

APPENDIX G
: USER'S MANUAL



Safety and Warranty

About this Manual

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The contents of this manual are the result of contributions by dozens of individuals all who have added their vital expertise and experience to the evolution of the contents of this manual.

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Using this Manual

It is recommended that the user become familiar with the operating procedures, terminologies and information contained within this user's manual. This will help to increase the user's effectiveness with this equipment.

Vehicle system familiarity

While this equipment provides very powerful functions with extensive vehicle coverage, it cannot replace knowledge and skill. To get the most out of this equipment, a full understanding of vehicle systems is required. It is recommended that the equipment be used in conjunction with the original service manual for the vehicle being tested.

The equipment is designed for use by trained service personnel and this manual assumes that the service technician who is going to use this equipment has a familiarity with vehicle electronic control systems, however, the latest service manuals and bulletins should always be referenced before using this equipment.

I. SAFETY INSTRUCTIONS -----

Thank you for purchasing ULTRASCAN plus scanners. To get the maximum performance of the equipment, please carefully read this manual first, and keep it at hand.

On delivery inspection

When the equipment is delivered, a check should be made for any damaged or missing components. If the unit is damaged or fails to operate according to the specifications, contact your local distributor or the manufacturer, Hanatech Co., Ltd., Hana bldg., 80-1 Songjung-dong, Gumi-shi, Kyung-buk Republic of Korea 730-913. In the unlikely event the equipment requires shipping back to the manufacturer, please use the original packing material.

Safety symbols

The following symbols are used throughout this manual:

 DANGER	This mark means that dangerous consequences may arise, with the possibility of death or serious injury to the user, if the machine is handled incorrectly.
 WARNING	This mark means dangerous consequences may arise, with the possibility of somewhat serious injury to the user and or damage to the machine and facilities, if the equipment is handled incorrectly.

SYMBOL	Description
	This symbol is affixed to locations on the equipment where the operator should consult corresponding topics in this manual (which are also marked with the  symbol) before using relevant functions of the equipment. In the manual, this symbol indicates explanations that are particularly important that the user is expected to read the manual before using the equipment.



This symbol represents DC (Direct Current)

Safety guideline

In order to ensure proper operation and satisfactory performance, observe the cautions listed below.



DANGER

This equipment is designed to comply with IEC61010-1 safety standards, and has been tested for safety prior to shipment. Excessive high voltage measurement or improper operation could result in personal injury, as well as damage to the equipment or the vehicle. Please read this manual carefully and be sure that you understand its contents before using the equipment.

The manufacturer disclaims all responsibility for any accident except for that resulting due to defect in its product.



WARNING



For safety reasons, this equipment should not be used to measure circuits carrying more than 30Vrms or 42.4V peak.

To avoid electrical accident that could result in injury or death, do not measure voltage in excess of these limitations.

Maximum rated measurable voltage is 30Vrms or 42.4V peak.

II. SAFETY PRECAUTIONS -----

DANGER

When an engine is running, keep the workshop area WELL VENTILATED or attach a building exhaust removal system to the engine exhaust system. Engines produce carbon monoxide, an odorless and poisonous gas that causes slower reaction time and may lead to serious injury or death.



WARNING

Brakes and wheel blocks

Apply the hand brake and block the wheels before using the test equipment. It is highly recommended to block the wheels on front-wheel drive vehicles because the hand brake does not hold the driving wheels.



Drive Test

Do not drive the vehicle and operate the test equipment at the same time. Any distraction may cause an accident. Have one person operate the test equipment while the other person drives the vehicle.



Never place the test equipment in front of you when driving the vehicle because the test equipment may hit your body and cause serious injury when the air bag inflates.

Do not try to test the SRS air bag system while driving the vehicle as unintended air bag inflation may result.





Engine Compartment

Maintain sufficient clearance between moving components or belts while using the test equipment in the engine compartment. Moving components and belts may catch loose clothing, test cables or a part of your body and cause damage or personal injury.



Electrical Components

Always turn the ignition key OFF when connecting or disconnecting electrical components unless otherwise instructed.

Vehicle Battery

ULTRASCAN PLUS equipments are designed to prevent damage from reverse polarity battery cable connection, however, it is always highly recommended to always ensure correct polarity terminal connection.

Never lay the test equipment on vehicle battery. You may short the terminals and may cause damage to your body, the test equipment or the battery.

To avoid damaging the test equipment or displaying false data, make sure the vehicle battery is fully charged and the connections to the electronic control module are clean and tight.

The warning messages above and the safety messages contained hereinafter cover situations Hanatech is aware of. Hanatech cannot know, evaluate or advise you as to all of the possible hazards. You must make sure that any conditions or service procedures encountered do not jeopardize your personal safety.

III. WARRANTY SERVICE -----

Warranty Period

In principle, ULTRASCAN plus products are warranted to the consumer to be free of defects in material and workmanship for the period of 3 years after the date of purchase.

If the product is found defective during this period, the product can be returned to Hanatech and will be repaired or replaced free of charge.

Freight and repair Cost

For the repair of head unit, Hanatech covers the freight cost for the service during one year from the date of purchase, and you can send the troubled unit to your local distributor without having to pay the freight cost. You should consult with your local distributor about the validity of remaining warranty period before sending the unit.

For the remaining two years, you are liable for any international cost incurred. Repair or replacement will be provided free of charge.

When the warranty period is expired after three years, the customer must pay the round trip freight and the repair or replacement cost.

Upon delivery

Hanatech inspects all the ordered product parts and components are included in the package before shipment, and includes the original copy of pre-shipment inspection report in the box. As soon as the product is delivered to you, please ensure everything you ordered is properly checked and included referring to the pre-shipment inspection report. If there is anything missing or damaged, you must notify the local distributor immediately within 3 working days from the delivery date for free of charge replacement of the parts.

In case of trouble

If you encounter any malfunction or trouble with the equipment, please refer to the Trouble Shooting chapter in this manual. If the problem cannot be solved, please



contact your local distributor for assistance. For early identification of a fault or error, your local distributor will require the following details:

1. Symptom of problem you are experiencing
2. Serial number of the head unit
3. Vehicle information: Which specific car were you testing when the problem occurred – Model name, Model year and system ID number if available (for Mitsubishi, Subaru and Suzuki only: Refer to Japanese car chapter for details)

Warranty Void

Even in the effective warranty period, if the problem is found to be caused by any of the followings, Hanatech charges the cost for round trip freight and actual cost for the service to the customer, and the shipment back to the customer will be suspended until the customer's payment is duly made

1. *Evidence of improper use or application of the product ignoring the cautions and warnings stipulated in the user's manual*
2. *Intentional damage or modifications to the product or user's attempt to repair without proper authorization*
3. *Any damage caused by Force Majeure including war and natural disaster*
4. *Loss of time, inconvenience and other consequential damage or loss*

Warranty void seal

In addition to the above mentioned warranty void conditions, warranty service is not provided in case the warranty void seal is broken or removed.

If you remove the head unit safety boot, you will see a yellow round sticker covering one of the screw holes in the back. Please be careful not to break this seal and never try to open the head unit without direct authorization from the manufacturer.

Bought in other countries

Only the products properly supplied by the contracted authorized local distributors are recognizable for free of charge warranty service. Any equipment bought outside the contracted national territory of your local distributor will be charged for service.

FCC RF INTERFERENCE STATEMENT

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

The equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does not cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures;

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected

Caution

Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. 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 UNDESIRE OPERATION.



Specification and Parts

I. Specification -----

A. Hardware

CPU: 16bit, 33MHz

RAM: 1 Mbyte (SRAM)

Program Cartridge Memory: 128Mbytes Flash Memory

Display: 320×240 Monochrome Graphic LCD with Back Light

Key Pad: 24 membrane keys, embossing type

Serial Port: RS232 , USB

Printer: General PC printer

Power: DC 8~18V, 800mA or higher

B. Environmental Specification

Indoor use only

Operating temperature: Max 50℃ / 122°F

Maximum relative humidity: 80% (up to 31℃/88°F) and 50% (40℃/104°F or higher)

Installation overvoltage categories: CAT II

Maximum measurable voltage: DC 30V Max

Pollution degree 2

Max. Altitude: Up to 2000m

C. Oscilloscope Specification (ULTRASCAN plus only)

4 Channel

Voltage Division: 0.1V ~ 20V Div

Time Division: Normal 25 μ s ~ 20sec

Sampling Rate: 500KHz / 2 channel

Measurable Voltage: DC $\pm$ 150V Max

D. Multi-meter Specification (ULTRASCAN plus only)

Voltage: DC 30V Max

Frequency: 1Hz ~ 100KHz

Duty Cycle: 0 ~ 99.9%

Current: $\pm$ 128 Amp

Voltage Output: DC 0.00 ~ 5.00V

Frequency/Duty Cycle Output: 1.0Hz ~ 1.0KHz

E. Mechanical Dimensions

Length: 302.1mm / 12.1"

Width: 171.9mm / 6.8"

Height: 75.7mm / 3.1"

Weight: 1.6kg / 3.5lb (head unit only)

Body Color: Dark Grey

Safety Boot Color: Yellow / Blue / Red

All specifications are subject to change without notice for the purpose of product and quality improvement.



II. Part List -----

A. Head unit and basic supplies

1. Head Unit (P/N. 1000-0005)

- Made of strong ABS resin, each unit has passed internal impact test before shipment.
- As the inner surface is coated with anti-electromagnetic interference material, it neither interferes the other electronic devices nor gets interfered by the other equipments.



2. Safety Boot (P/N. 2002-0030)

- Flexible plastic cover that protects the head unit from physical, chemical and electrical damage
- Yellow boots are used for ULTRASCAN plus, and blue and red boots are also available upon distributor's demand.



3. Carry Case (P/N. 3003-0003)



Provides convenient transportation and the protection of the head unit and other components from outer physical impact during the transportation and storage. Carry case is provided when purchasing the head unit and at least one software package together. Includes keys and dial lock

4. Main Data Link Cable (P/N. 3001-0001)

- Connects vehicle side DLC and ULTRASCAN plus head unit for data transmission.
- Connecting parts on both ends are exactly same, therefore, simply put any one end to the head unit, and then hook the other end to the vehicle side DLC after connecting an appropriate adaptor



5. Power Cable 1 – Cigarette Lighter (P/N. 3000-0004)

- Supplies power to the head unit from the cigarette lighter socket. Used when DLC is located near the driver or passenger seat and power is not supplied through DLC.
- LED lights on both ends turn ON when power is properly supplied.
- The metal plunger part in the end of cigarette lighter connector is removable by unscrewing for the fuse replacement. It may become





loose over repeated use, therefore, it is highly recommended to check if it is tightly screwed frequently. A set of plunger parts are included in the basic supplies. Refer to spare parts section hereinafter.

- The rated voltage and current for this power cable are 12V and less than 2A.

6. Power cable 2 – Vehicle Battery (P/N. 3000-0005)

- Supplies power from the vehicle battery when the DLC is located in the engine bay or when using the oscilloscope or multi-meter functions
- Connect each of the two alligator clips to the battery terminal of the correct polarity with caution.
- Must be used together with the Power Cable 1. Insert the cigarette lighter adaptor of the Power Cable 1 into the socket, and connect the other end to the head unit.
- Red LED light turns ON when power is properly supplied from the vehicle battery.



B. Basic supplies for ULTRASCAN plus

1. 4 Channel Oscilloscope Adapter (P/N. 3000-0007)

- Collects and delivers electrical signal from the probes to the head unit for oscilloscope, multimeter and ignition pattern analysis functions.
- Refer to the manual book 2 for further information



2. Probes (P/N. 3000-0001)

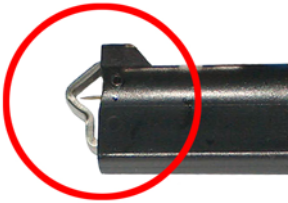
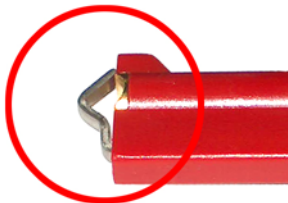
- Obtains and transmits voltage signal from electrical wire or sensor terminal to the main unit for the Oscilloscope, Multimeter and Primary Ignition Pattern Analysis functions.
- Since ULTRASCAN plus supports up to 4 channels, 4 probes are provided together for the maximum utilization of the function.
- Each probe has rubber bands of same color on both ends for easier distinction.
- These probes directly get voltage signal by applying a probe needle into the electric wire, which you have to handle with care. Refer to the following warning message.





DANGER

Note that the probe has a needle while the Secondary Ignition Probe does not. These probes with needle get electrical signal directly from the wire, therefore, extending them to high voltage lines is extremely dangerous.

Probe with needle	Probe without needle
	

3. Secondary Ignition Probe (P/N. 3000-0002)

- Applied to the high tension spark plug wires to get the secondary ignition voltage signal by induction.
- The probe has no needle and the body is colored RED for clear distinction from the oscilloscope probes that have needles to measure the voltage from the wire directly. Refer to the warning message above.



4. #1 Cylinder Trigger Pick-up Clamp (P/N. 3000-0003)

- Clipped on the spark plug wire to cylinder No. 1 to get the trigger signal that is used to identify the correct cylinder number of each ignition voltage signal.
- Refer to the ignition pattern analysis section in the manual book 2.



5. Ground Cable (P/N. 3000-0006)

- Used for circuit ground while using Scope, Multi-meter and Ignition Pattern functions to get more stable and accurate test result.
- Highly recommended to extend this cable to the (-) terminal of the vehicle battery always when using these functions.





