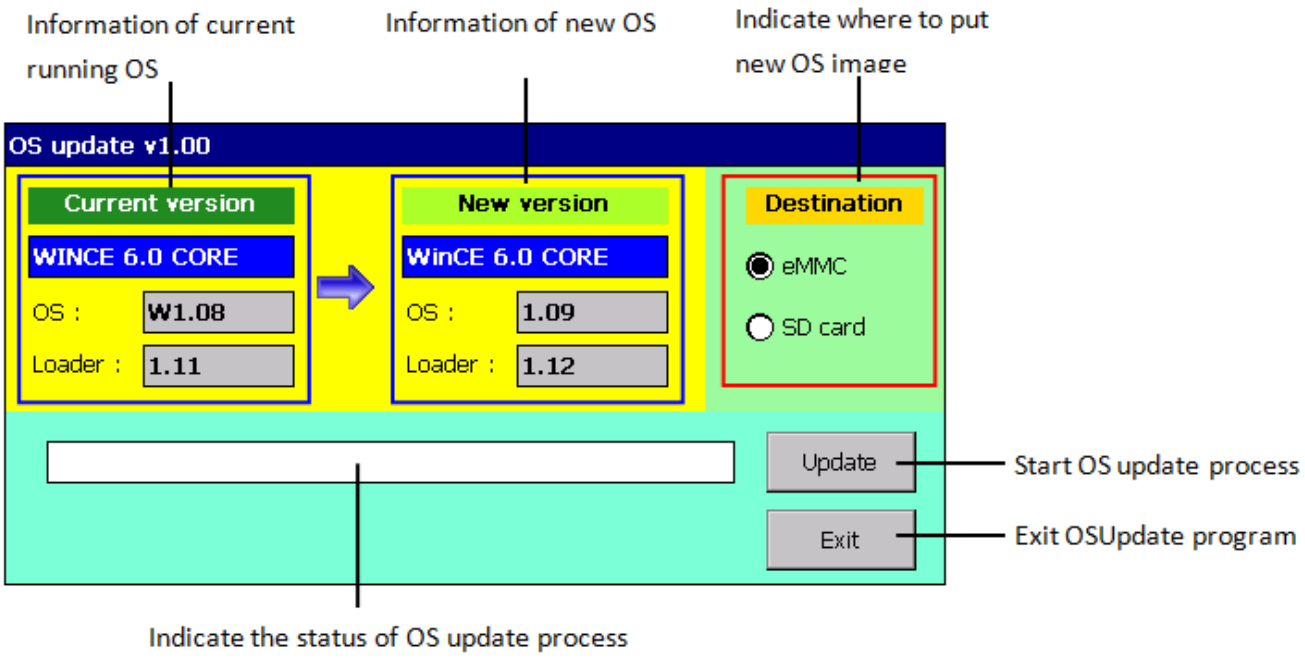
The Auto Run procedure will look for four kinds of files and execute the file according to following prioritization:

1. **Startup.bat** under path **"**Local Storage**"** in eMMC.
2. **Autoexec.exe** under path **"**Local Storage**"** in eMMC.
3. **Startup.bat** under root path in SD card.
4. **Autoexec.exe** under root path in SD card.

By above rule, users can either edit the batch file "**startup.bat**" to execute the specific applications on PC and place the batch file into eMMC or rename the specific executed application to "**autoexec.exe**" and then place it into eMMC or SD card. Please be noted the procedure will stop once the priority one is found, for example, if the "**startup.bat**" is found, the Auto Run will stop finding next "**autoexec.exe**" even if it exists.

3.6 OS Update

We provides a software utility for customers to update WinCE OS image on BE905A1. The following picture is the main screen of the **OSUpdate** program which you can find under the \Windows folder.



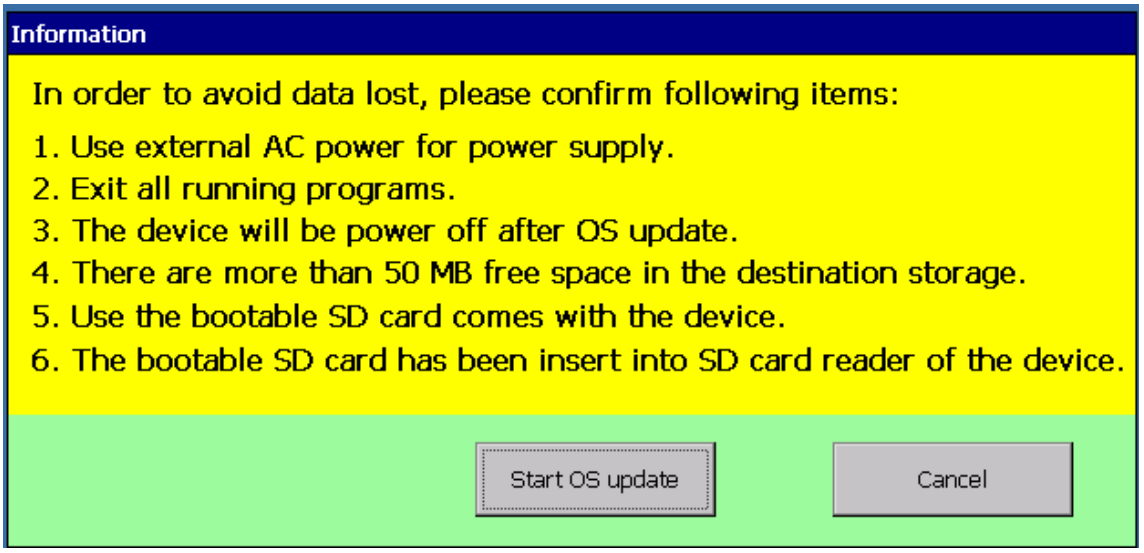
Operation Procedures

STEP 0. Plug in AC power then execute **"OSUpdate.exe"**.

STEP 1. Select the destination storage device on which new OS will be put.

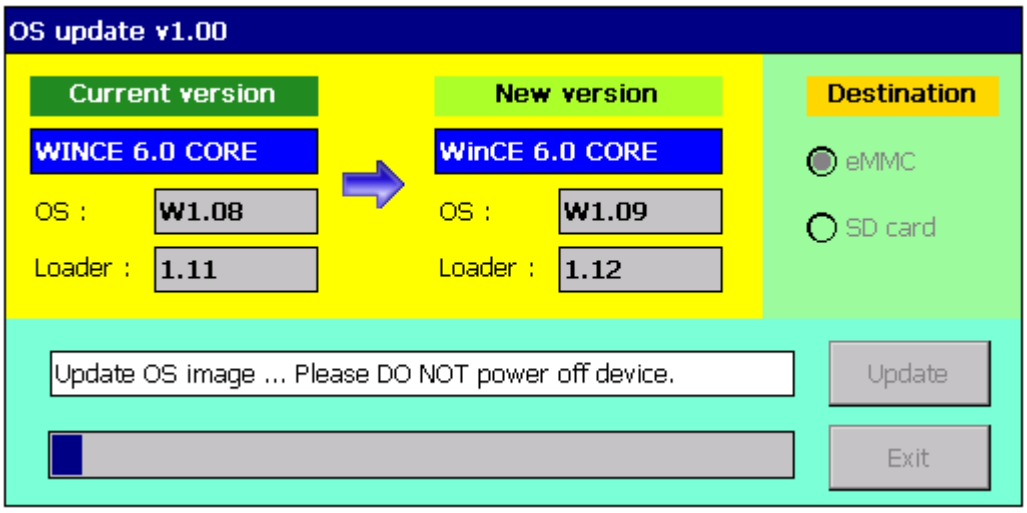
STEP 2. Click "**Update**" button to move to next step.

STEP 3. An information screen will be shown as below:



Please read each item carefully and click "**Start OS update**" button to start the update process if you agree and make sure your device match all items or select "**Cancel**" button to go back to main screen. The 5th and 6th items only be shown in case of you select "**SD card**" as the destination storage device.

STEP 4. If you decide to start the OS update process, the program will start to update OS image as below. **Please DO NOT power off the device while updating OS image.**



STEP 5. The program will power off the device after finishing the OS update process. Click the power button to boot your device by new OS image.

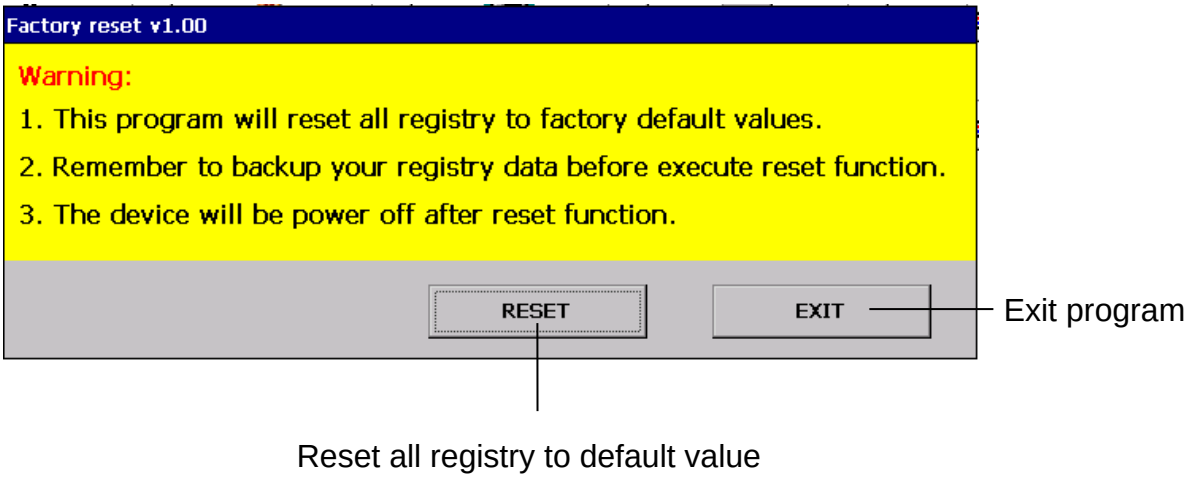
NOTE: Here are rules for OS update that customers have to follow up to avoid OS update fail:

1. Core version OS could only be updated to the devices built-in core version OS and only devices built-in WinCE professional version OS could update via professional version OS. The "**Update**" button will be disabled in case of invalid OS checked.

2. Please plug-in external AC power adapter before executing OSUpdate.exe. The "**Update**" button will be disabled without external AC power.

3.7 Factory Reset

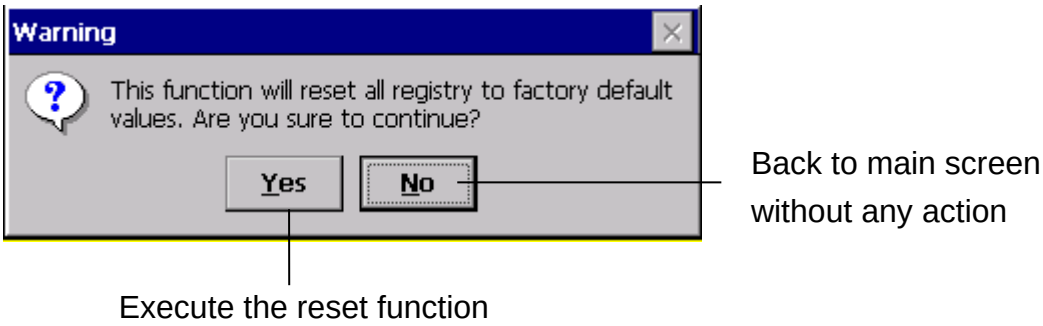
We provide a **FactoryReset** program for customers to reset all registries to default values. The following picture shows the main screen of **FactoryReset** program.



