MIDTRONICS

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TOYOTA

LEXUS



NVS-8150

Digital Battery System Analyzer

INSTRUCTION MANUAL

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Chapter 1: Introduction & Overview

Personal Precautions

⚠ DANGER



Risk of explosive gases.
Never smoke or allow a spark or flame in the vicinity of a battery.

Batteries can produce a highly explosive mix of hydrogen gas and oxygen, even when the battery is not in operation. Always work in a well-ventilated area.

⚠ WARNING

Wash hands after handling.

REQUIRED BY CALIFORNIA PROP. 65: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.

Follow all manufacturers' instructions and BCI (Battery Council International) safety recommendations, which include the following precautions:

- ⇨ Battery acid is highly corrosive. If acid enters your eyes, immediately flush them thoroughly with cold running water for at least 15 minutes and seek medical attention. If battery acid gets on your skin or clothing, wash immediately with a mixture of water and baking soda.
- ⇨ Always wear proper safety glasses or face shield when working with or around batteries.
- ⇨ Keep hair, hands, and clothing as well as the analyzer cords and cables away from moving engine parts.
- ⇨ Remove any jewelry or watches before you start servicing the battery.
- ⇨ Use caution when working with metallic tools to prevent sparks or short circuits.
- ⇨ Never lean over a battery when testing, charging, or jump starting.

Manual Conventions

Symbols	Description
	The safety symbol indicates instructions for avoiding hazardous conditions and personal injury.
	When used with the words **CAUTION**, **WARNING, or DANGER** indicates instructions for avoiding hazardous conditions and personal injury.
	The wrench symbol indicates procedural notes and helpful information.
◀▲▼▶	These symbols indicate which arrow keys on the keypad to press for a given function.
CAPITAL LETTERS	The text for screen options are in regular capital letters.
NEXT	The text for soft keys are in **Bold** capital letters.

Registering Your Analyzer



Before using your analyzer, we recommend that you register it online to activate your warranty. Registration will also make it faster and easier for you to obtain technical support and service.

To register, log on at www.midtronics.com/warranty.html and have your serial number ready. The number is at the bottom of the label on the back of the analyzer.

If your analyzer needs repair, call Midtronics Customer Service 1.800.776.1995. Servicing the analyzer yourself may void your warranty. Refer to the appendix on what is covered by the warranty.

Components & Accessories

	Battery Test Cable 00002-A0830
	IR Printer (00002-A0870)
	Printer Paper A095
	Stud Adapters A0333
	Amp Clamp (Optional) A018

External Connections



① RJ45 connector (Accessories Port) with a release lever for accessory connections.

② 6-pin connector, with a locking ring, for the battery test leads.

③ Temperature measurement sensor.

④ Data transmitter, which transmits test results to an IR printer.



⑤ DB-9 connector for future accessories.

⑥ Spring-loaded data card slot for test data storage and software upgrades.

Connecting The Battery Test Cable

Connect the battery test cable to the tester by first aligning the cable connector's 6 pins with the holes on top of the tester. Firmly insert the connector and finger-tighten the locking ring.

IMPORTANT: Do not turn the locking ring more than ¾ of a turn or you will damage the tester components.

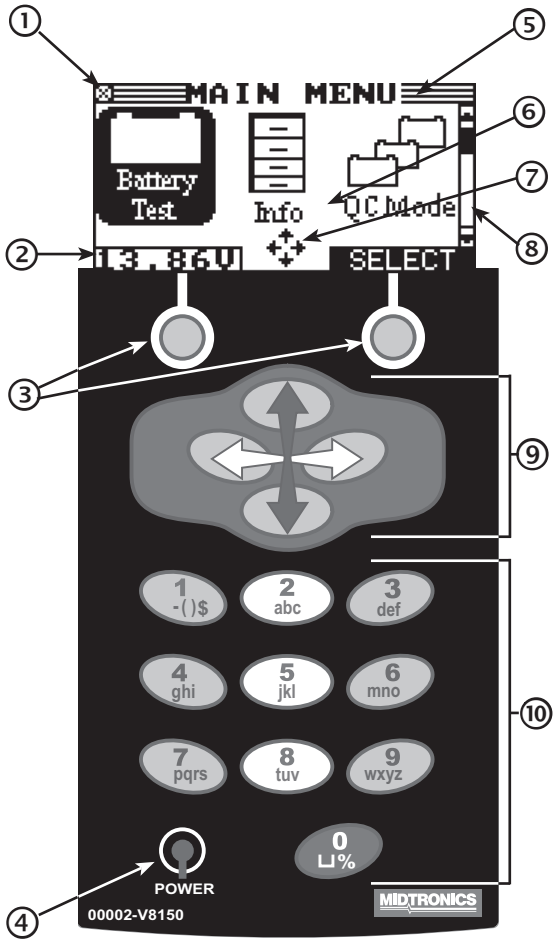
Connecting An Accessory Cable

If you are using an accessory cable, plug it into the accessories port on top of the tester as you would a phone jack. To remove it, press the lever and pull out the cable connector.