C. Diagnostic Adapters

Diagnostic adapters may be sold separately, therefore check if all the adapters you ordered are included in the package upon delivery.

There are two types of adapters: capsulated and wired types.

Most of ULTRASCAN plus adapters are capsulated for better durability and storage, however, sometimes it is difficult or almost impossible to connect the capsulated adapter to vehicle side DLC when it is located deep inside beneath the dashboard. We use wire type adapters for the cars such as Hyundai and Kia that we were reported to have such connecting difficulties.

Capsule type	Wire type
	

1. OBD2 Standard Adapter

(P/N. 3001-0010)

Used for all OBD generation 2 and EOBD compatible vehicles. Vehicle side DLC is generally located near the driver's seat and most frequently found beneath the dash panel.



2. Toyota / Lexus 17Pin Rectangular Adapter (P/N. 3001-0011)

Used for the diagnosis of Toyota and Lexus of OBD generation 1. Vehicle side DLC of this type is generally located in the engine compartment.



3. Toyota/Lexus 17Pin Semi-circular Adapter (P/N. 3001-0012)

Also used for the diagnosis of Toyota and Lexus of OBD generation 1.

The vehicle side DLC is generally found beneath the dashboard.

Refer to the following warning message.



WARNING

The appearances of this adapter and **MAZDA 17Pin adapter** are exactly same, however, the internal wiring and circuit are different. Check the **engraved name** and the **body color** of the adapter carefully before use. **Improper adapter connection may result in serious malfunction of either control system and ULTRASCAN plus head unit.**

4. Honda 3 Pin Adapter and 2 Pin Jump Wire

(P/N. 3-pin: 3001-0014, 2-pin wire: 3001-0023)

3-pin adapter is used for the diagnosis of Honda cars of OBD generation 1 that support DTC read and erase as well as data stream.

Older Honda cars have 2-pin DLC that supports DTC read only. The jump wire is used for these older cars to bridge the 2-pin DLC terminals.

The vehicle side DLC is generally located under the dashboard or the glove box.





5. Mitsubishi and Hyundai 12Pin Adapter (P/N. 3001-0001)

Used for the communication with Mitsubishi and Hyundai cars of OBD generation 1.

A wire type adapter is provided as the connecting difficulties of capsule type adapter in quite a few Hyundai cars were reported.



6. Mitsubishi 12+16pin dual headed adapter (P/N: 3001-0030)

Used for the communication with Mitsubishi cars with both of 12-pin OBD1 and 16-pin OBD2 adapters on-board.

Refer to the Mitsubishi section, Chapter 6 for details.



7. Nissan and Samsung 14Pin Adapter (P/N. 3001-0006)

Used for the communication with Nissan cars of OBD generation 1 and all Samsung passenger cars.

Vehicle side DLC is generally found under the dash or inside the fuse box.



8. Mazda 17Pin Adapter (P/N. 3001-0013)

Used for the communication with Mazda cars of OBD generation 1.

Vehicle side DLC is generally located in the engine compartment.

Refer to the warning message in the next page:



**WARNING**

The appearances of this adapter and **Toyota 17Pin SEMI-CIRCULAR adapter** are exactly same, however, the internal wiring and circuit are different. Check the **engraved name** and the **body color** of the adapter carefully before use. **Improper adapter connection may result in serious malfunction of either control system and ULTRASCAN plus head unit**

9. Subaru 9Pin Adapter (P/N. 3001-0022)

Used for the communication with Subaru cars of OBD generation 1.

The vehicle side DLC is generally located beneath the dashboard.

**10. GM Daewoo 12Pin Adapter**

(P/N. 3001-1002)

Used for the communication with Daewoo cars of OBD generation 1.

The vehicle side DLC is generally located beneath the glove box, door side.

**11. Kia 6Pin Adapter (P/N. 3001-0003)**

Used for the communication with old Kia cars of OBD generation 1.

Only the Diagnostic Trouble Code reading function is available for the cars with this type of adapter as only the slow pulse signal is transmitted through the vehicle side DLC.

The split wire of the adapter is to be connected to the ground terminal of the vehicle side DLC.





12. Kia 20Pin Adapter (P/N. 3001-0004)

Used for the communication with Kia cars of OBD generation 1.

DTC read & erase and data stream functions are available for the cars with this type of adapter.

Refer to the following warning message.



WARNING

The appearances of **Kia 20Pin adapter** and **Ssangyong 20Pin Rectangular adapter** are exactly same, however, the internal wiring and circuit are different. Check the **engraved name** and the **body color** of the adapter carefully before use. **Improper adapter connection may result in serious malfunction of either control system and ULTRASCAN plus head unit**

13. Ssangyong 20Pin Rectangular Adapter (P/N. 3001-0005)

Used for Ssangyong cars of OBD generation 1.

Vehicle side DLC is located in the engine compartment.

Refer to the warning above.



14. Ssangyong 14Pin Circular Adapter (P/N. 3001-0007)

Used for old Ssangyong cars of OBD generation 1.

Vehicle side DLC is located in the engine compartment.



15. Holden 6 Pin Adapter(P/N. 3001-0023)

Used for Australian Holden of OBD generation 1.

Japanese cars such as Toyota and Nissan assembled in Australia with Holden built engines may have this type of adapter, too. Vehicle side DLC is generally located beneath the glove box to the center fascia.

**16. GM Opel 10Pin Adapter (P/N. 3001-0019)**

Used for the communication with Opel cars of OBD generation 1.

Also available with ULTRASCAN plus Australian Holden, South American Opel and European Vauxhall software packages.

Vehicle side DLC is generally located in the fuse box beneath the dashboard or near the parking brake.

**17. Ford 20 Pin Adapter(P/N. 3001-0020)**

Used for the communication with Ford cars of OBD generation 1, including Australian and British Fords.

Vehicle side DLC is generally located in the fuse box beneath the dashboard.





18. Ford EEC-IV(P/N. 3001-0017)

Used for the communication with Australian Ford cars of OBD generation 1, Vehicle side DLC is generally located in the engine compartment.



19. BMW 20Pin Adapter(P/N. 3001-0016)

Used for the communication with BMW cars.
Vehicle side DLC is generally located beneath the dashboard or in the engine compartment.



20. VAG 2X2Pin Adapter(P/N. 3001-0029)

Used for the communication with Volkswagen/Audi Group cars,
Vehicle side DLC is located in various place on the vehicle but generally around dashboard.
Applied with SEAT, SKODA with this adapter also.



21. Mercedes Benz 38Pin Adapter(P/N. 3001-0015)

Used for the communication with Mercedes Benz cars equipped with 38Pin vehicle side DLC.

Applied with C202, CLK208, E210, E124, S140, SL129, SLK170, G463, G461.

**22. Mercedes Benz 4Pin Adapter(P/N. 3001-0009)**

Used for the communication with Mercedes Benz cars equipped with 8Pole or 16Pole vehicle side DLC.

(Red: Battery +, Gray: K Line,, Yellow : Ignition check, Black: Ground)

Applied with C201, E124, S126, SL107, G463

**23. Upgrade cable (P/N. 3000-0010)**

To be connected to main data link cable for updating your ULTRASCAN plus software by downloading updated codes from your PC. Refer to the related chapter in this manual.





D. Software Cartridge

- Contains vehicle information and operating software for ULTRASCAN plus scanners.
- The appearance and measurements for ULTRASCAN plus cartridges complies with standard PCMCIA, however, inner circuits are of Hanatech's own design. Therefore, you can neither use it with the other equipment nor copy its contents to the other standard PCMCIA.



WARNING

MAKE SURE TO TURN POWER OFF BEFORE REMOVING OR INSERTING A CARTRIDGE. It is extremely dangerous to insert or remove a PCMCIA card while the head unit is turned on. Both PCMCIA card and head unit can be critically damaged and break down. Always turn power off by pressing the [POWER] key or removing power supply cable from the head unit before inserting or removing a PCMCIA card..

E. Spare Parts

1. ULTRASCAN plus

- **Extra fuses** (P/N. 3008-0003)

For the replacement of the fuse located inside the cigarette lighter power cable. You can also replace it with a fuse of which rated current is 2 Ampere or less.



- **Spare cigarette lighter power cable plunger parts**

A set of spare parts for replacement when the original parts are lost.



2. ULTRASCAN plus

- **Wrench for probe needle replacement** (P/N. 3008-0002)

A screw driver type hexagon wrench used for the replacement of the probe needle.



- **Extra probe needles** (P/N. 3008-0001)

A couple of short spare needles and extended needle units.

You can use any metal sawing needle when you run out of spare needles.





F. Optional Supplies

1. Printer Cable (P/N. 3000-0009)

To be connected between head unit RS232 port and printer to enable direct interface with a PC printer.

Compatible with the printers that support PCL mode, and Hewlett Packard ® is highly recommended.



2. Host-Pro PC Interface Package

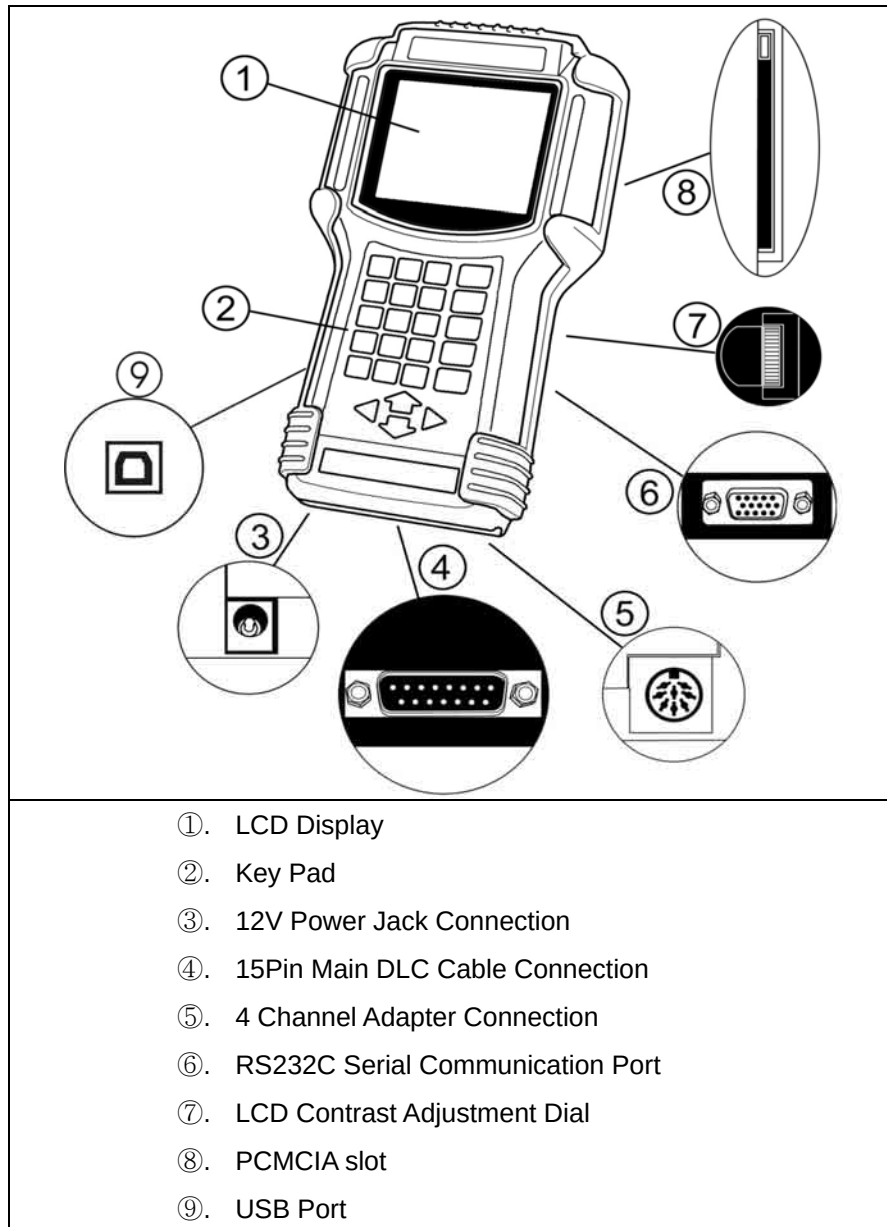
- Consisted of a software installation CD (P/N. 3005-0002), 5 meter USB cable (P/N. 3000-0014).
- Enables realtime PC interface of ULTRASCAN plus scanners. Refer to the PC interface section of this manual and the separate HOST-PRO user manual for further information.



Operating ULTRASCAN plus

I. Getting Started-----

A. Head Unit



B. PCMCIA card

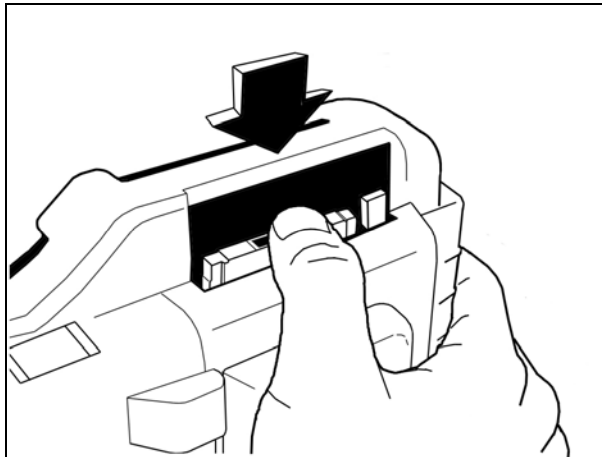


WARNING

Insert or remove PCMCIA card when ULTRASCAN plus power is turned OFF. Serious damage to head unit and PCMCIA card may occur in case of insertion or removal of PCMCIA card while ULTRASCAN plus is operating.