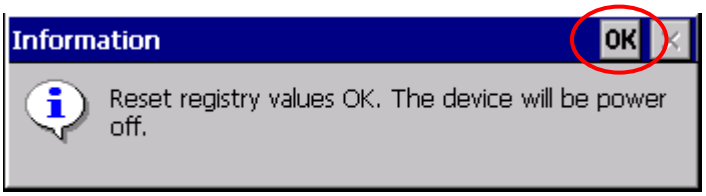
Operation procedures

Step 0. This program will reset all registries to default values. Remember to perform backup before executing the reset function.

Step 1. Click the "**RESET**" button to execute the reset function. Below dialog will pop up to confirm with the user again:



Step 2. Below dialog will appear after finished reset function, click "**OK**" button to power off device:



Step 3. The registry values will revert to default values after device re-boot.

NOTE: The time zone value will reset to factory default after device re-boot. Users must configure the time zone manually after factory reset.

4 Hardware Test Utility

We provides several test utilities to help developers verify the correctness of hardware modules/peripherals function on BE905A1.
Below table lists the current available test programs. Please refer to the following sections for more details.

Utility Name	Stored Path	Description
Serial Port Test	\\Windows\SerialPortTest.exe	Send/Receive data through COM port
GPS Test	\\Windows\GPSTest.exe	Setup the GPS connection to receive GPS message, display current GPS status
GSM Test	\\Windows\GSMTest.exe	Test basic GSM functions, like phone call or SMS
GPRS Test	\\Windows\GSMTest.exe	Establish cellular data network connection to access Internet
GPIO Test	\\Windows\GPIOTest.exe	Verify all GPIO functions ; test audio output(internal speaker or earphone) function
ADC Test	\\Windows\ADCTest.exe	Verify each ADC channel functions
Keypad Test	\\Windows\KeypadTest.exe	Verify 7 user-defined keys functions
Backlight Control	\\Windows\BKLTCtrl.exe	Adjust the brightness of LCD backlight
CAN BUS Test	\\Windows\CANBusTest.exe	Test basic CAN Bus functions like "transmit" or "receive" messages; set acceptance mask and filter for CAN Bus
Light Sensor Test	\\Windows\LightSensorTest.exe	To read illumination value from the built-in light sensor and adjust brightness automatically

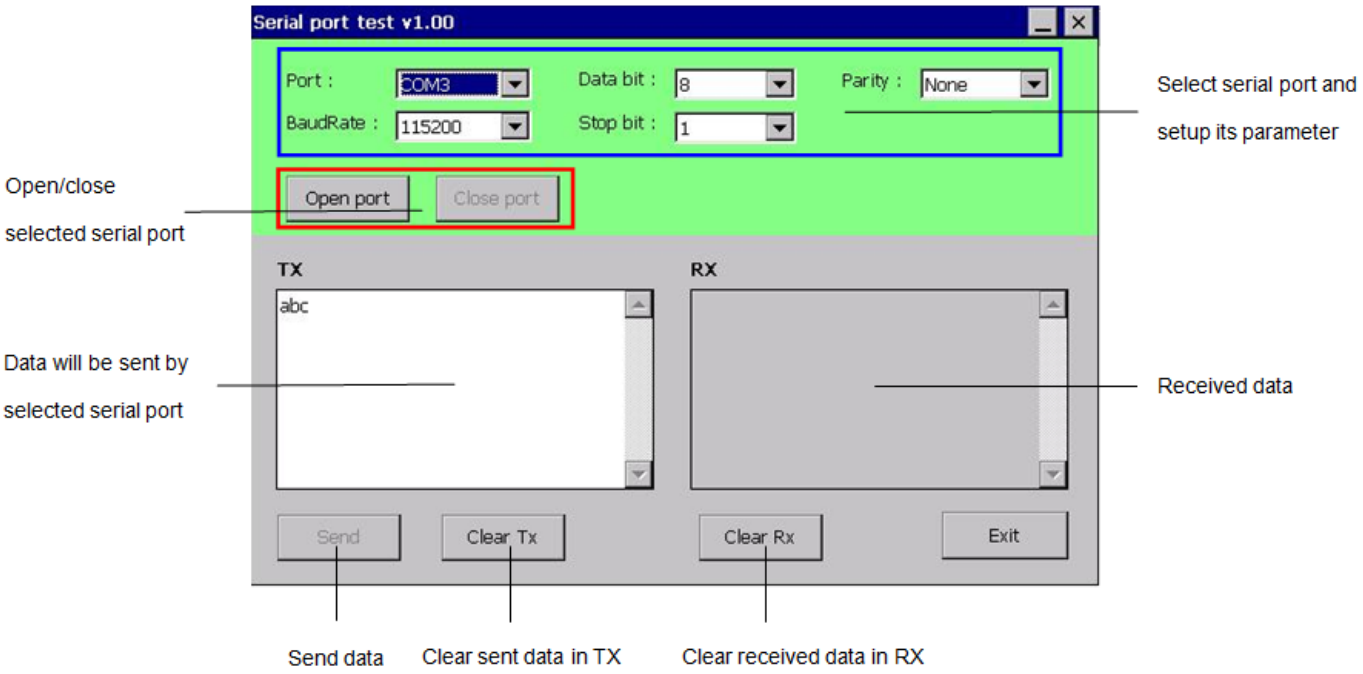
4.1 Serial Port Test

About Serial Port Test

This program let user send/receive data through selected COM ports. There are 4 available COM ports on BE905A1, following table lists simple description of these COM ports:

Port Name	Description	Working Parameters (Baud Rate/Data Bit/Parity/Stop Bit)
COM2	Port for GPS module	9600/8/N/1
COM3	Public RS232 port	Baud rate (bps): 4800/9600/19200/38400/57600/115200
COM6	Port to send AT command to GSM module	115200/8/N/1
COM7	Port for dial-up network	115200/8/N/1

Utility Snapshot



Operation Procedures

STEP 1. Take COM3 for example, connect BE905A1 to PC or another device by RS232 cable.

STEP 2. Select serial port from the drop-down list and then set all parameter values.

STEP 3. Click “**Open Port**” button to open selected serial port.

STEP 4. To test the sending function, input data in "**TX"** text-box and then click “**Send**” button to send "***input data***" through selected serial port.

STEP 5. To test the receiving function, send data from the device connected to BE905A1, all "***receive data***" will be shown at "**RX"** text-box.

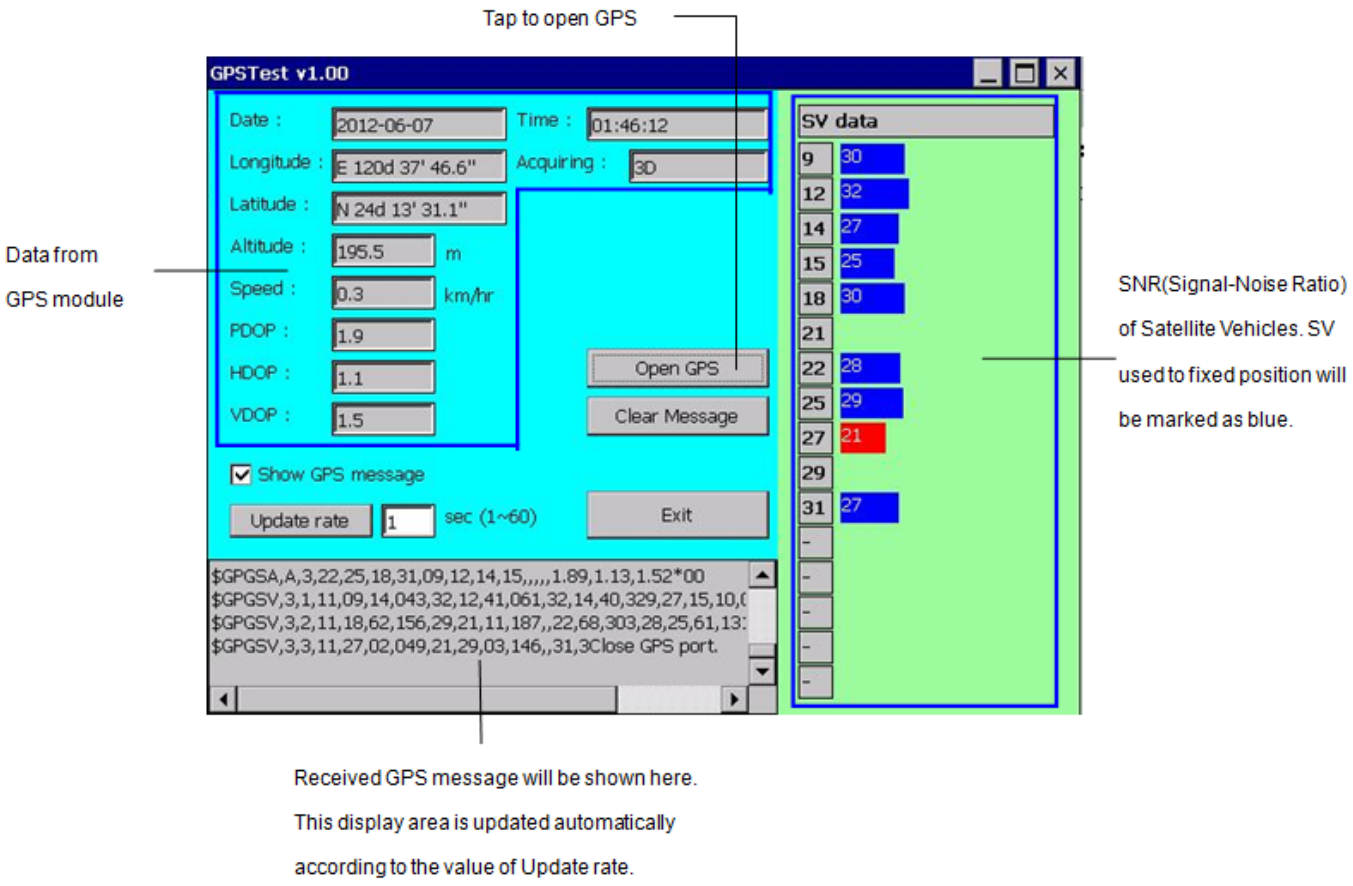
NOTE: To test the COM3 port, you must use the DB-9 male connector of the Multi I/O cable for this test utility.

4.2 GPS Test

About GPS Test

BE905A1 has a built-in GPS module, and by this program user can receive and parse GPS data to show related geographical information on the window.

Utility Snapshot



Operation Procedures

STEP 1. Click "**Open GPS**" button to set up the connection on GPS module.
Once the connection is set, the program will show SNR of Satellite Vehicles, date, time and acquiring status. Other information will be shown while the acquiring status is fixed as 2D or 3D.

STEP 2. If the "**Show GPS message**" check-box is checked, all received GPS message will be shown in the message text-box. In addition, "**Clear Message**" button could clear all messages in the text-box.

STEP 3. User could change the value of update rate by clicking "**Update rate**" button to send the value to GPS module to set the output frequency of GPS message.

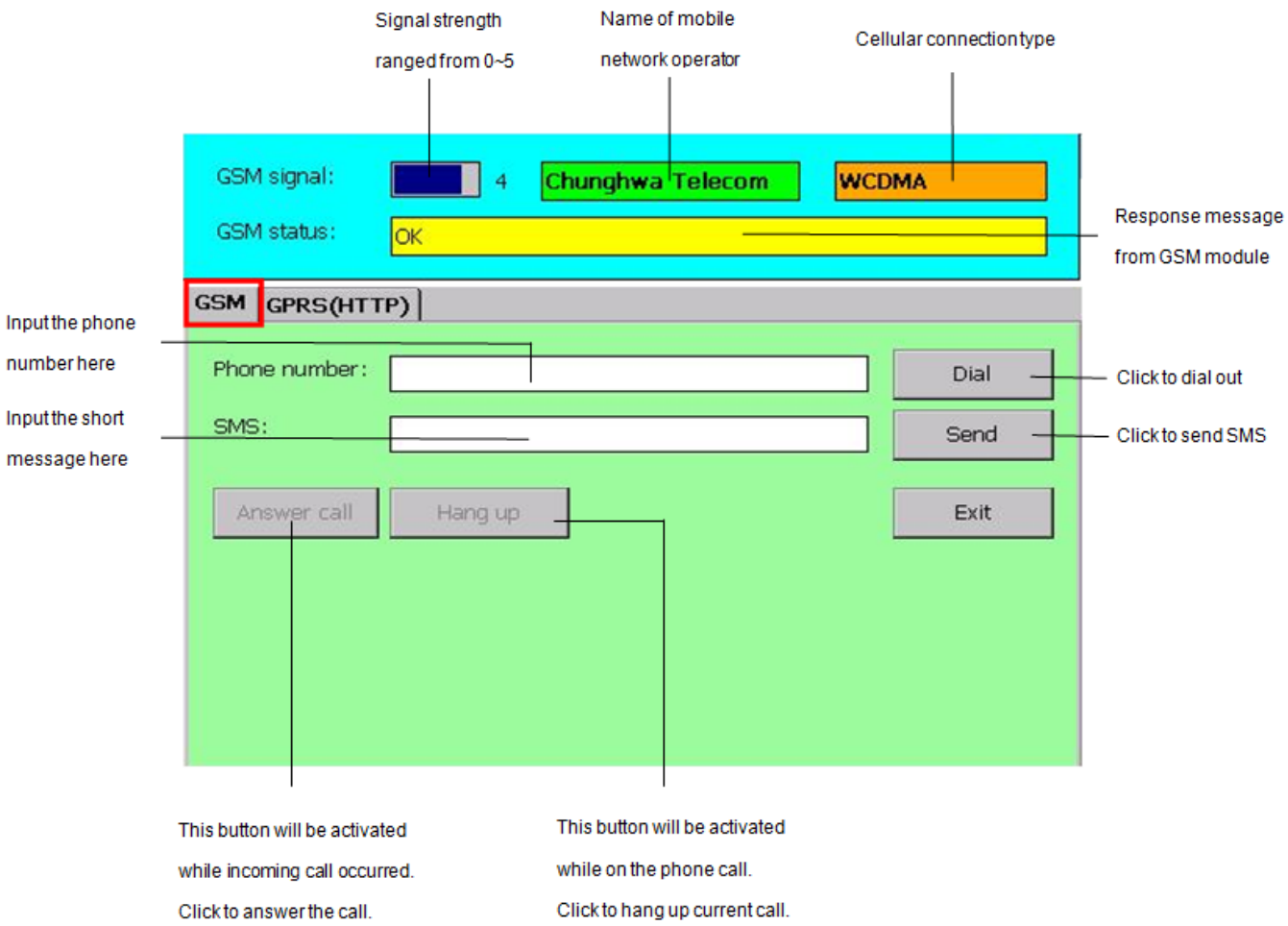
NOTE: To test the GPS function, you should position the device on the place where the GPS satellite signal is well received, like open sky area.

4.3 GSM Test

About GSM Test

This program let user test the basic GSM functions such as phone call and SMS.

Utility Snapshot



Operation Procedures

STEP 1. User could dial or answer a phone call if the GSM Status shows "**OK**".
If GSM Status shows "**Open COM error**", please close this program and check if there is other program using GSM module or COM6 port.

STEP 2. Input the phone number and click "**Dial**" button to create an outgoing call.

STEP 3. If there is an incoming call, the ring sound will be played and the "**Answer call**" button will be activated. Click "**Answer call**" button to answer the incoming call.

STEP 4. The "**Hang up**" button will be activated while a call was set up. Click "**Hang up**" button to disconnect current call.

STEP 5. If there is an incoming short message, a dialog as below will appear to show the message content, sender and date of received short message.

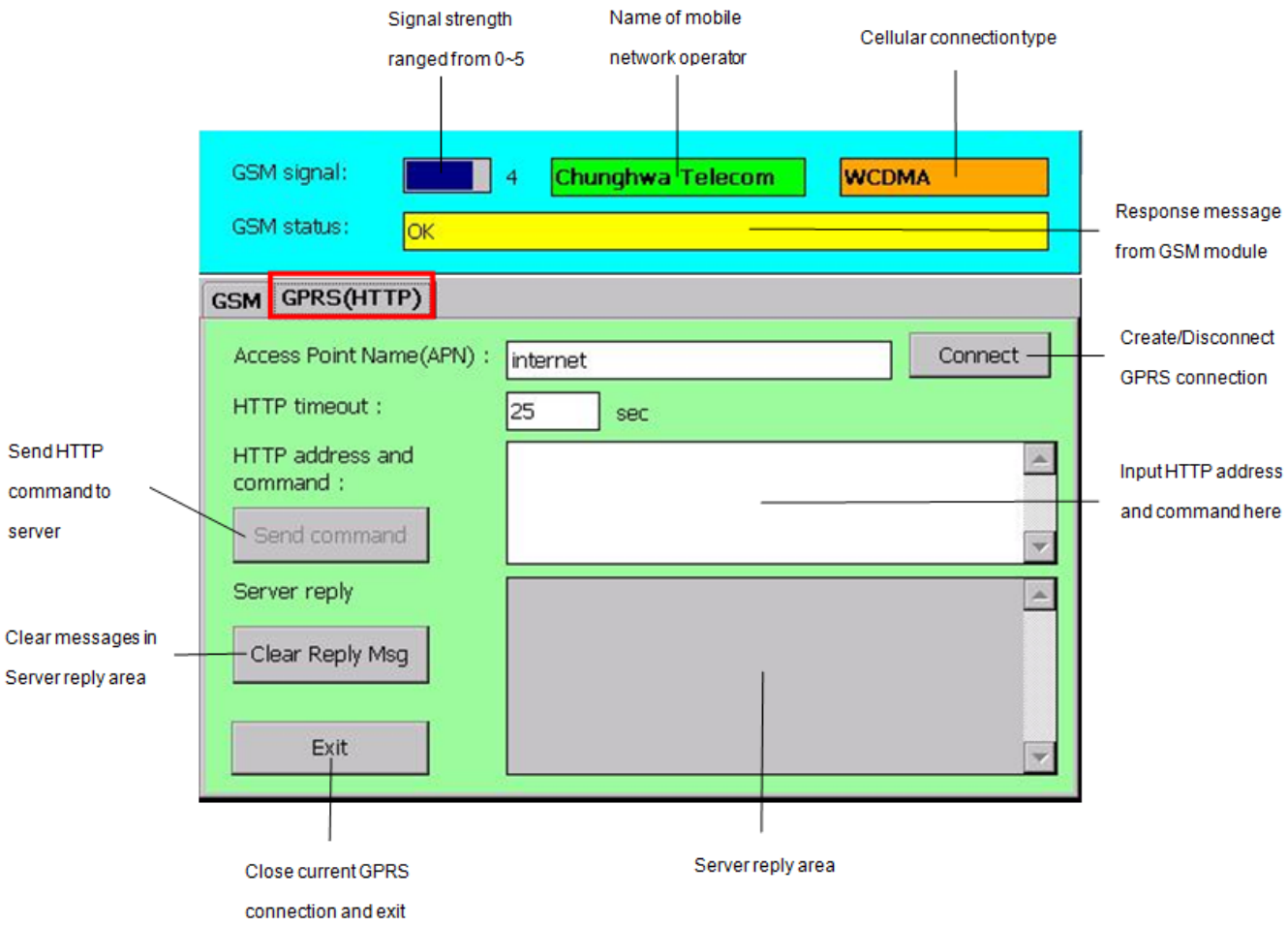
NOTE: You must insert SIM card in BE905A1 before power up to try this test utility.

4.4 GPRS Test

About GPRS Test

This program let user create GPRS connection and send HTTP command through GPRS network by AT command.

Utility Snapshot



Note: This test utility is only a simple program for limited AT command input fields to create GPRS connection to server. It may not contain all possible AT command connection parameters from some mobile network providers in the world. So if you fail to connect to server by this test utility, please try to test your case by using "**Network and Dial-up Connection**" setting described in Section 3.3.

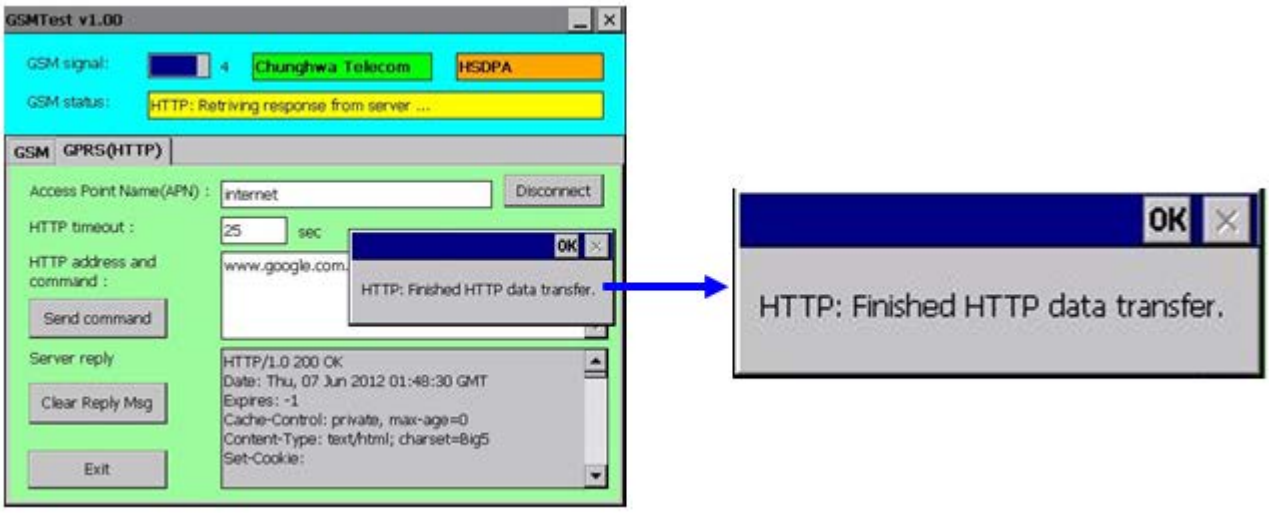
Operation Procedures

STEP 1. Input Access Point Name(APN). Please check this value with your mobile network provider.