1. Insertion

Slowly insert the PCMCIA card into the slot and press firmly until it clicks into place.



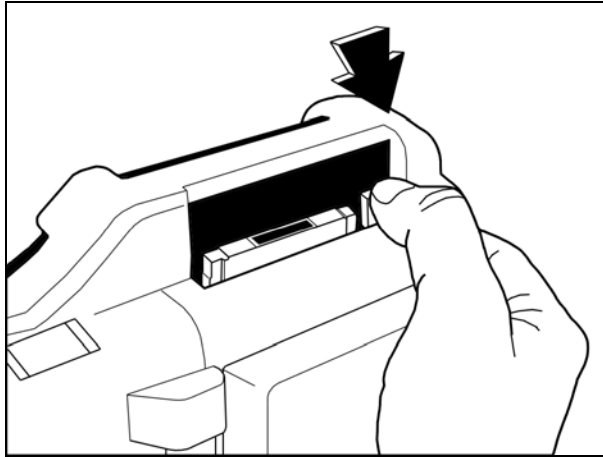
WARNING

Make sure not to insert the PCMCIA card upside down.
The card will not fit into the place when inserted upside down, however, if you press it too hard applying excessive power, the frame and connecting pins inside ULTRASCAN plus may be broken or bent.
Free of charge warranty service is not provided in this case.

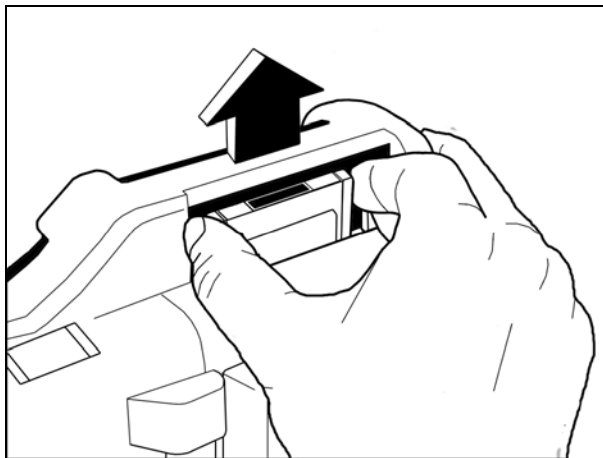


2. Removal

1. Press the eject button to release the PCMCIA card from the tight connection with the inside frame and pins.



2. Hold the PCMCIA card gently and pull it slowly out of the slot.



C. Main DLC Cable

1. Connection to the head unit

- a. The male connectors in both ends of the main DLC cable are exactly same and you can connect any of them to the head unit.
- b. Press the main DLC cable connector into the head unit 15 pin female connector, and tighten up the two screws for firm connection.



2. Connecting the DLC adapters

Locate the vehicle side adapter and connect the corresponding DLC adapter to the remaining male connector of the main DLC cable



CAUTION

It is recommended to keep the main DLC cable connected and screwed to the head unit. Frequent connection and removal of the main DLC cable may loose the screwing parts and bend the connecting pins.



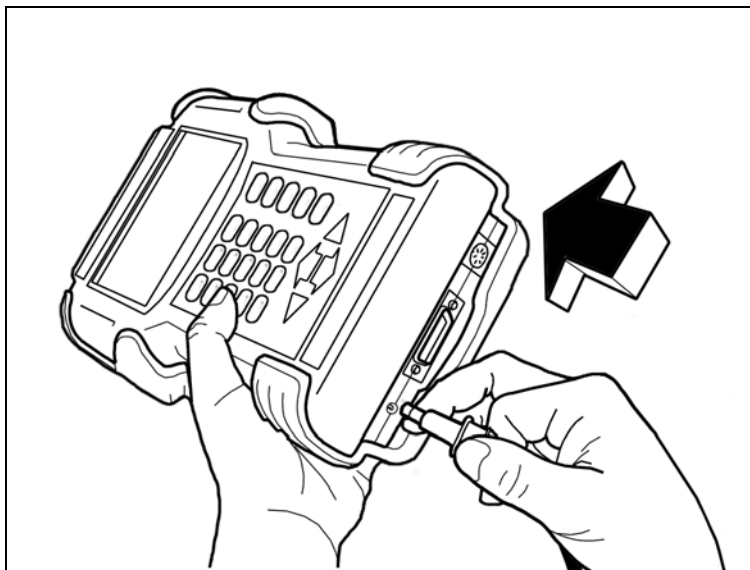
D. Power supply

1. Power supplied through DLC adapter

12V battery power is supplied through all DLC adapters except GM/Daewoo 10Pin and Mitsubishi/Hyundai 12Pin adapters

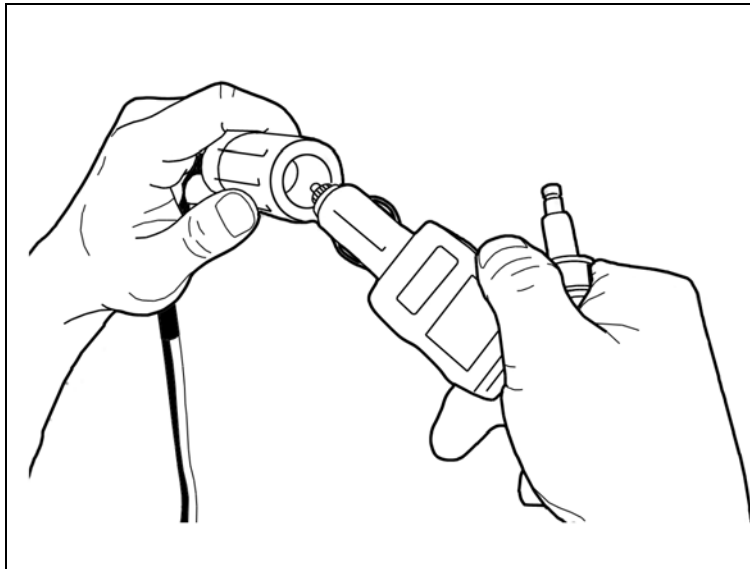
2. Cigarette lighter

- a. Use the cigarette lighter cable when power is not supplied through the DLC adapter.
- b. Insert the cigarette lighter connector into the socket, and check if the red LEDs in both ends of the cable are ON.
- c. Insert the metal power jack into the head unit power socket.



3. Vehicle battery

- a. Since the head unit must be placed in the engine compartment when using multimeter, oscilloscope or ignition pattern analysis function, it is necessary to get the power from the vehicle battery.
- b. Connect the alligator clips of the battery power cable to the battery terminals of correct polarity. Check the red LED on the round socket turns ON.
- c. Connect the cigarette lighter power cable connector into the battery power cable socket.



4. Power ON

Press the [POWER] key of the head unit key pad to turn power ON.

To turn power OFF, press the [POWER] key for more than 1 second.



E. Contrast

- a. The LCD display is sensitive to the temperature.
It becomes too faint when it is cold and too dark when it is hot.
- b. If the screen is too faint or too dark to read, you can adjust the contrast by turning the contrast dial in the right side of the head unit.
- c. In case of any trouble with the display, please refer to the Trouble Shooting chapter in this manual.

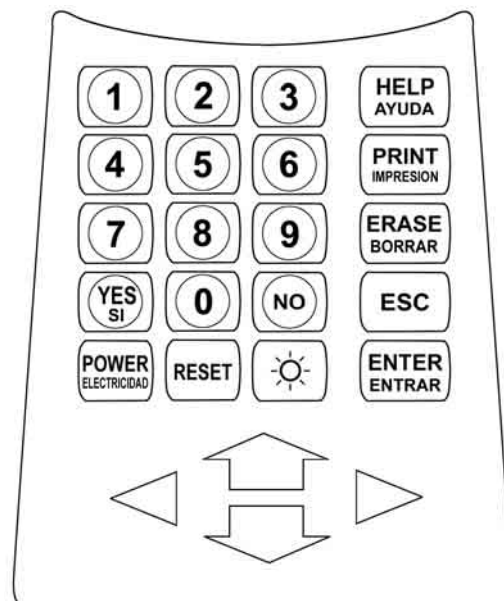
II. Control Keys -----

A. Keypad

The keypad is made of chemistry proofing PVC material that prevents contamination and damage from hazardous oily workshop environment.

The membrane keypad is designed and tested to maintain its normal operation over 1 million time key press for each.

Each key is raised for better tactile feel. The keypad has total of 24 keys.



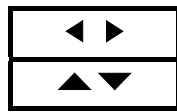
B. Making selection in the menu

1. Numeric Keypad

- a. Simply press the corresponding number
- b. This is available only when you are selecting an item of which number is 9 or less. For more than 10, you should locate the highlighted bar on the desired item and press the [ENTER] key.



2. Arrow keys



Page Up/Down

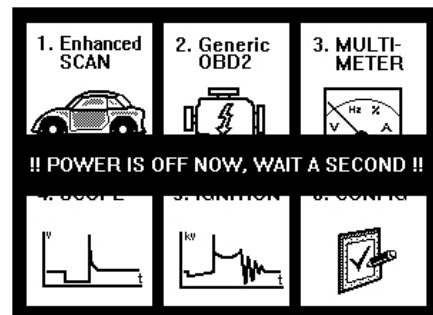
Scroll Up/ Down

- a. Scroll up and down the highlighted bar in the menu by pressing Up/Down arrow keys and press the [ENTER] key to confirm the selection.
- b. If the menu has more than 12 items, you may have to scroll up or down the pages to make selection. You do not have to pound on Up/Down arrow keys to scroll the whole page. Simply pressing the Left or Right arrow key will shift page to page. Move the highlighted bar by pressing the up/down keys when the desired item appears on the screen, and press the [ENTER] key.

C. Function keys

1. POWER

- a. After connecting appropriate power cable, press this key shortly to turn the ULTRASCAN plus on.
- b. To turn off, press this key for more than a second until the powering OFF message appears on the screen as shown in the right.



2. Back light []

- a. LCD module of ULTRASCAN plus has an illuminating back panel for better legibility in dark or shady places.
- b. Press this button to turn the back light ON and OFF.

3. ESC

Used to abort an operation of ULTRASCAN plus or move to the upper level menu.

4. HELP

a. DTC Read

- When a trouble code is detected, you can press this key to view the detailed information of the DTC.
- DTC definition, DTC registration conditions and check points are provided (For Korean and Malaysian cars only as of May, 2003)

b. Service Data (Data Stream)

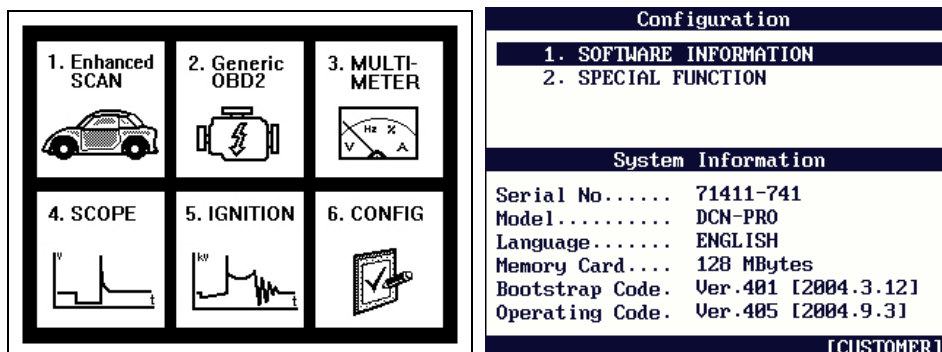
- While live data is being displayed on the screen, select a live data item by moving the highlighted bar, and press this key to view the detailed information about the selected item.
- Standard value and technical explanations are provided. (For Korean and Malaysian cars only as of May, 2003)

5. PRINT

- a. When a printer is connected to ULTRASCAN plus via printer cable, press this key to print out the current display: DTC list, a set of data stream, oscilloscope waveform or ignition pattern.
- b. Refer to the Optional Parts section for detailed information on the printer cable.

III. Configuration -----

Press the [6] key from the initial function menu to proceed to the configuration menu. You can check the version numbers of the software packages contained in the PCMCIA card, test the keypad and LCD, set up sound and language options and download software updates in the configuration menu.



A. Software Information

When you select [1. SOFTWARE INFORMATION] in the configuration menu, a list of software packages contained in the PCMCIA card will appear as below:

Software Information		
HYUNDAI-DOMESTIC	V.600	2004.9.1
HYUNDAI (NON USA)	V.200	2004.9.1
HYUNDAI (USA)	V.200	2004.9.1
KIA (DOMESTICS)	V.600	2004.9.1
KIA (NON USA)	V.200	2004.9.1
KIA (USA)	V.200	2004.9.1
DAEWOO VEHICLES	V.600	2004.9.1
SSANGYONG VEHIC	V.600	2004.9.1
SAMSUNG VEHICLE	V.600	2004.9.1
TOYOTA/LEXUS	V.200	2004.8.5
TOYOTA/LEXUS USA	V.260	2004.6.30
HONDA/ACURA	V.250	2004.6.30
Press [Enter] key to continue.		