STEP 2. Click "**Connect**" button to create GPRS connection by input APN. If the connection is set up successfully, the "**Connect**" button will become "**Disconnect**" and the "**Send command**" button will be activated.

STEP 3. Input HTTP address and command, for example http://www.google.com. Then click "**Send command**" button to send out HTTP command via GPRS connection. User could change the value of HTTP timeout before sending out HTTP command, considering some HTTP commands need more time to transfer data.

STEP 4. After receiving all data from server, the program will show all data at "**Server reply**" area and display a dialog as below to indicate that all data from server has been read.



STEP 5. User could clear data in "**Server reply**" area by clicking "**Clear Reply Msg**" button.

STEP 6. Click "**Disconnect**" button to close current connection, or "**Exit**" button to close current connection and exit program.

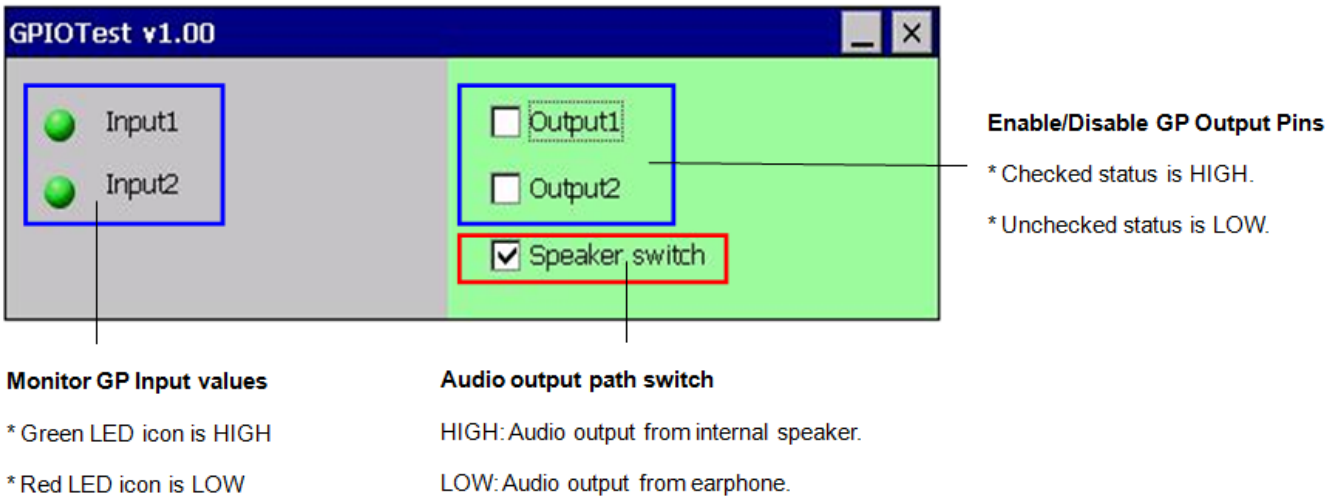
NOTE: The reception quality of 3G connection may depend on what area you're in or what frequency is used

4.5 GPIO Test

About GPIO Test

The program will get the status of GP output pins at start up and update current value of all GP input pins every 0.5 second.
For input values, green LED icon means HIGH and red LED icon means LOW.
For output values, checked status means HIGH and unchecked status means LOW.
For speaker switch item, it's used to switch the audio output path, either internal speaker or earphone.

Utility Snapshot



NOTE: You must use the JST male connector on the Multi I/O cable for this test utility. Moreover, an extra hardware board is needed. Please refer to Section 2.14 for GPIO paragraph.

Operation Procedures

STEP 1. Connect the extra hardware test board to BE905A1.

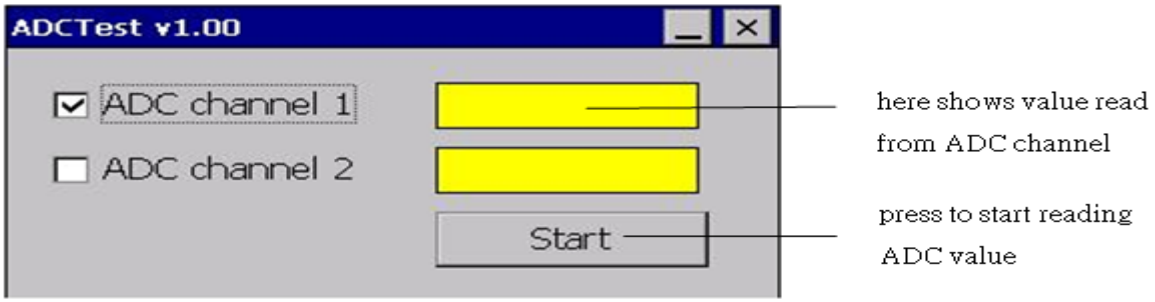
STEP 2. User could click the check box to change the output value.

4.6 ADC Test

About ADC Test

This program will show the input analog voltage value (ranged from 0~30V).
By default, this program will read ADC values per 0.5 second.

Utility Snapshot



Operation Procedures

STEP 1. User needs to input a voltage (available from 0~30V) to the ADC channels.

STEP 2. Click check box to select the ADC channels to be read.

STEP 3. Click "**Start**" button to start reading ADC values of selected channels.
The "**Start**" button will become "**Stop**" button while start reading.

STEP 4. Click the "**Stop**" button will stop the reading action.

NOTE: You must use the JST male connector on the Multi I/O cable for this test utility. Please refer to Section 2.14 for ADC paragraph.

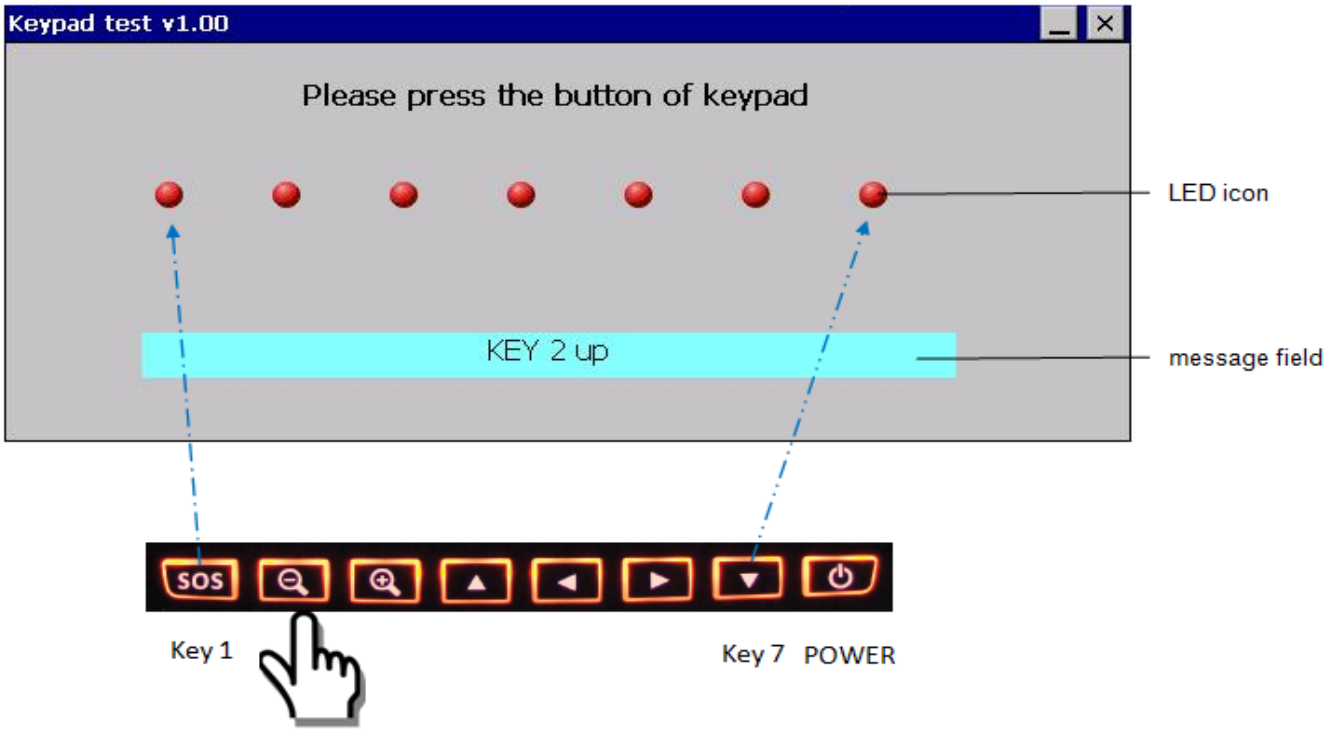
NOTE: The converted ADC value may have little deviation with the real input voltage.

4.7 Keypad Test

About Keypad Test

The 7 LED icons on this program will be mapped to the 7 physical buttons (except the POWER button) on BE905A1.The LED icon status will be changed corresponding to the selected button pressed(Green color) or un-pressed(Red color).
Also a message will be shown in the message field while the LED icon status of the button is changed.

Utility Snapshot



Operation Procedures

STEP 1. User could press any one of 7 buttons and see if the LED icon status is correct or not.

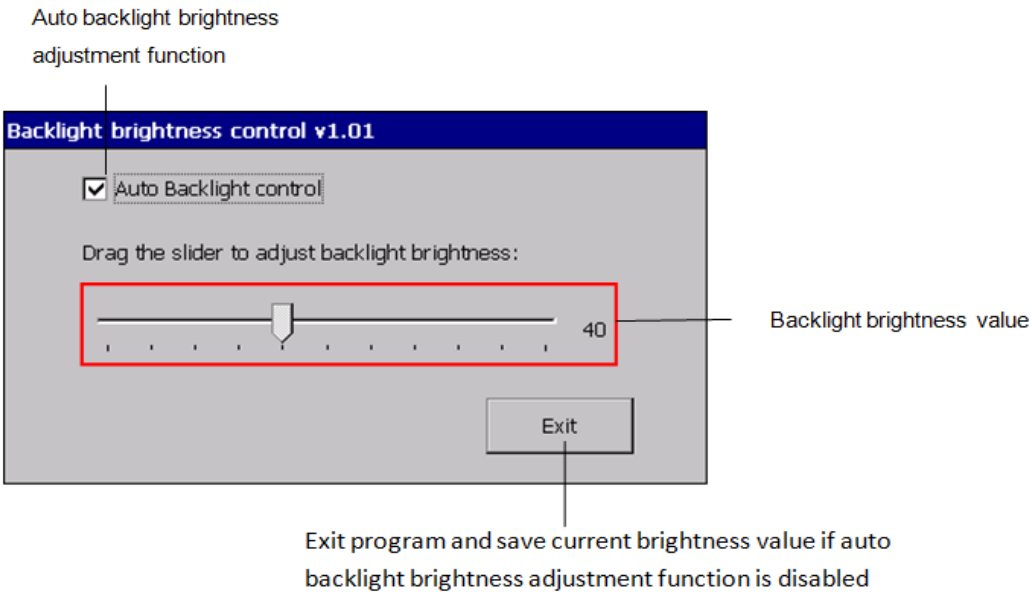
NOTE: Multiple key-press detection and decoding (two Keys fully compliant but more than two with some limitations).

4.8 Backlight Control

About Backlight Control

User could use this program to adjust the brightness of LCD backlight.
The adjustment value is from 20 to 100.

Utility Snapshot



Operation Procedures

STEP 1. Check/Uncheck the "**Auto Backlight control**" check box to enable/disable the auto backlight brightness adjustment function.

STEP 2. If the auto backlight brightness adjustment function is enabled, the backlight brightness value will be update automatically.

STEP 3. If the auto backlight brightness adjustment function is disabled, drag the slider to change current brightness value of LCD backlight.

STEP 4. User could use the first button 

of keypad to ON/OFF backlight.

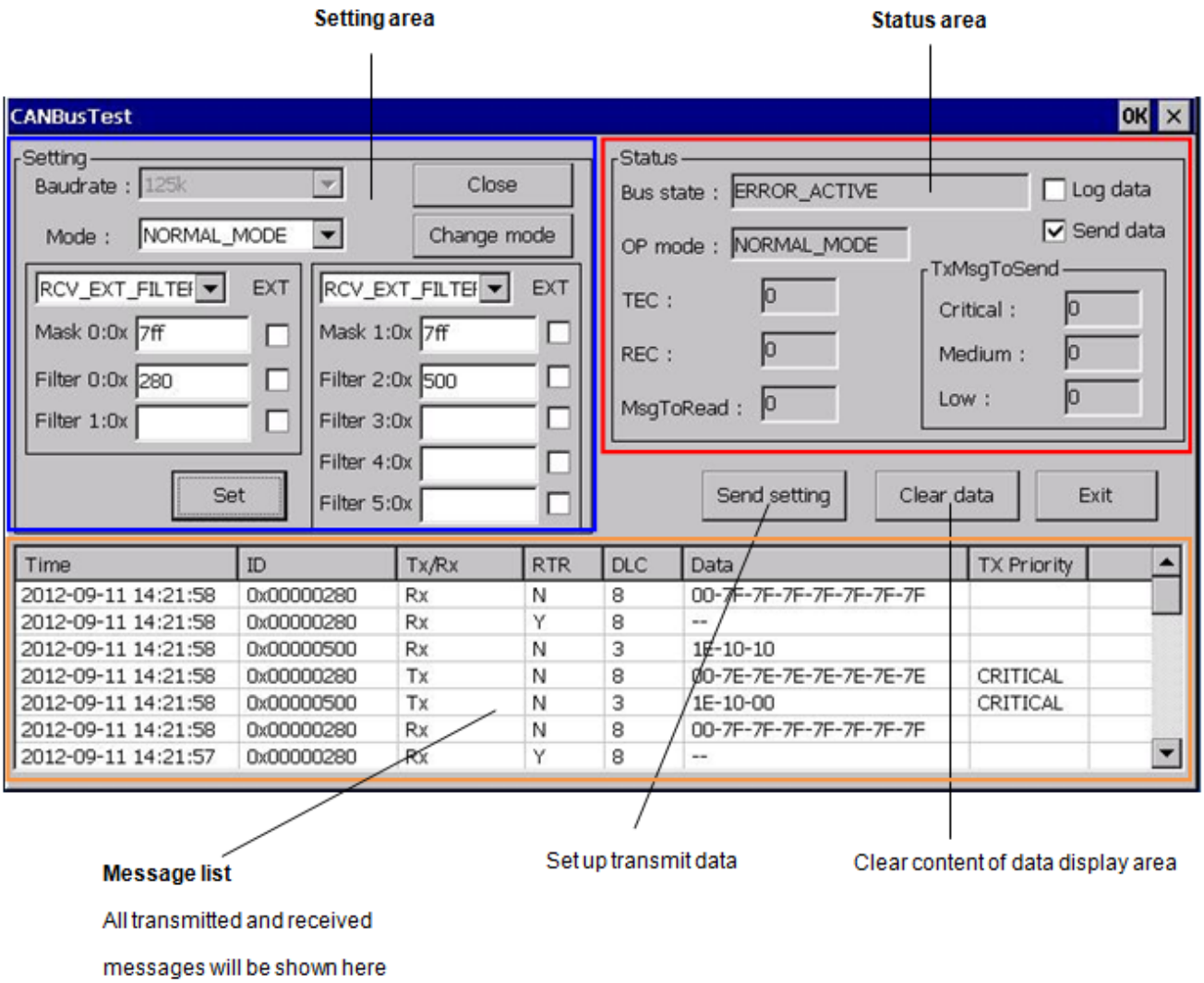
STEP 5. Click "**Exit**" button to exit the program. Current brightness value will be saved if the auto backlight brightness adjustment function is disabled.

4.9 CAN BUS Test

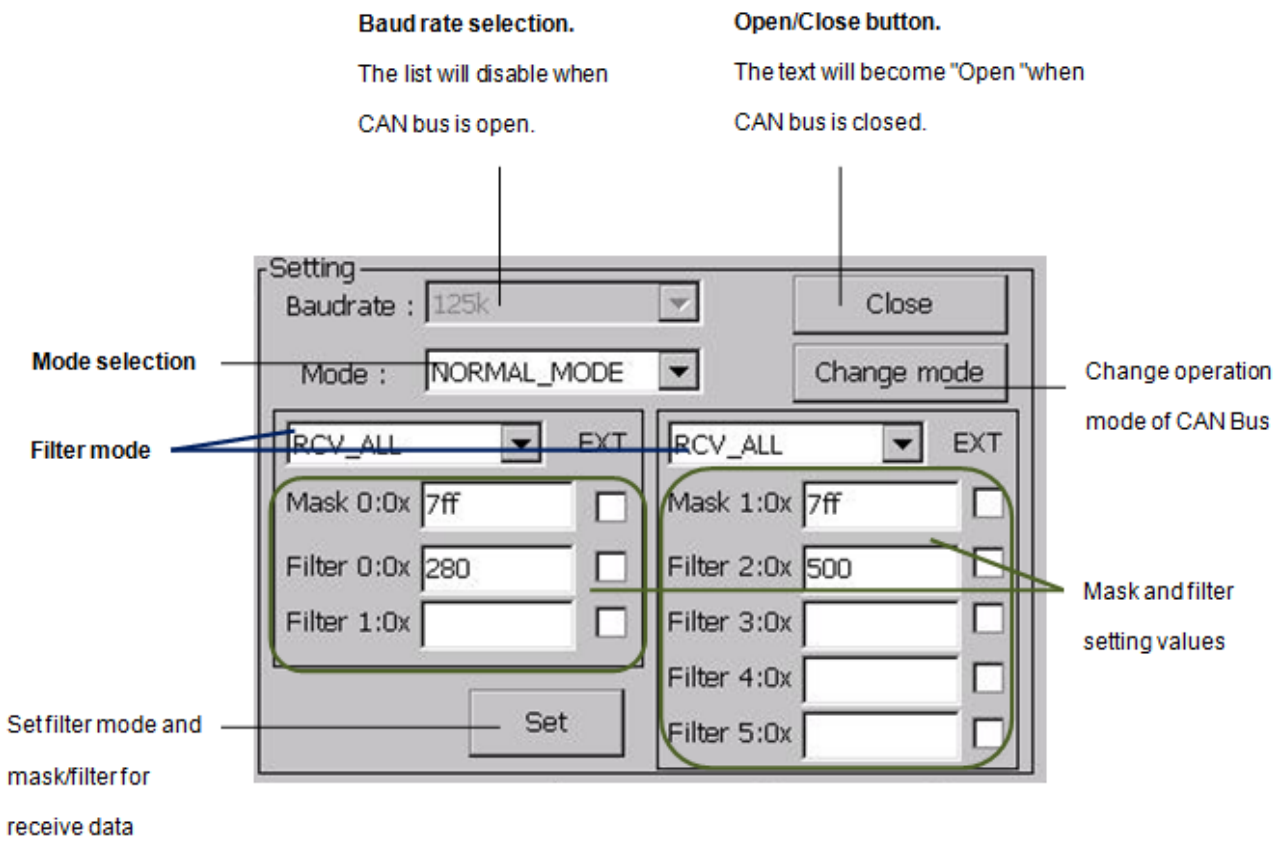
About CAN Bus Test

CANBusTest program let user test basic CAN bus functions such as transmit or receive messages via CAN bus and set acceptance mask and filter for CAN bus. Below snapshot shows the main operation screen of CANBusTest program:

Utility Snapshot



Setting Area

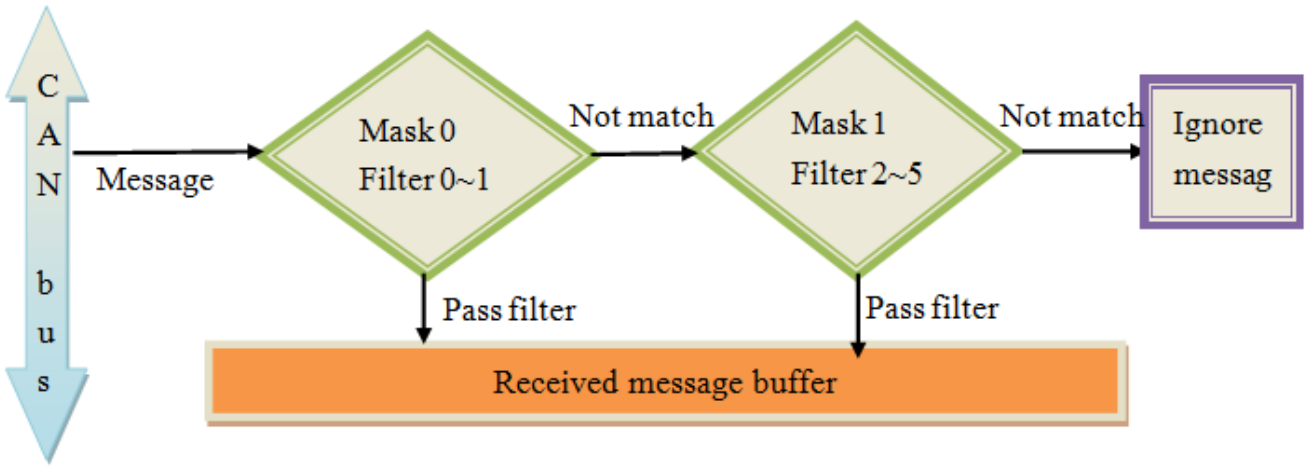


Definition of CAN bus operation mode

Operation mode	Description
NORMAL_MODE	Actively monitor all bus messages and generates acknowledge bits, error frames, etc. This is also the only mode in which the 905A could transmit message over the CAN Bus.
SLEEP_MODE	The TXCAN pin will remain in the recessive state. Wake up when bus activity occurs or setting to the other mode.
LOOKBACK_MODE	Internal transmission of messages from the transmit buffers to the receive buffers without actually transmitting messages on the CAN Bus. The acceptance filters and masks can be used to allow particular messages only.
LISTEN_MODE	No messages will be transmitted in this mode (including error flags or acknowledge signals). The acceptance filters and masks can be used to allow particular messages only.