Should you get any update files from your local distributor or from Hanatech website, please compare the version number and last update date to check if the update is necessary.

B. Special functions

1. Download software

- You can download the software updates from your PC when you select [1. DOWNLOAD SOFTWARE].
- Instructions will be given separately whenever an update is available. Contact your local distributor for the availability of update frequently and keep posted of such events.

2. Language

- You can select provided language. English and Spanish languages are available for selection as of May, 2003.
- Hanatech is translating the menu and messages of ULTRASCAN plus to various local languages such as Russian, Arabic and Chinese for convenience of non-English speaking customers, and the each language will be provided as an update when the translation is completed.

3. Sound

- You can toggle ON and OFF the key sound.

4. Save Configuration

- If you have made any change in this [Special Function] menu, you have to save the configuration to make such changes effective.
- Press the [4] key to save the changes in configuration



ULTRASCAN plus Functions

The functions you can choose when all the test vehicle details are selected properly are explained in this chapter of the manual. The actual list of available functions may be different according to the vehicle you want to test.

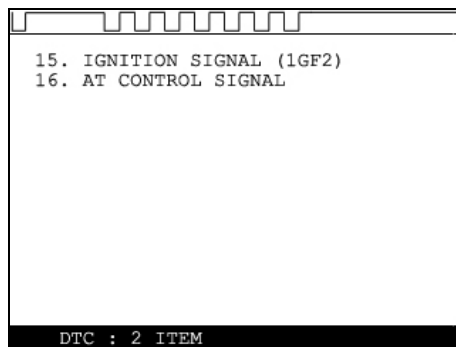
I. Diagnostic Trouble Code-----

A. DTC Read

1. Pulse signal type

- a. Many of old Toyota, Honda, Mazda, Hyundai and Kia cars until early 90's support slow pulse signal output for the DTC reading function.

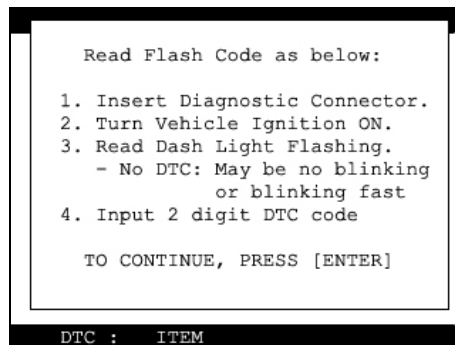
As shown below, ULTRASCAN plus shows the pulse signal being received through the DLC adapter in the top and the received DTC numbers.



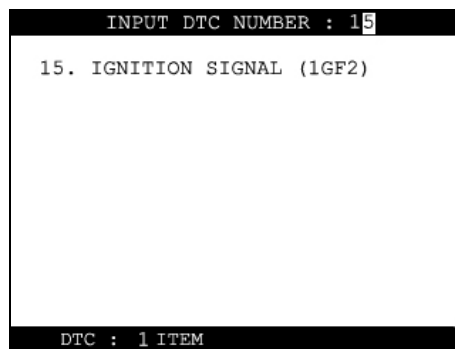
b. Manual input

- Even older cars such as Honda with 2-pin adapter have no signal output terminal for DTC in the DLC adapter. In this case,

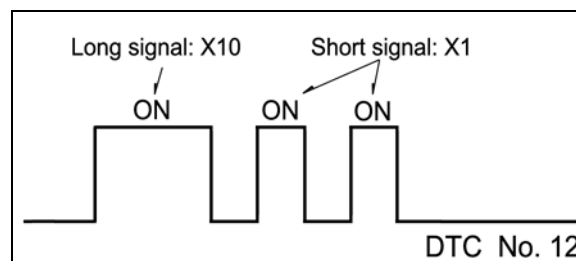
ULTRASCAN plus shows the following message as there is no signal input through the adapter.



- You have to count the MIL flashing on the dashboard and manually input the DTC number to ULTRASCAN plus to view the details as below:



- Long flash signals count for tens and short signals for ones. Input two digits for tens and ones in sequence using the numeric keypad. A flash signal for a code is followed by another if there are multiple trouble codes. Blinking signals for all trouble codes flash in sequence, and repeat after a pause.





c. Others

- Generally ULTRASCAN plus reads DTC pulse signal from the diagnostic adapter and shows the DTC number, title and details automatically.

2. Serial Communication type

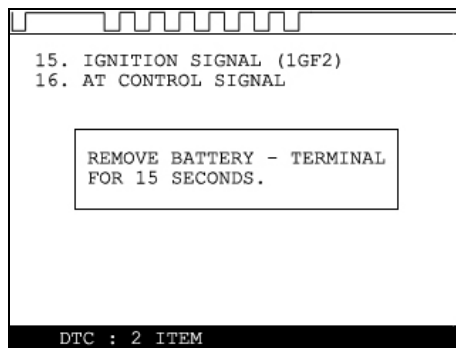
- a. Most of the cars built in 1990's or later support serial communication with a scanner, and the DTC is read by bi-directional communication.
- b. ULTRASCAN plus sends a command to the control module to reply with the DTC numbers stored in memory, and the control module replies thereupon.

B. DTC Erase (Clear fault code)

1. Pulse signal type

- a. Pulse signal type does not support bi-directional serial communication, therefore, a scanner is unable to send a command to the control module to erase the DTC information from memory.

These old cars require you to remove battery terminal to clean up diagnostic information from control module memory.



Removing the battery terminal will get rid of all information contained in the car stereo and other electronic devices. And it may not effectively erase the fault codes in some cars. Refer to the original repair manual for further information.

Check if DTC information is properly removed by reading the trouble code again after erasing the code.

2. Serial communication type

- a. ULTRASCAN plus sends a command to the control module to erase DTC information stored in memory, and the control module replies thereupon.
- b. Check if DTC information is properly removed by reading the trouble code again after erasing the code



C. DTC Help tips

- a. Help tips are provided when you press the [HELP] key after locating the highlighted bar on one of the detected trouble code(s). This function is available when ULTRASCAN plus detects one or more trouble code(s)
- b. Help tips including trouble code definition, conditions and check points are provided for all Korean cars and Malaysian cars as of May 2003. Wiring diagrams are also provided for Korean cars of 2000 model-year or older.

DIAGNOSTIC TROUBLE CODE
D.T.C. No.: (P0336) DTC conditions : When IG key ON, cranking is possible but the reference mark is not within standard range when more than 200RPM Failsafe: Feedback control suspends Idle speed adaptation control stops (Refers to the actual value) Uses mean value instead of idle speed characteristic curve. Using adapted target air volume is prohibited(Refers to the actual value)

- c. Press the [ESC] key to return to DTC list.

II. Current Data -----

(= Data Stream, Live Data, Service Data)

A. Pulse Signal Type

- a. Data stream is not generally supported for this type of old cars because the speed of pulse signal communication is too slow to read the data stream variables.
- b. Some of old Toyota cars using 17-pin rectangular adapter exceptionally support data readings as the system supports relatively high speed pulse signal communication.

B. Serial Communication Type

- a. Most of control systems with serial communication support data stream function. Select [Current data] from the menu, then the data readings follow.
- b. Some systems like SRS or ABS may be designed not to support data stream intentionally by the car make while the other systems are supported. A scanner is a passive tool that reads information from the control system, and it is unable to actively generate information that the system does not provide.



C. Data Freeze

The [Data Freeze] function places the selected data stream variable on top of the LCD screen so that the user can check and compare desired sensor values continually without having to scroll up and down.

This function is different from 'Freeze Frame Data' function of Generic OBD2.

1) Step One

Select a desired sensor using the [◀][▶] and the [▲][▼] keys.

2) Step Two

Press the [ENTER] key to freeze the selected sensor.

i.e., when O2 sensor and MAP sensor are selected and frozen, these sensor values will be placed at the top of the display as below :

SERVICE DATA		
O2 SENSOR -----	58mV	↑
MAP SENSOR -----	946	
O2 SENSOR -----	58mV	
MAP SENSOR -----	946	
AIR TEMP SENSOR -----	34°C	
TPS SENSOR -----	19mV	
STEP MOTOR -----	39.5%	
BATTERY VOLTAGE -----	13.2V	
IGNITION SIGNAL -----	OFF	
COOLANT TEMP SENSOR ---	82°C	
ENGINE RPM -----	760rpm	
SHORT TERM FUEL TRIM --	104	↓
1: GRAPH 2: FULL ENTER : FIX		

3) Step Three

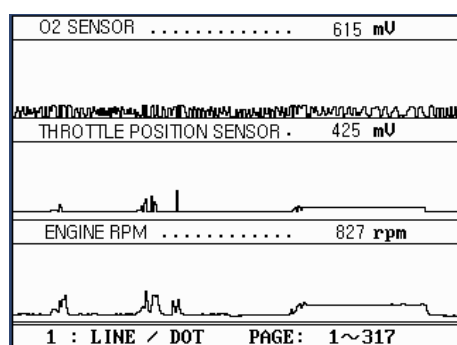
Up to five sensors may be frozen at a time. For example, if the Injection Time, which can be shown when scrolled down, is selected and frozen, Injection Time value will be placed below the previously frozen O2 and MAP sensor.

SERVICE DATA	
O2 SENSOR -----	58mV
MAP SENSOR -----	946
INJECTION TIME -----	0.2mS
ENGINE RPM -----	760rpm
SHORT TERM FUEL TRIM --	104
LONG TERM FUEL TRIM ---	86
IDLE SWITCH -----	OFF
POWER STEERING SWITCH -	OFF
AIR CONDITINER SWITCH -	OFF
INJECTION TIME -----	0.2mS
BTDC -----	5
AIR CONDITIONER RELAY -	OFF
1: GRAPH 2: FULL ENTER : FIX	

D. Data Graph

ULTRASCAN plus provides the [Data Graph] function for more efficient data analysis.

- When you press the [1] key after locating the highlight bar on the desired sensor, the sensor data graph will be displayed as shown below.
- You can display up to 3 graphs in a screen by choosing the sensors as previously explained [Data Freeze] procedure - Press the [Enter] key after locating the highlight bar on the desired sensor, and then press the [1] key. When more than 4 sensors are selected, the graphs of upper three sensors will be displayed.





- c For each sensor data graph, the name of the sensor and its current value will be simultaneously displayed together.
- d To change the sensor, go back to the previous Service Data display by pressing the [Esc] key, and then choose other sensors.
- e To halt the graph output, press the [ENTER] key. It will resume when you press the [ENTER] key again.

E. Help tips

- a When you press the [HELP] key after locating the highlight bar on a certain data stream variable, the help message will be displayed. This works the same for detected Trouble Codes in [Self Diagnosis] function.
- b Detailed information including conditional standard range on the selected sensor will be displayed as shown below.

O2 SENSOR -----	523mV
Idling right after engine start (OPEN LOOP) : Approx. 450mV~950mV Idling after warm-up (CLOSED LOOP) : Changes between 100mV ~ 950mV	

- c Press the [ESC] key to go back to the data stream display.



III. Actuation Test -----

- The actuation test is a very helpful function that temporarily activates or stops a certain actuator such as an injector, a motor or a solenoid by force, so that the user can evaluate the system's condition or the part's normal operation by observing its reaction
- Signals from various sensors are input to a control unit, and the actions are taken by controlling to actuators. Sensors and actuators are causes and effects in a control system.
- While the data stream function is useful to observe if the sensors are working properly and the control unit is collecting correct data from the sensors without problem, the actuator test is helpful to examine if the actuators are working in normal conditions and the control unit is commanding proper control over the system.
- Some of the cars such as Nissan or Toyota provide even more advanced actuation tests by letting the user observe the reaction of overall control system when manually adjusting the sensor input values.

A. Menu Selection

- a Choose [ACTUATION TEST] from the function Selection Menu
- b The name of the actuator to be tested, test method and the test condition are shown in the display. Available actuators, test methods and conditions may differ in each vehicle.

B. Test Start

1. Selecting Test Item

- a Choose an actuator to test from the menu by using the [▲] and [▼] keys.
- b Check the test conditions and press the [ENTER] key when all the conditions are met.

ACTUATION TEST	
ACTUATOR : #1 INJECTOR	
METHODS	STOP FOR 6 SECONDS
CONDITION	KEY ON, ENGINE RUN
ENTER: START TEST ↓: SELECT ITEM	

2. Testing

- a [TESTING...] message will be displayed during the actuation test
 Test method means how the actuation test will be performed. Check the actual reaction of the actuator



- b In the example below, the injector will stop injecting fuel for 6 seconds while engine is idling, and it will make engine stall or unstable.
- c Testing a fan or an injector is easy to check the proper reaction as it generates distinctive changes in vehicle condition such as fan whining or unstable idling. However, valves or motors are generally tested while engine is stopped and all you can hear may be a small and unclear electric buzzing sound. Test in a quite place and observe the test results carefully.

ACTUATION TEST	
ACTUATOR : #1 INJECTOR	
METHODS	STOP FOR 6 SECONDS
CONDITION	KEY ON, ENGINE RUN
TESTING....	
ENTER: START TEST ↓ : SELECT ITEM	

ACTUATION TEST	
ACTUATOR : #1 INJECTOR	
METHODS	STOP FOR 6 SECONDS
CONDITION	KEY ON, ENGINE RUN
TEST COMPLETE	
ENTER: START TEST ↓ : SELECT ITEM	

- d When the test is completed, the [TEST COMPLETE] message will be displayed. You can choose other actuators by using the [▲] and [▼] keys. Press the [ESC] key to quit test mode.

IV. Black Box -----

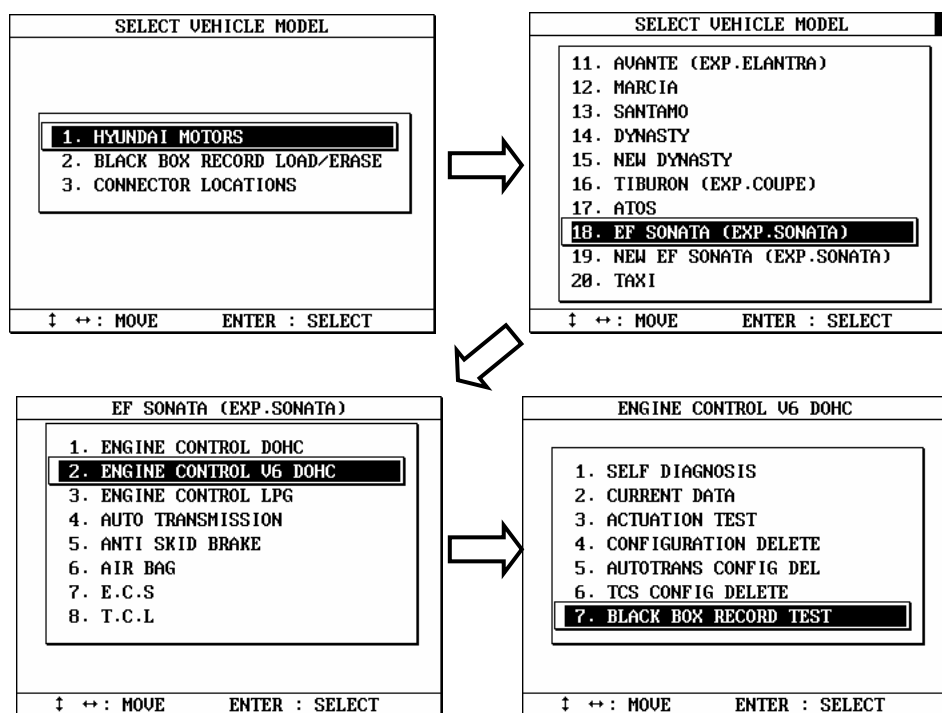
(= Record Replay)

Just like the 'Black Box' or a 'flight recorder' of an aircraft, ULTRASCAN plus can 'record' data stream during the vehicle drive test and the recorded data can be 'retrieved' later for intensive analysis of vehicle's condition.

ULTRASCAN plus has a menu when selecting Japanese cars, so called "Record Replay" same as Black Box function and you can understand "Record Replay" as Black Box function.

A. Function selection

Choose [#. Black Box Data] from the [Function Selection Menu] after selecting Origin, Car Manufacturer, Model name and system to test.



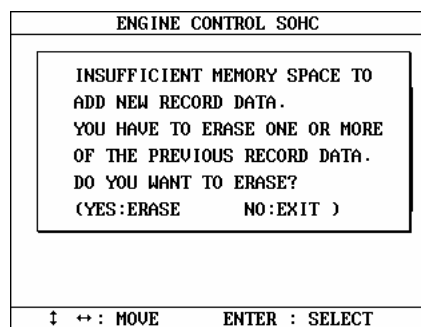


B. Capacity

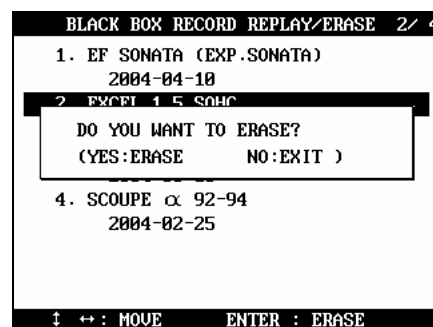
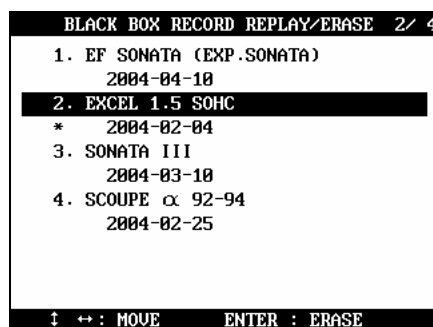
- a During a normal test, the [Data Stream] frames pass by in rapid succession, and cannot be recalled unless the data has been saved. Thanks to its extensive internal memory, ULTRASCAN plus can record up to 2040 frames of Data Stream for multiple cars.
- b By loading the recorded data, you can diagnose sensor data frame to frame without missing a single critical moment.

C. Memory Check

- a. ULTRASCAN plus checks its internal memory before it starts recording Black Box data. If there is no sufficient free memory space available, ULTRASCAN plus will suggest deleting one or more of previous record(s).

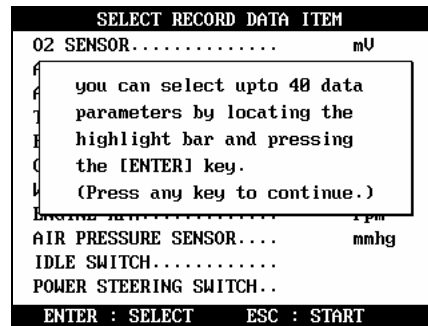


- b. Press the [ERASE] key to proceed, then a list of saved data will follow. Locate the highlight bar on data to delete, and press the [ENTER] key. A query for your confirmation will follow. Press the [YES] key to erase otherwise press the [NO] key.



D. PID(Live data parameter) selection

- a You are required to select the parameters to record.



- b ULTRASCAN plus will show you the whole live data parameters available in the control system you selected. Locate the highlight bar on the desired parameter and press the [ENTER] key.

Selected parameter will be marked star(*).

You can also deselect the parameter by repeating the procedure.

SELECT RECORD DATA ITEM 11/ 29		
* O2 SENSOR.....	mU	
* O2 DUTY.....	%	
* O2 CONTROL.....		
* THROTTLE ANGLE.....	°	
* ADAPT TPS.....	°	
* BATTERY VOLTAGE.....	V	
* AIR TEMPERATURE SENSOR.	° C	
* WATER TEMPERATURE SNSR.	° C	
* AIR FLOW SENSOR.....	kg/h	
* ENGINE RPM.....	rpm	
* VEHICLE SPEED SENSOR...	Km/h	
ENTER : SELECT ESC : START		

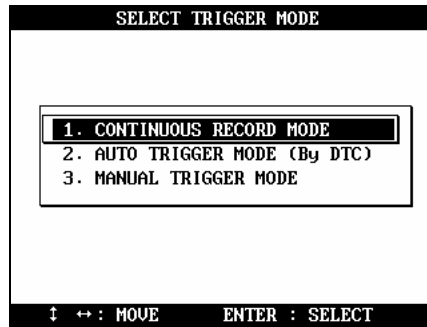
SELECT RECORD DATA ITEM 9/ 29		
* O2 SENSOR.....	mU	
* O2 DUTY.....	%	
* O2 CONTROL.....		
* THROTTLE ANGLE.....	°	
* ADAPT TPS.....	°	
* BATTERY VOLTAGE.....	V	
* AIR TEMPERATURE SENSOR.	° C	
* WATER TEMPERATURE SNSR.	° C	
* AIR FLOW SENSOR.....	kg/h	
* ENGINE RPM.....	rpm	
* VEHICLE SPEED SENSOR...	Km/h	
ENTER : SELECT ESC : START		

- c You can select up to 40 PIDs to record. Press the [ESC] key when the selection is completed, then ULTRASCAN plus will start recording data.



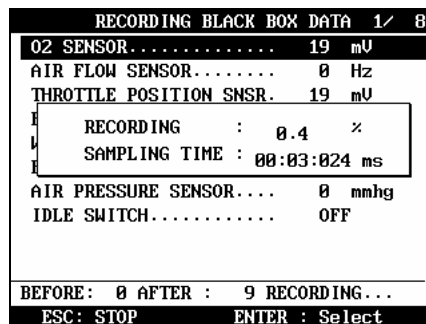
E. Trigger Modes

There are three trigger modes in the black box function.



a Continuous Record Mode (No trigger mode)

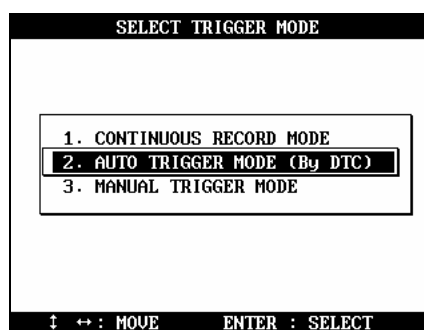
- ULTRASCAN plus will record live data of selected parameters up to 2040 frames or until you press the [ESC] key.
- Percentile memory usage and sampling time(frequency) will appear in the center of the screen while recording data, and the actual live data values will remain unchanged.



- Since no DTC trigger is applied in this mode, number of “Before DTC” frames will remain 0, and the “After DTC” will keep increasing as the more frames are recorded.

b Automatic Trigger Mode (Triggered by DTC)

- ULTRASCAN plus will keep recording live data of selected parameters up to 128 frames.
- Once a DTC is detected or the [ESC] key is pressed by the user, it will proceed with recording remaining frames up to 2,040 or until you abort.
- This function will let you have a set of data stream before and after the ECM's DTC recognition when you perform the test drive.



- Before DTC, you will see the Live Data of the selected parameters keep refreshing, however, once triggered by DTC or [ESC] key stroke, only the percentile process information and sampling frequency will be displayed.

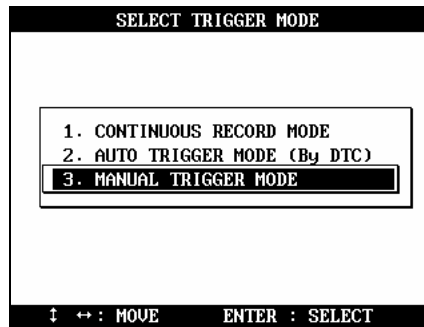
RECORDING BLACK BOX DATA 4/ 9		
O2 SENSOR.....	19	mV
AIR TEMPERATURE SENSOR.	-38	° C
THROTTLE POSITION SNSR.	19	mV
BATTERY VOLTAGE.....	10.9	V
CRANK SIGNAL.....	OFF	
WATER TEMPERATURE SNSR.	-29	° C
ENGINE RPM.....	0	rpm
AIR PRESSURE SENSOR....	0	mmHg
IDLE SWITCH.....	OFF	
BEFORE: 128 AFTER : 0		
ESC: STOP ENTER : Select		

RECORDING BLACK BOX DATA 1/ 10		
O2 SENSOR.....	4882	mV
O2 DUTY.....	2.3	%
O2 CONTROL.....	0.9	
RECORDING : 1.9 %		
SAMPLING TIME : 00:23:216 ms		
WATER TEMPERATURE SNSR.	60	° C
AIR FLOW SENSOR.....	0.0	kg/h
ENGINE RPM.....	0	rpm
VEHICLE SPEED SENSOR...	0	Km/h
BEFORE: 0 AFTER : 39 DTC NUM 6		
ESC: STOP ENTER : Select		



c Manual Trigger Mode

- ULTRASCAN plus will keep recording live data of selected parameters up to 128 frames, and once the [ESC] key is pressed by the user, it will proceed with recording remaining frames up to 2040.
- The screen display is the same as when selecting the Auto Trigger Mode.



F. Saving the recorded data

- a When the total frame number reaches 2040 or when you press the [ESC] key to abort, a query asking you if you would like to save recorded data or to discard it. Press [YES] to save or [NO] to cancel.

```

RECORDING BLACK BOX DATA 1/ 10
02 SENSOR..... 4882 mU
02 DUTY..... 2.3 %
=====
DO YOU WANT TO SAVE THIS DATA
? (YES:SAVE NO:CANCEL)
=====
AIR FLOW SENSOR..... 0.0 kg/h
ENGINE RPM..... 0 rpm
VEHICLE SPEED SENSOR... 0 Km/h
BEFORE: 0 AFTER :1741 DTC NUM 6
ESC: STOP ENTER : Select
    
```

- b When pressed [YES], a dialog box follows and asks you to input the test date. Enter the date and press the [ENTER] key to save the recorded data to ULTRASCAN plus memory.

Pressing the [ESC] key cancels saving data.

Date format is DD-MM-YYYY(D-day, M-month, Y-year), and only numeric values are available.

```

RECORDING BLACK BOX DATA 1/ 10
INPUT THE DATE
MODEL : EF SONATA (EXP.SONATA)
DEVICE: ENGINE CONTROL V6 DOHC
DATE : D M Y
BEFORE: 0 PAGE
AFTER : 1740 PAGE
DTC ITEM NUM: 6ITEM
↔:MOVE ESC:CANCEL
VEHICLE SPEED SENSOR... 0 Km/h
BEFORE: 0 AFTER :1741 DTC NUM 6
ESC: STOP ENTER : Select
    
```

```

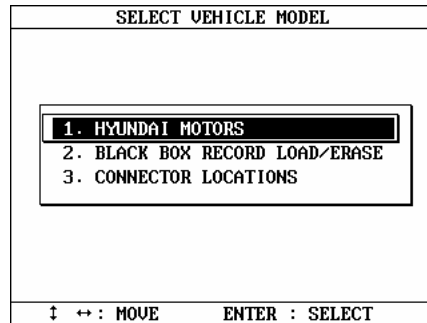
RECORDING BLACK BOX DATA 1/ 10
INPUT THE DATE
MODEL : EF SONATA (EXP.SONATA)
DEVICE: ENGINE CONTROL V6 DOHC
DATE : 10D 04M 2004Y
BEFORE: 0 PAGE
AFTER : 1740 PAGE
DTC ITEM NUM: 6ITEM
↔:MOVE ESC:CANCEL
VEHICLE SPEED SENSOR... 0 Km/h
BEFORE: 0 AFTER :1741 DTC NUM 6
ESC: STOP ENTER : Select
    
```

- c Tested Vehicle model name and control system will be saved as well as the date stamp for future retrieval.