Acceptance Mask and Filter

BE905A1 provides 2 sets of acceptance mask and filter for user to sieve out necessary messages from incoming messages. Below diagram shows the receiving message flow of CAN bus driver of BE905A1:



Following table is the truth table of mask and filter value:

Mask Bit n	Filter Bit n	Message Identifier bit	Accept or Reject bit n
0	x	x	Accept
1	0	0	Accept
1	0	1	Reject
1	1	0	Reject
1	1	1	Accept

Note: x = don't care

Combining 2 filter modes, acceptance mask and filter, user could receive message and ignore the other messages. Here we list the definition of filter mode:

Definition of Filter mode

Filter mode	Description
RCV_ALL	Turn mask/filters off, receive any message
RCV_STD_FILTER	Receive only valid messages with ID that meet mask and filter criteria
RCV_EXT_FILTER	Receive only valid messages with extended ID that meet mask and filter criteria. When receiving message with standard ID, automatically applies 16 bits of mask and filter normally associated with extended ID to the first 16 bits of the data field.

Rule of filter and mask

1. As the mask settings exceeding 11bits, the way it works will match the Filter mode table above.

Example 1:

set Mask0 = 0x1fffffff
set Mask1 = 0x1fffffff
set Filter 0 = 0x0a001e10
set FilterMode = RECEIVE_EXT_WITH_FILTER

Message A: ID=0x280 , data = 0x1E, 0x10
Message B: ID=0x280 , data = 0x10, 0x1E
Message C: ID=0x500 , data = 0x1E, 0x10
Message D: ID=0x3040 , data = 0x1E, 0x10
RTR Message: ID=0x280, data = no data

⇨ Message A and RTR Message will be received and the other messages will be ignored because data of Message B could not pass Filter 0.

Change the filter mode to RECEIVE_STD_WITH_FILTER.

⇨ Message A, Message B , RTR Message will pass the filter and be received.

2. If the mask setting not exceeding 11 bits, both RCV_STD_FILTER and RCV_EXT_FILTER will work in the same way to filter message ID, based on the value of acceptance mask and filter.

Example 2:

set Mask0 = 0x7ff
set Mask1 = 0x1fffffff
set filter0 = 0x280
set filter2 = 0x800 with Extended

Message A: ID=0x800 , data = 0x1E, 0x10
Message B: ID=0x280 , data = 0xaa, 0xbb
Message C: ID=0x3567 , data = 0xb3, 0xb2
Message D: ID=0x400, data = 0xee, 0xe3

When mask 1 filter mode is set to RCV_EXT_FILTER, only Message A and Message B will be received; regardless of how mask 0 filter mode is set. Because the mask value does not exceeding 11 bits, BE905A1 will filter the message ID based on the value of acceptance mask and filter.

3. Filter with Extended setting is used to filter the Extended ID, filter without Extended setting will be used to filter the Standard ID. **But if the** mask settings exceeds 11bits, 11 of the Most Significant Bits of the filter are used to filter the ID and 16 of the Least Significant Bits of the filter are used to filter the first 16-bits of the data.

Example 3:

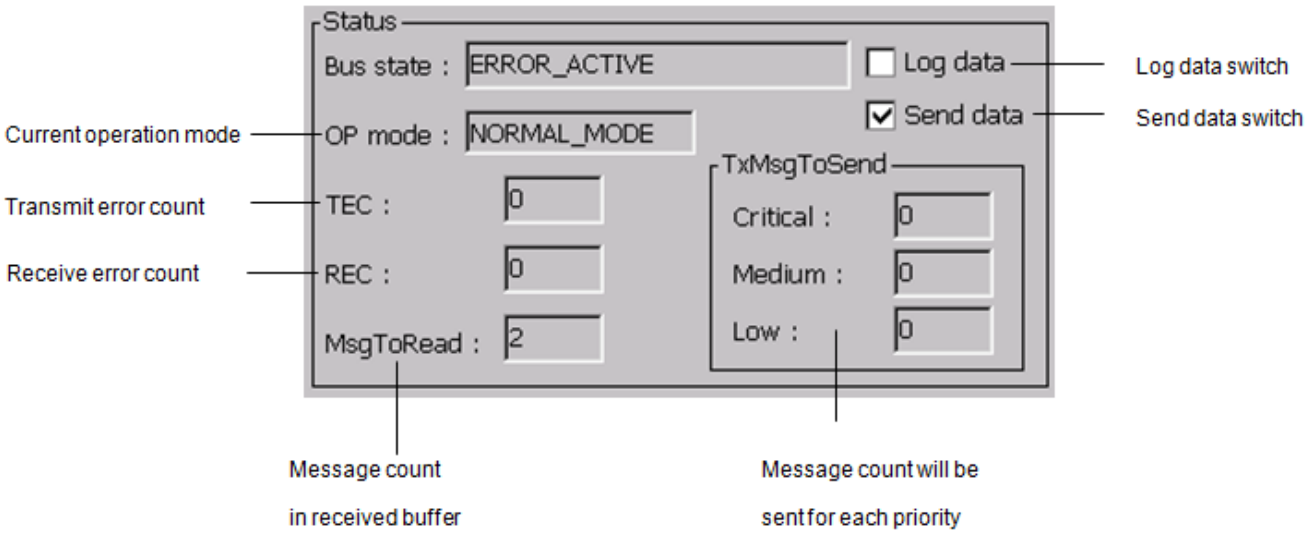
set Mask0 = 0x1fffffff
set Mask1 = 0x1fffffff
set filter0 = 0x800 with Extended
set filter1 = 0x280
set FilterMode = RECEIVE_EXT_WITH_FILTER

Message A: ID=0x800 , data = 0x1E, 0x10
Message B: ID=0x280 , data = 0xaa, 0xbb
⇨ Only Message A will be received. Message B will be ignored because its data could not pass Filter 1.

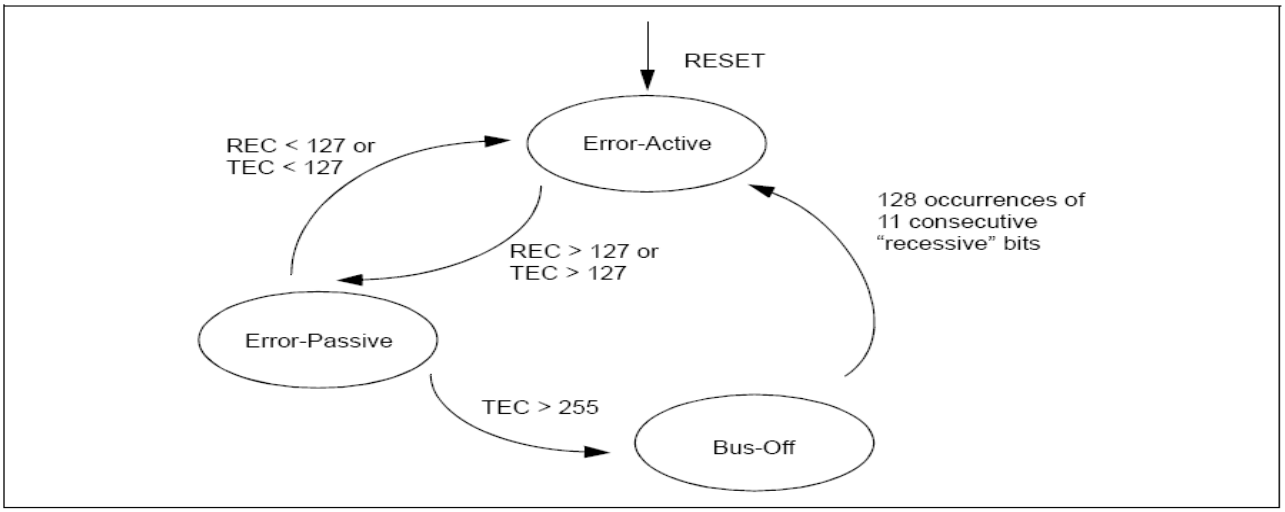
Set FilterMode to RECEIVE_STD_WITH_FILTER
⇨ Both Message A and Message B will be received.

Status Area

The program will show current status of CAN bus at status area as below:



CAN bus of BE905A1 will switch its state automatically based on the value of TEC and REC. Below diagram shows the bus state transition:



Following table lists the definition of each bus state:

Definition of Bus state

Bus state	Description
ERROR_ACTIVE	BE905A1 is on active state or active warning state if TEC < 127 and REC < 127. The active state is usual state when the node can transmit or receive messages and active error frames (made of dominant bits) without any restrictions. BE905A1 will switch to active warning state if TEC or REC > 96.
TX_ERROR_ACTIVE_WARNING	
RX_ERROR_ACTIVE_WARNING	
TX_ERROR_PASSIVE	BE905A1 will switch to passive state if TEC > 127 or REC > 127. In this state, BE905A1 can transmit messages and passive error frames (made of recessive bits).
RX_ERROR_PASSIVE	
TX_BUS_OFF	Only transmitters can switch to bus-off state. A transmitters will become bus off state if TEC > 255. The bus-off state makes it temporarily impossible for the station to participate in the bus communication. During this state, messages can neither be received nor transmitted.
RX_PASSIVE,TX_PASSIVE	RX_ERROR_PASSIVE + TX_ERROR_PASSIVE
RX_PASSIVE,TX_WARNING	RX_ERROR_PASSIVE+ TX_ERROR_ACTIVE_WARNING
RX_WARNING,TX_PASSIVE	RX_ERROR_ACTIVE_WARNING+ TX_ERROR_PASSIVE
RX_WARNING,TX_PASSIVE	RX_ERROR_ACTIVE_WARNING+ TX_ERROR_PASSIVE

Log data switch

If user checks the Log data switch, the program will save all transmitted and received data in file named as "**CANLogyyyymmddhh.txt**" at the folder of this program.

Send data switch

A checked "***Send data***" switch means the program will transmit user defined message based on the transmit data setting. More detail information about transmit data setting could be found in the <Transmit Data Setting> paragraph.

Message List

The program will display all transmitted and received messages in Message list as below:

Time	ID	Tx/Rx	RTR	DLC	Data	TX Priority
2006-01-01 14:31:32	0x00000500	Rx	N	3	1E-10-10	
2006-01-01 14:31:32	0x00000280	Rx	N	8	00-7F-7F-7F-7F-7F-7F-7F	
2006-01-01 14:31:32	0x00000280	Rx	Y	8	--	
2006-01-01 14:31:32	0x00000500	Rx	N	3	1E-10-10	
2006-01-01 14:31:32	0x00000280	Rx	N	8	00-7F-7F-7F-7F-7F-7F-7F	
2006-01-01 14:31:31	0x00000280	Rx	Y	8	--	
2006-01-01 14:31:31	0x00000500	Rx	N	3	1E-10-10	CRITICAL

Following table lists the description of each field in the Message list:

Field	Description
Time	Receive or Transmit time of message.
ID	Target ID of this message. (Hexadecimal value)
Tx/Rx	Tx: Transmit message, Rx: Receive message.
RTR	Indicate this message is Remote Transmit Request or not.
DLC	Data length (UNIT : bytes)
Data	Data content of this message (Hexadecimal value).
Tx priority	The transmit priority of a transmit message. (CRITICAL/MEDIUM/LOW)

Operation procedures for main screen

STEP 1. Select CAN bus baud rate and click "**Open**" button to open CAN bus. The text of button will become "**Close**" and the program will start to update information in status area if CAN bus is opened successfully.

STEP 2. Default operation mode of CAN bus is NORMAL_MODE. Selecting new mode and click "**Change mode**" button could change current operation mode of CAN bus.