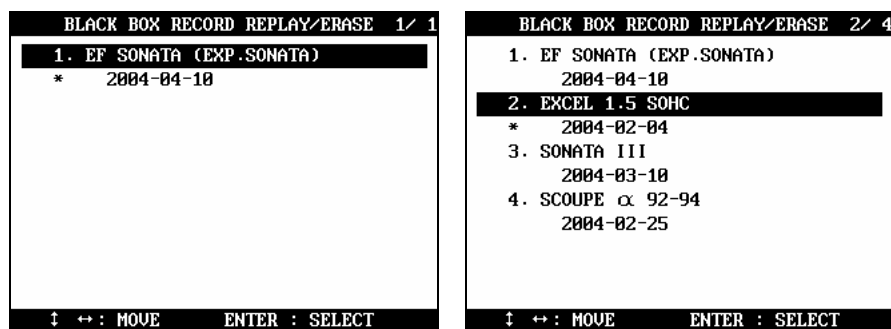


G. Black Box Data Load

- a You can load saved data by choosing [BLACKBOX RECORD LOAD / ERASE] from the [Car Manufacturer Selection] menu as shown below:



- b A list of recorded Black Box Data will follow for your selection
Up to 4 black box data can be stored in the memory per car manufacturer, therefore, up to 4 saved black box data can be listed in the menu.



- c The details of recorded data will be displayed for confirmation. If the record is correct, press the [ENTER] key. Press the [ESC] key to abort.
d If you want to erase any of these saved data, locate the highlight bar and press the erase key.

H. Loaded Blackbox data

Loaded black box data has basically the same format as the [Service Data (Live Data Stream)]. See the illustration below.

1. Data format

In the lower part of the display, the total number of recorded frames, frame number before and after the DTC(Diagnostic Trouble Code), and the number of DTC detected is displayed. In the example below, you can see that a total of 458 frames were recorded, and data stream currently shown in the main window is of the 336th frame from the beginning. It also tells you that the current frame is the 80th after 2 trouble codes were detected.

BLACK BOX RECORD REPLAY/ERA			1/ 10
02 SENSOR.....	4882	mV	
02 DUTY.....	2.3	%	
02 CONTROL.....	0.9		
THROTTLE ANGLE.....	0.0	°	
ADAPT TPS.....	29.9	°	
BATTERY VOLTAGE.....	10.8	V	
WATER TEMPERATURE SNSR.	60	° C	
AIR FLOW SENSOR.....	0.0	kg/h	
ENGINE RPM.....	0	rpm	
VEHICLE SPEED SENSOR...	0	Km/h	
TIME : 00:00:000ms		YES : REPLAY	
1:Graph 2.DTC ↔ : PAGE		1/1740	

The live data values may not be realistic as the screen was captured while the scan tool was linked to a simulator.

2. Data Replay

- a. Press the [YES] key then the saved blackbox data will start replaying. ULTRASCAN plus preserves the refresh time intervals of Black Box data. Therefore, Black Box data is replayed at the same speed as when it was originally recorded.



- b. If you want to go forward or backward faster, press the [◀] or [▶] key while replaying. Replay speed will restore to the original speed when the key is released.

BLACK BOX RECORD REPLAY/ERA				5/ 10
02 SENSOR.....	4882	mU		
02 DUTY.....	2.3	%		
02 CONTROL.....	0.9			
THROTTLE ANGLE.....	0.0	°		
ADAPT TPS.....	29.9	°		
BATTERY VOLTAGE.....	10.8	V		
WATER TEMPERATURE SNSR.	60	° C		
AIR FLOW SENSOR.....	0.0	kg/h		
ENGINE RPM.....	0	rpm		
VEHICLE SPEED SENSOR...	0	Km/h		
TIME : 00:34:452ms				YES : PAUSE
NO:STOP REPLAY ↔ : PAGE				117/1740

- c. Pressing the [YES] key will pause the replay. You can resume replaying from the frame where it was paused by pressing the [YES] key again.

BLACK BOX RECORD REPLAY/ERA				5/ 10
02 SENSOR.....	4882	mU		
02 DUTY.....	2.3	%		
02 CONTROL.....	0.9			
THROTTLE ANGLE.....	0.0	°		
ADAPT TPS.....	29.9	°		
BATTERY VOLTAGE.....	10.8	V		
WATER TEMPERATURE SNSR.	60	° C		
AIR FLOW SENSOR.....	0.0	kg/h		
ENGINE RPM.....	0	rpm		
VEHICLE SPEED SENSOR...	0	Km/h		
TIME : 00:46:332ms				YES : REPLAY
NO:STOP REPLAY ↔ : PAGE				157/1740

- d. Pressing the [NO] key will stop replaying. You can restart replay by pressing the [YES] key again, but it will start from the first frame.

BLACK BOX RECORD REPLAY/ERA				5/ 10
02 SENSOR.....	4882	mU		
02 DUTY.....	2.3	%		
02 CONTROL.....	0.9			
THROTTLE ANGLE.....	0.0	°		
ADAPT TPS.....	29.9	°		
BATTERY VOLTAGE.....	10.8	V		
WATER TEMPERATURE SNSR.	60	° C		
AIR FLOW SENSOR.....	0.0	kg/h		
ENGINE RPM.....	0	rpm		
VEHICLE SPEED SENSOR...	0	Km/h		
TIME : 02:18:402ms				YES : REPLAY
1:Graph 2.DTC ↔ : PAGE				467/1740

3. Graph

- a As previously explained in section [3. Service Data], data from up to three selected parameter data can be graphed.
- b Make sure that the Black Box data replay is stopped. If it is being replayed or paused, press the [NO] key to stop replaying completely.
- c Choose the parameter by locating the highlight bar and pressing the [ENTER] key. The selected parameter will be marked with a triangle as shown below:

BLACK BOX RECORD REPLAY/ERA 9/ 10		
▶ 02 SENSOR.....	4882	mV
02 DUTY.....	2.3	%
02 CONTROL.....	0.9	
▶ THROTTLE ANGLE.....	0.0	°
ADAPT TPS.....	29.9	°
BATTERY VOLTAGE.....	10.8	V
WATER TEMPERATURE SNSR.	60	° C
AIR FLOW SENSOR.....	0.0	kg/h
▶ ENGINE RPM.....	0	rpm
VEHICLE SPEED SENSOR...	0	Km/h
TIME : 00:00:000ms YES : REPLAY		
1:Graph 2.DTC ↔ : PAGE 1/1740		

- d Then press the [1] key to view the data in graph format.

02 SENSOR.....	4882	mV
THROTTLE ANGLE.....	0.0	°
ENGINE RPM.....	0.0	rpm
-00:00:000ms ↔ ↓ :MOVE PAGE: 1/1740		

The line graphs are flat as it is not based on data recorded from the active vehicle.



- e Up to 316 frames can be displayed on a single page.
If recorded data has more than 316 frames, you can shift to next or previous page by using the [▲] and [▼] keys.
- f The dotted line indicates from which frame the live data parameter values are being displayed. You can move it left and right with the [◀] and [▶] keys.

02 SENSOR.....	4882	mV
THROTTLE ANGLE.....	0.0	°
ENGINE RPM.....	0.0	rpm
00:43:362ms↔ ↓ :MOVE PAGE: 147/1740		

- g Elapsed time and frame number are indicated in the bottom.
 - *Continuous Record (No trigger) Mode*: Elapsed time and number of frames from the first frame
 - *Automatic / Manual Trigger (Triggered by DTC or user) Mode*: Elapsed time and number of frames from the trigger point (DTC detection or [ESC] key stroke by the user). Before the trigger point will be marked in negative values.
- h To return to the Black Box Data Display, press the [ESC] key.

4. DTC

- a You can check the DTC(s) found during recording Black Box Data.
- b Make sure that the Black Box data replay is stopped. If it is being replayed or paused, press the [NO] key to stop replaying completely.
- c Press the [2] key then the list of DTC(s) will appear as below:

D. T. C		
P0120	T.P.S	ERROR
P0115	WATER TEMP	SENSOR ERROR
P0230	FUELPUMP PRIM	CIRCUIT ERROR
P1624	RADIATOR FAN	
P1625	AIR CONDITIONER	FAN
P0130	O2(B1,S1)	ERROR
DTC : 6 ITEM		

- d Because Black Box Data is not live or active, you cannot erase DTC(s).

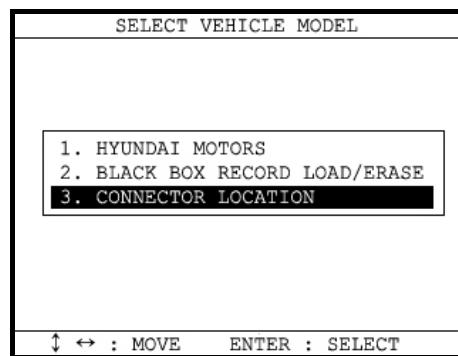


V. Connector Location -----

- a The vehicle side OBD2 adapter is easy to find as the location is quite regular – under the dash, however, the old vehicle side DLC adapters of OBD generation 1 are located quite randomly and sometimes it is very difficult to find.

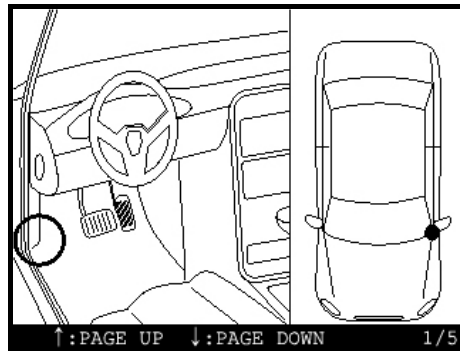
ULTRASCAN plus has the vehicle side adapter location maps for each car make to aid the user in locating the adapters.

The locations suggested in this function are purely from Hanatech's experience, therefore, it may contain incorrect information. It is always highly recommended to refer to the original repair manual published by the car manufacturers for correct information.

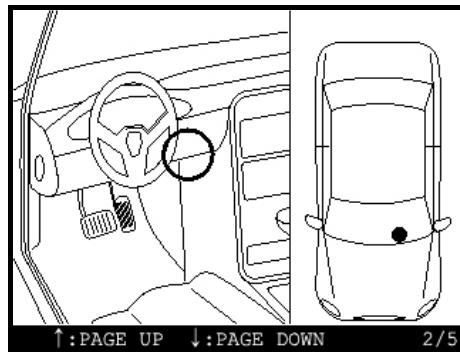


- b Select [CONNECTOR LOCATION] from the vehicle selection menu if the adapter is not found in the place where it is supposed to be.

A drawing indicating the location of the vehicle side adapter follows. In the right bottom of the display, the total number of location maps for the selected car make is indicated. The example below is when Hyundai motors is selected, and it tells there are total 5 maps.



- c The maps are provided in the order of most frequently found location. Press Up or Down key to view the next or previous map. Press the [ESC] key to return to vehicle selection menu.



- d Location maps for Korean cars are based on Left Hand Drive vehicles, and the others such as Japanese, Australian and Malaysian cars are based on Right Hand Drive cars. You may have to consider reversed image according to your local practice. Refer to each car make section in this manual for further information.



Trouble Shooting

This part of manual presents you the instant actions to be taken for the most frequently reported troubles.