STEP 3. Change filter mode and mask/filter setting values then click "**Set**" button to change current filter setting of CAN bus.

STEP 4. All transmit and receive messages will be shown in the message list. Click "**Clear data**"

button could clear content of message list.

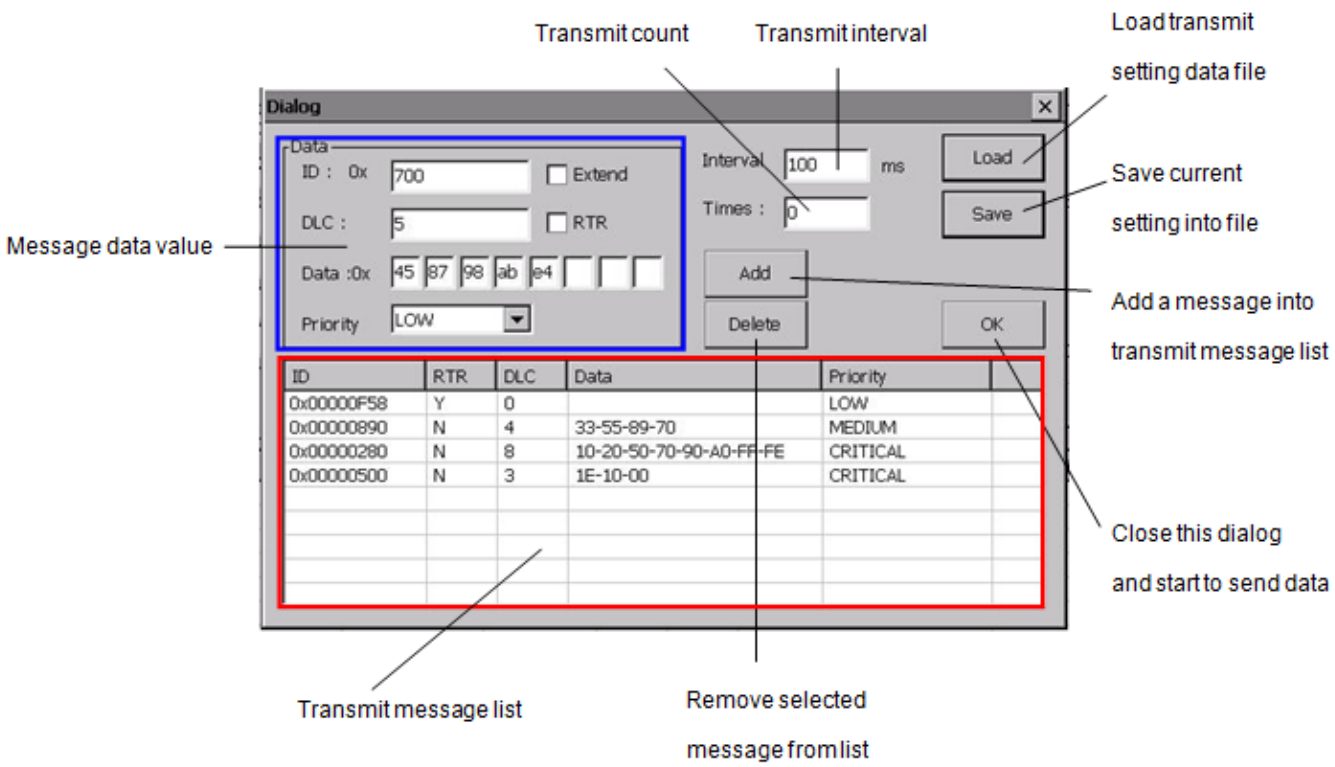
STEP 5. Click "**Send setting**" button to set up transmit data. More detail information about transmit data setting could be found in the <Transmit Data Setting> paragraph. User could pause or resume the transmit by Send data switch.

STEP 6. If user wants to change baud rate, please close CAN bus by click "**Close**" button first.

STEP 7. Click "**Exit**" button to close CAN bus and exit the program.

Transmit Data Setting

When user clicks the "**Send setting**" button, following dialog will be shown for user to se tup the transmit data rule:



Message data value definition

Field	Description
ID	Target ID of this message. (Hexadecimal value).
Extend	Indicate the ID value is standard format (11 bits) or extended format (29 bits).
RTR	Indicate this message is Remote Transmit Request or not.
DLC	Data length in this message (UNIT : bytes)
Data	Data content of this message (Hexadecimal value).
Priority	The transmit priority of a transmit message. (CRITICAL/MEDIUM/LOW)

Operation procedures for transmit setting dialog

STEP 1. Fill message data value and click "**Add**" button to add current message data into transmit message list.

STEP 2. If there are messages in the transmit message list, user could select a message in the list and the data of selected message will be shown at above area.

STEP 3. User could click "**Delete**" button to remove a selected message from transmit message list.

STEP 4. "**Save**" button could be used to save all messages in the list and current transmit setting into a file.

STEP 5. User could click "**Load**" button to load transmit messages and transmit setting from a file.

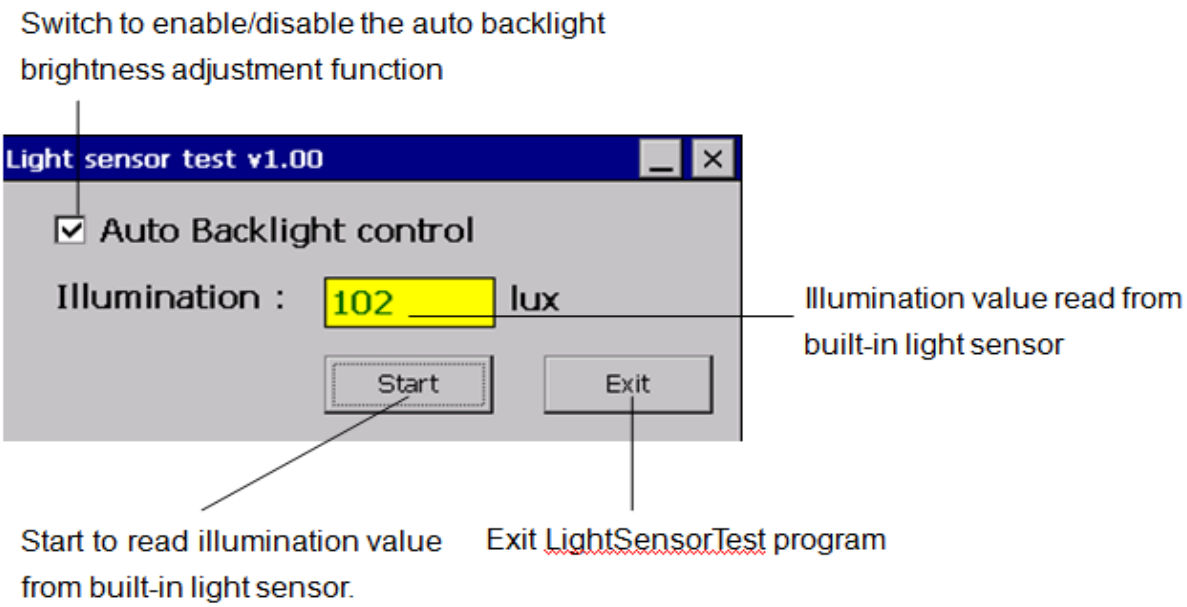
STEP 6. Change the transmit interval and count value, then click "**OK**" button to close the dialog. The program will start to transmit data via CAN bus base on the setting.

4.10 Light Sensor Test

About Light Sensor Test

By default setting, BE905A1 will adjust the backlight brightness based on the illumination value read from built-in light sensor to save power. User could enable or disable the auto backlight brightness adjustment function and read illumination value from the built-in light sensor by this **LightSensorTest** program.

Utility Snapshot



Operation Procedures

STEP 1. Check/Uncheck "**Auto Backlight control**" to enable/disable the auto backlight brightness adjustment function.

STEP 2. Click "**Start**" button to read illumination value from built-in light sensor. The "**Start**" button will become "**Stop**" button.

STEP 3. Click "**Stop**" button to stop read action.

STEP 4. Click "**Exit**" button to exit the program.

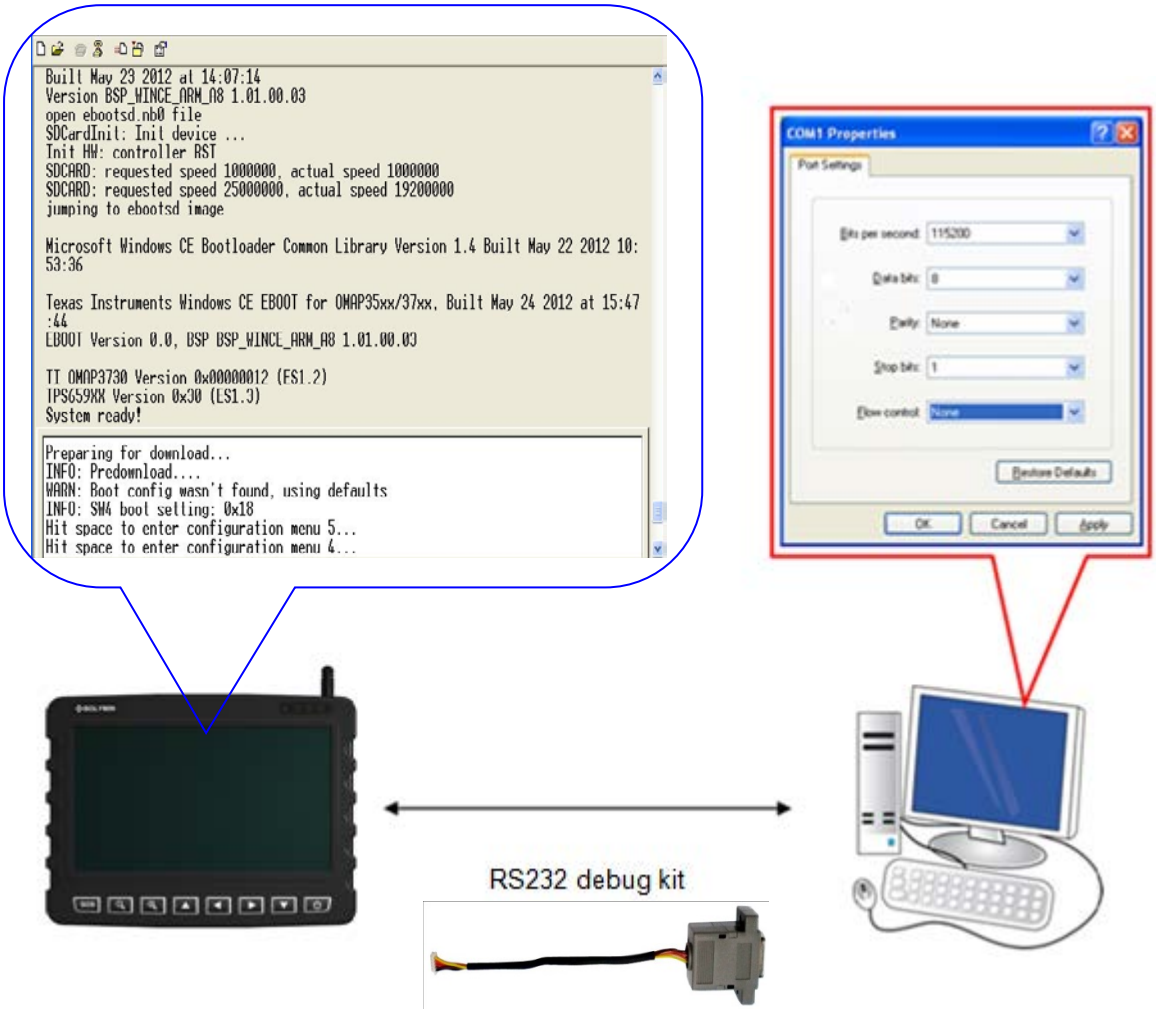
Appendix A - Dump Boot Message of BE905A1

As illustrated below, first connect BE905A1 and PC via RS232 debug kit. On PC side, you should launch terminal emulation program, e.g. **Hyper Terminal** in Windows XP system, to communicate with BE905A1 so that you can capture the boot message. If your PC is with Windows 7, the Hyper Terminal is not included by default, you can either use the 3rd party software like **Putty** or copy the **hypertrm.exe** and **hypertrm.dll** from one XP system to your target Windows 7 PC.

On the terminal emulation program, here we take Hyper Terminal on Windows XP for example, set up the COM port parameters : **115200** baud rate, **8** data bits, **None** parity, **1** stop bit and **None** flow control.

Then power on BE905A1. You should see the boot message as below example shown on the screen of Hyper Terminal program.

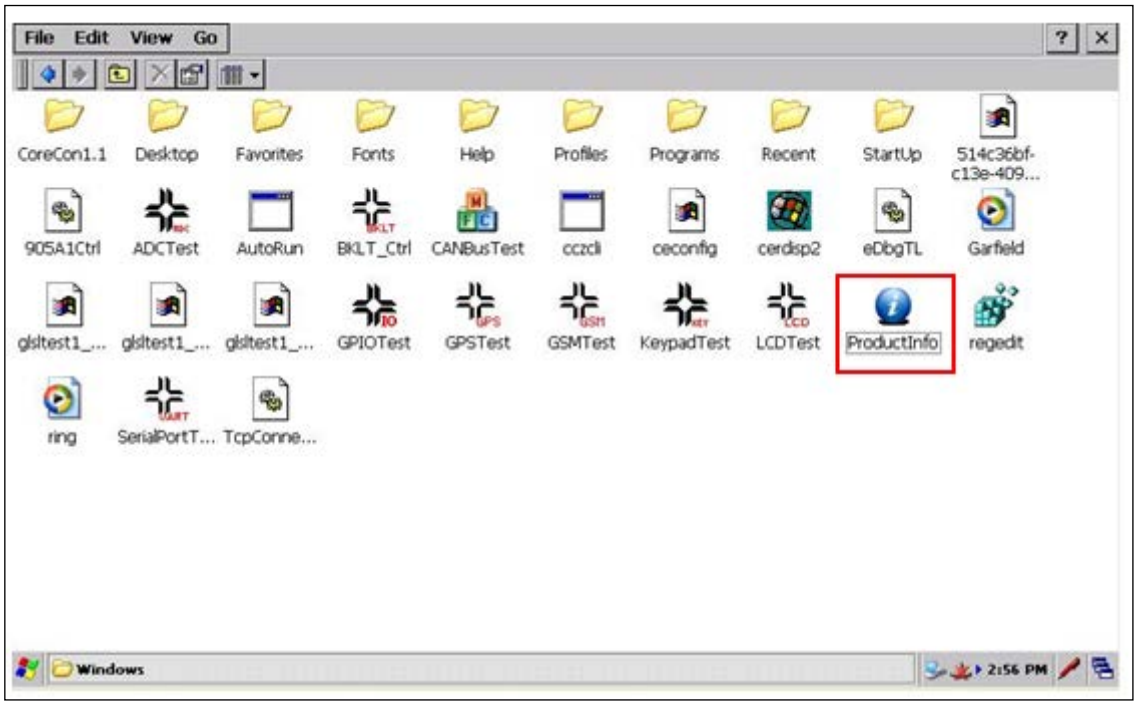
NOTE: Please refer to Section 2.12 for how to connect your PC and BE905A1 via Debug Kit



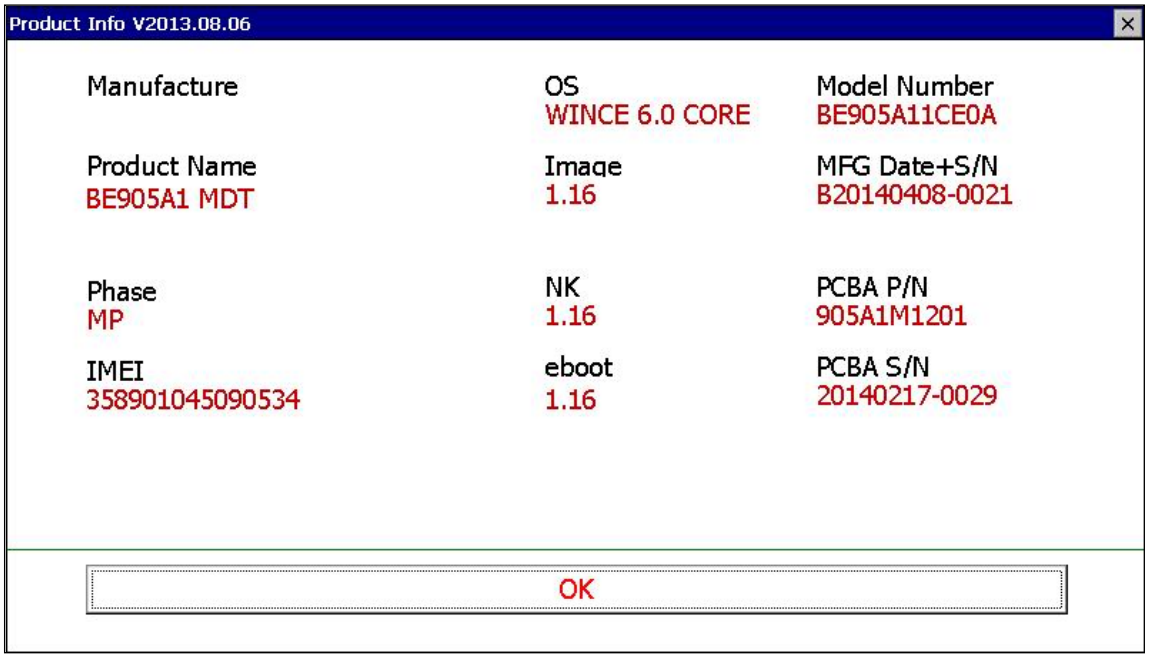
Appendix B - Product Information of BE905A1

We provide a simple utility for viewing the product information, like the product name, model number, IMEI, OS image built version and etc.

Go to **Windows** folder and double click an icon named "**ProductInfo**" to launch this utility.



Product information of BE905A1.



Appendix C - Core Version vs. Pro. Version of OS

Why can't I find Internet Explorer or Media Player program in the Windows CE OS of my BE905A1?

Those two programs are not included in the Windows Embedded CE 6.0 Core version by Microsoft. Relative to the Core version SKU, the Professional version offers the richest set of components and applications to enable complex consumer and enterprise class devices. Professional SKU can satisfy complex scenarios such as web browsing, media playback and etc. Please also note that both SKUs have different license fee.

Besides the lack of some built-in applications between Core and Pro. OS, developers should know a wierd situation that some applications may execute well on Professional OS but abnormal on Core OS. That's because some dependant software components required for the application are not contained in Core OS SKU.

We offer the Core version OS with BE905A1 by default but if users need to develop more functional applications based on enhanced software components of Pro. version, please contact your distributor for additional support.

Appendix D - Troubleshooting

D.1 Why does the system time show " 2006-01-01 12:00:00PM "?

It must be the RTC battery running out of power to cause system date and time reset to factory default setting. What you should do is to plug in the power souce to charge the RTC battery and then configure the correct date and time manually.

Appendix E – DGPS

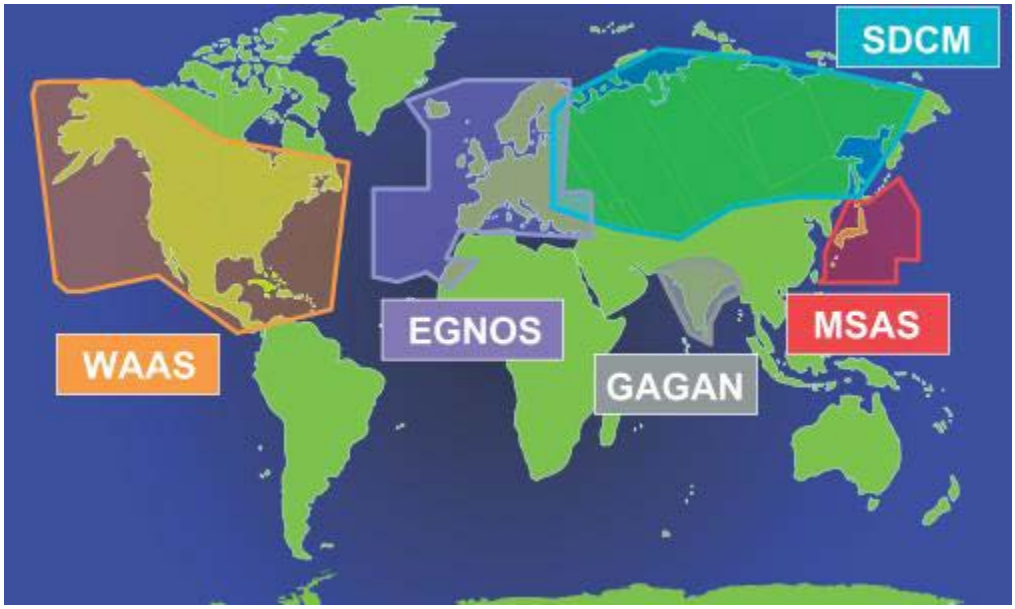
BE905A1 supports DGPS to get more accurate data. It uses SBAS engine technology, the accuracy is about 2.0m.

DGPS [RTCM, SBAS (WAAS, EGNOS, MSAS)]

Ionospheric corrections such as those received from local SBAS geostationary satellites (WAAS, EGNOS, MSAS)
The maximum improvement of positioning accuracy is reached with SBAS and can only be expected in an environment with unobstructed sky view during a period in the order of minutes.

Several countries and regions have implemented their own satellite-based augmentation system. For example, The North American SBAS component, WAAS (Wide Area Augmentation System), covers the continental United States (CONUS), Canada and Mexico.
The Europeans, for their part, have EGNOS (the European Geostationary Navigation Overlay Service), which covers Europe's "ECAC" area, while Japan is covered by MSAS (Multi-functional Satellite Augmentation System).

GPS L1 and GLONASS L1 receiver & SBAS. GPS accuracy < 2 m SBAS accuracy < 1-2 m DGPS accuracy < 0.5 m	DPS Engine comprises an 'All in One' signal processing core with advanced algorithms and true parallel processing of all available signals including SBAS (e.g. WAAS, EGNOS, MSAS). DGPS / DGLONASS corrections from different sources are combined by the unique MULTIREF capability.



< End of BE905A1 User Manual >