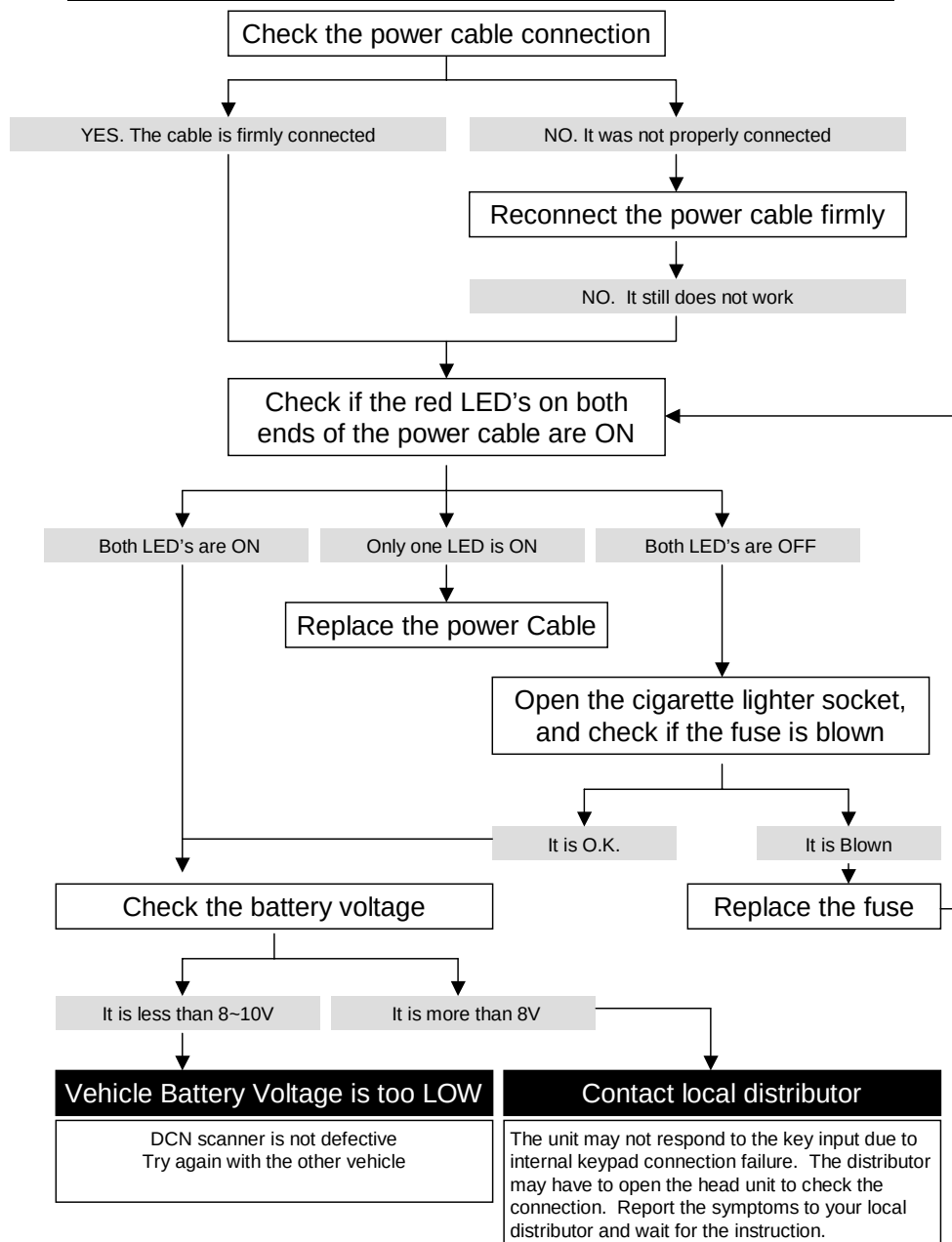
The purpose of this troubleshooting guide is to minimize the loss of time and cost caused by disputing of troubles that can be simply solved by the user himself.

Please always refer to this troubleshooting guide and do as suggested herein when you have any trouble while using ULTRASCAN plus equipment in advance to calling up your local distributor.

The manufacturer keeps endeavoring to minimize the possible troubles, therefore, remedies to prevent listed problems can be made without notice to individual users.

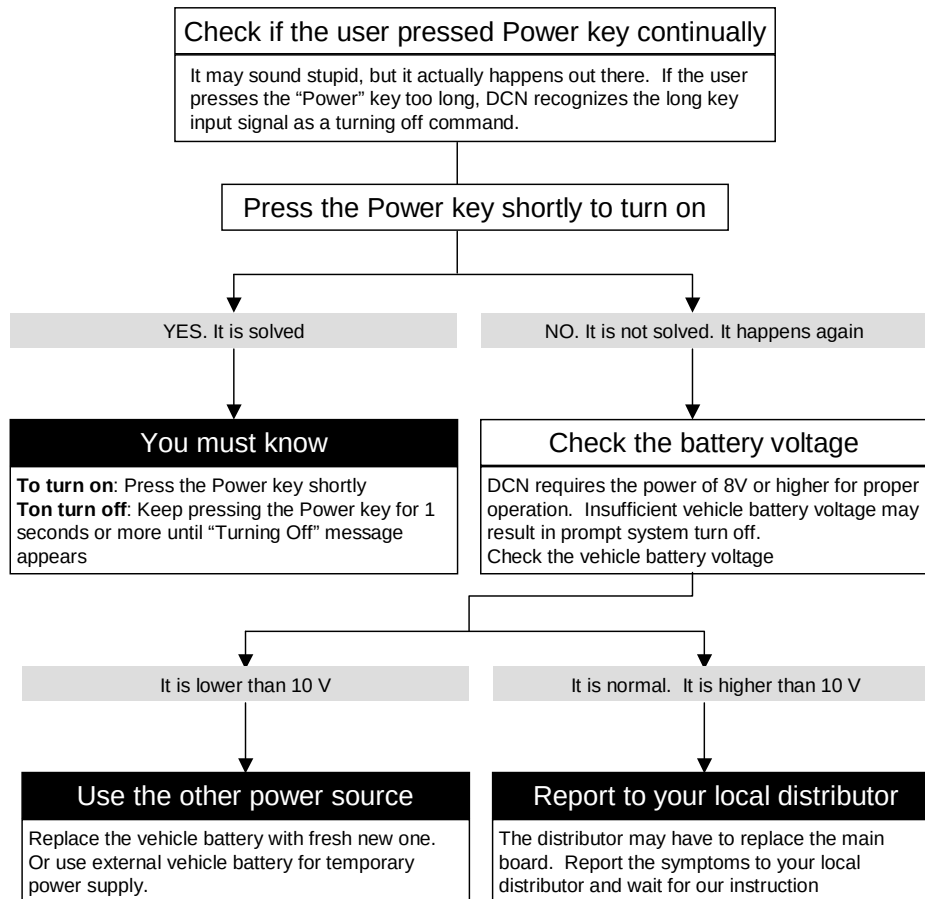
Note your local distributor's contact information here:

DCN would not turn on when the Power key is pressed

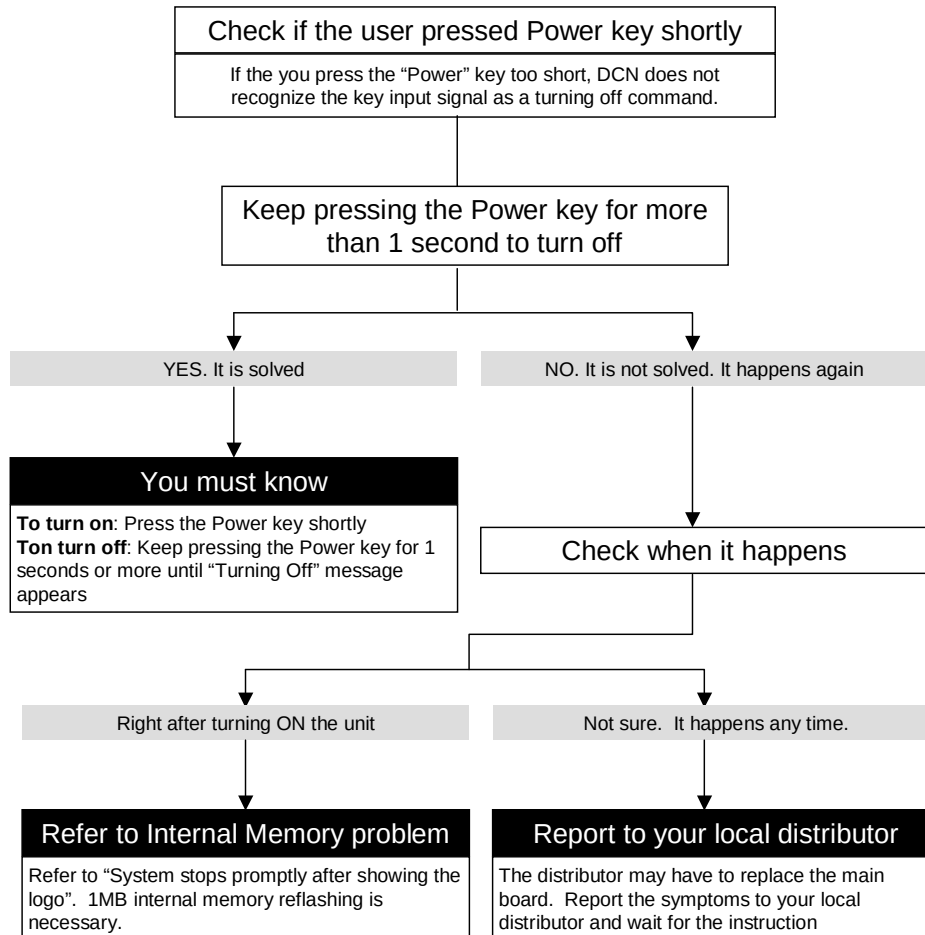




Power automatically turns off after turned on

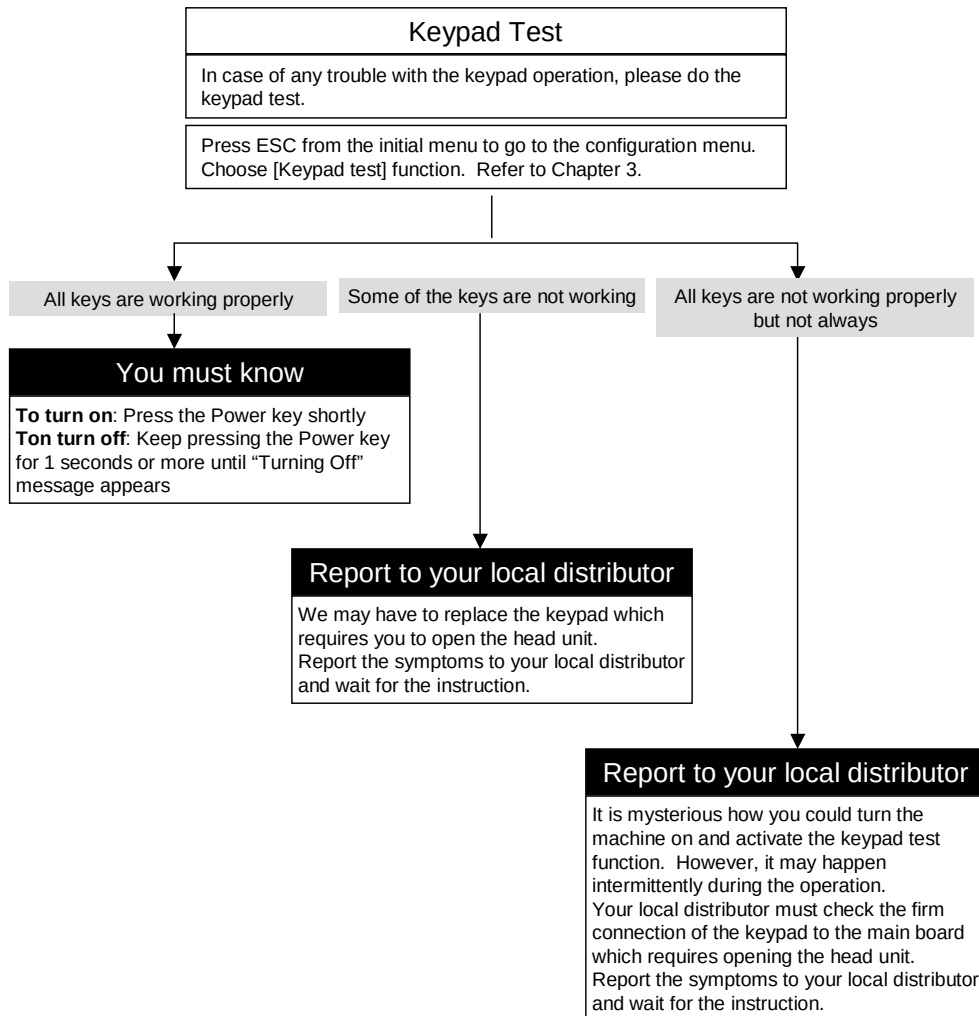


Power doesn't turn off even the Power key is pressed





Improper response to Key input



LCD screen problems

The display is too dim or too dark

Adjust the contrast using the contrast wheel on the right side of DCN scanner

LCD stands for Liquid Crystal Display, and it is very sensitive to temperature.

If you have placed DCN scanner in a cold or hot place, the display may become too dim or too dark when turned on. This is not a defect of DCN scanner, but a normal response of all LCD's to the change of temperature.

This is not a defect of DCN scanner.

However, if you cannot control the contrast using the dial, please contact us for further assistance.

A part of LCD became very dark

Adjust the contrast using the contrast wheel on the right side of DCN scanner

The LCD unit of DCN scanner has a backlight for brighter display. This backlight generates heat as time elapses when turned on.

As mentioned above, because LCD is sensitive to temperature, the part of the LCD near the backlight may turn dark when you keep DCN turned on for more than 2 hours.

This is not a defect of DCN scanner.

However, if the LCD becomes dark too early or the contrast adjustment doesn't work, please contact us for further assistance.

Report to your local distributor

If the problem is too serious to use properly or the contrast dial does not function, report the symptoms to your local distributor and wait for instruction. Replacement of the LCD module may be necessary.



LCD screen problems

Backlight doesn't turn on

Press the [Backlight] button

When you press the [Backlight] button marked [☀], the backlight must be turned-on with a faint ticking sound.

Please contact your local distributor for further assistance if the key doesn't work



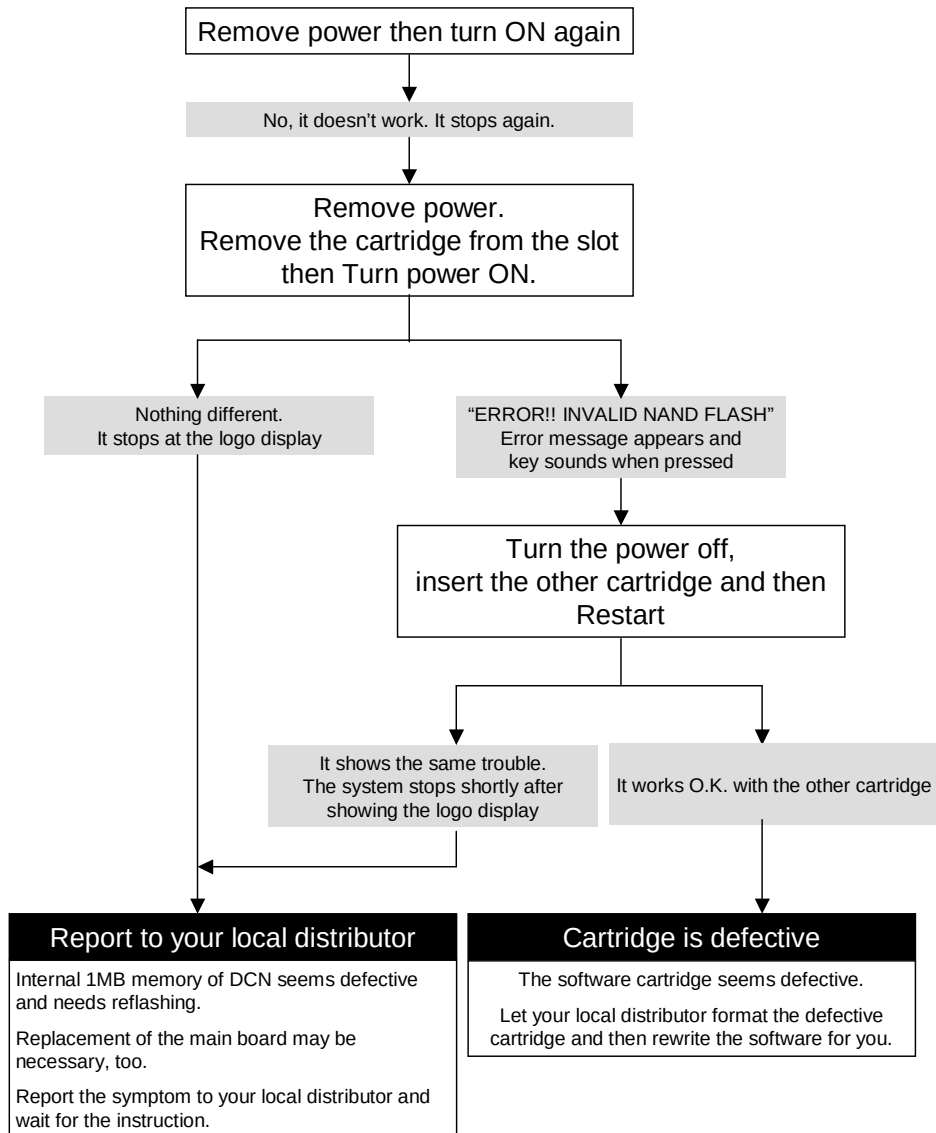
Report to your local distributor

Your local distributor must check the firm connection of the LCD module power wire to the main board, which requires opening the head unit. Or the replacement of the LCD module may be necessary, too.

Report the symptoms to your local distributor and wait for the instruction.

System fails promptly after showing the DCN logo

System fails with continuous BEEP sound and erratic display





“INVALID NAND FLASH” Error

When an error message appears as below as soon as turning on the head unit.
!!!ERROR!!!
INVALID NAND FLASH
CANNOT READ ROM INFO
CHECK PROGRAM CARD

Turn the power off,
Remove the cartridge
and insert it again firmly

Ensure that the upper side of the cartridge faces upward. Upper side has the title on it, and the lower side has the caution descriptions.

If you try to insert the cartridge upside down, it would not go into the slot. However, if you apply excessive power to insert the cartridge into the slot upside down, it may break the internal frames and communication pins.

Yes, it works fine now

No, it doesn't work

You must know

Try to insert the cartridge firmly whenever you replace the cartridges.

Also make sure to turn the power off before pressing the cartridge for firm connection or removal.

Cartridge is defective

The software cartridge seems defective.

Let your local distributor collect and check all the PCMCIA cards you have. Formatting the cards and rewriting software may be necessary.

“This card needs scope upgrade” Error

When an error message appears as below as soon as turning on the head unit.
THIS CARD NEEDS SCOPE
UPGRADE. PRESS [ENTER]
AND CONTINUE UPGRADE

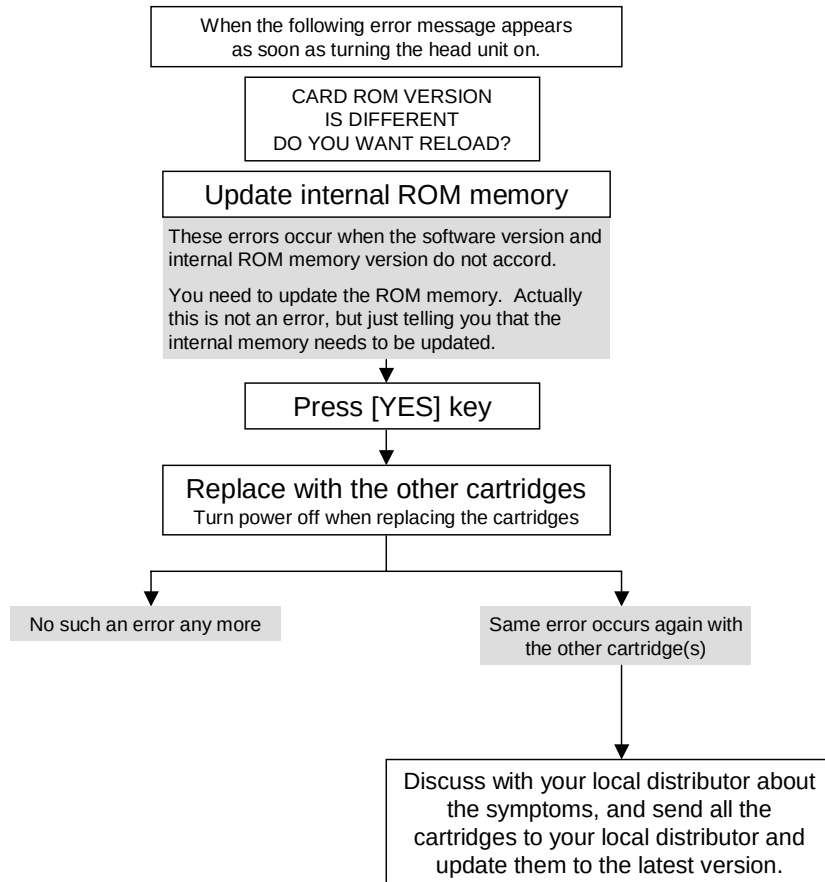
This error message is saying that the cartridge's software is very old and has never been updated for a long time.
Since it is too out-dated, simply updating the base program is not enough. Your local distributor needs to collect all the cartridges from you, and update them to the latest version.

Update all the cartridges

Let your local distributor collect and check all the cartridges you have.
Formatting the cards and rewriting software will be necessary.

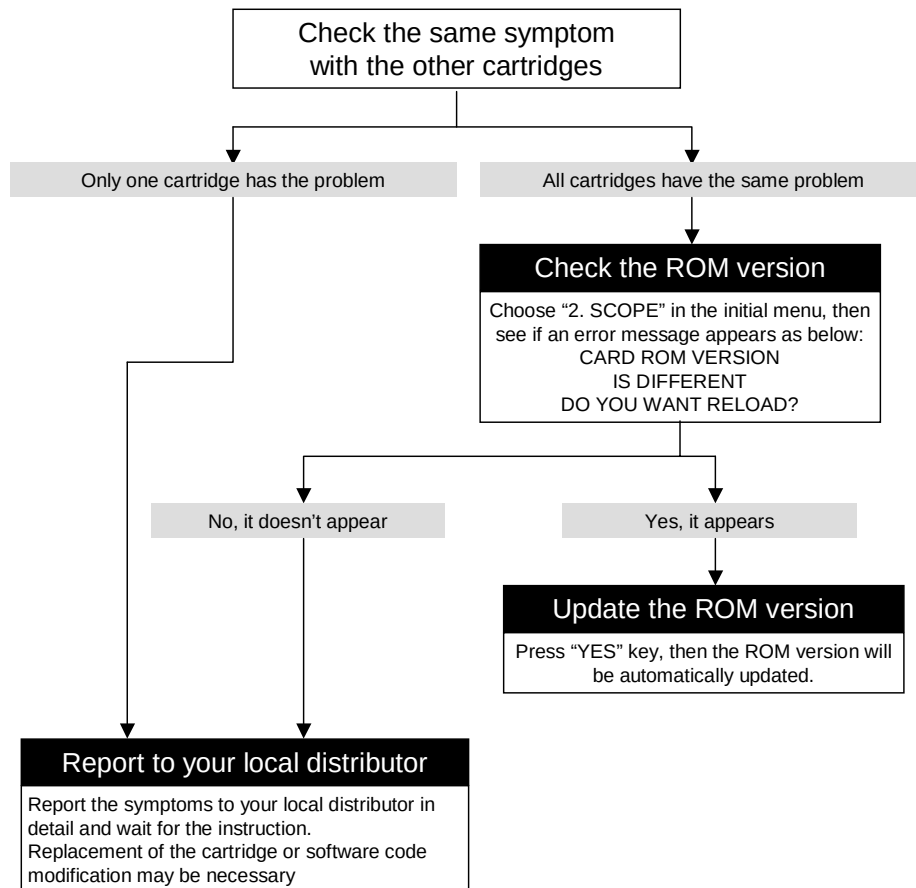


“Card Rom Version is different” Error



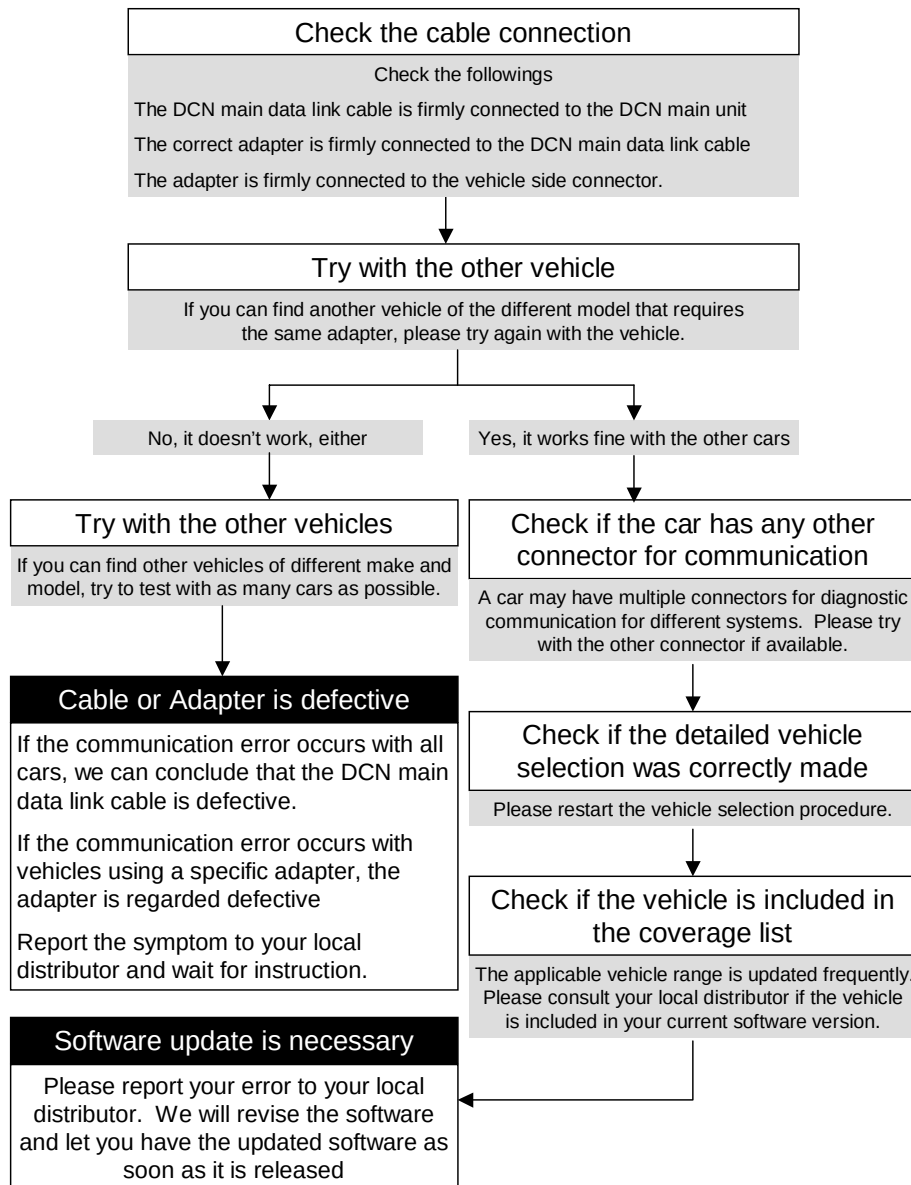
Broken characters and erratic display

When illegible or unknown symbolic characters or erratic dots or lines appear on the screen after loading a program





Communication Error





Hanatech Co., Ltd.
Automotive Diagnostic Equipment Specialist



Global Standard

ULTRASCAN plus CE
Marked

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