Data Card

When inserting a data card (2GB max.), push it into the slot until it locks. To protect the card slot and enable the analyzer to read and write to the card, leave the card in the slot.

Display And Keypad



① **Internal Batteries Status Indicator**
This indicator appears in the screen's top left corner, lets you know the status and charge level of the analyzer's six (6) 1.5-volt batteries. The X in the top left corner of the screen shows that the analyzer is powered by the battery you're testing to conserve the analyzer's internal batteries.

② **Voltmeter**
When you first connect the analyzer to a battery it functions as a voltmeter. The voltage reading appears above the left soft key until you move to other menus or functions.

③ **Soft Keys**
Press the two soft keys linked to the bottom of the screen to perform the functions displayed above them. The functions change depending on the menu or test process. So it may be helpful to think of the words appearing above them as part of the keys. Some of the more common soft-key functions are **SELECT, BACK**, and **END**.

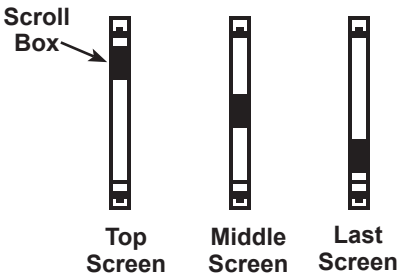
④ **POWER Key**
Press the **POWER** button to turn the analyzer on and off. The analyzer also turns on automatically when you connect its test leads to a battery.

⑤ **Title Bar**
The title bar shows you the name of the current menu, test tool, utility, or function.

⑥ **Selection Area**
The selection area below the Title Bar contains selectable items or dialog boxes that display information or require a response.

⑦ **Menu Screen Arrows**
When displayed in menu screens, the menu screen arrows show you which **ARROW** key on the keypad to press to display other icons or screens. When displayed under a list of options, the menu screen arrows show you which keypad arrow to press to highlight a character or item in a list.

⑧ **Scroll Bar**
Another navigational aid is the scroll bar on the right side of the screen. The position of its scroll box shows you whether the screen is the top (or only screen), middle, or last in a series.



⑨ **Arrow (◀ ▲ ▼ ▶) Keys**
Press ▲ to move up to the next selectable item or row. When entering text, use ▲ to move to the previous character.

Press ▼ to move down to the next selectable item or row. When entering text, use ▼ to move to the next available character.

Use ▲ or ▼ to scroll to the letters A through Z and the numbers 0 through 9. When entering text, use ▶ to move one space to the right and ◀ to move one space to the left.

⑩ **Alphanumeric Keypad**
In some cases, you can use the Alphanumeric Keypad to enter numerical test parameters instead of scrolling to them with the ▲◀ ▶▼ keys.

You can also use the Alphanumeric Keys to create and edit customer coupons. The keypad includes characters for punctuation.

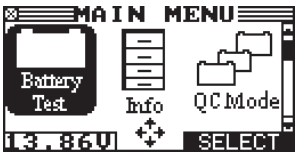
To add a space, press ▶. To add a character or insert a space, press ◀.

Refer to the following table for the characters associated with each alphanumeric key.

Key	Character
①	$ - ( ) 1
②	a b c 2
③	d e f 3
④	g h i 4
⑤	j k l 5
⑥	m n o 6
⑦	p q r s 7
⑧	t u v 8
⑨	w x y z 9
⓪	% , . # 0

Data Entry Methods

Menu Icons



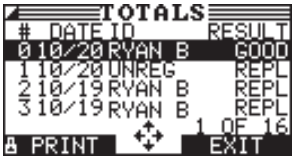
A menu icon is a graphical representation of a function you can select, such as the Battery test Icon in the Main Menu. To select an icon, use ◀ or ▶ to highlight it. Highlighting changes the icon to a white picture on a black background. To confirm your selection, press the appropriate soft key.

Option Buttons



Some lists have option buttons before each item. To select an item, use ▲ or ▼ to move the dot to the button next to the item. To confirm your selection, press the appropriate soft key.

Scrolling Lists



Scrolling lists contain items that extend above and below the screen. The first number above the right soft key indicates the position in the list of the highlighted item. The second number above the right soft key indicates the number of items in the list.

To select an item, press ▲ or ▼ to highlight the item and press the appropriate soft key. To advance the highlight bar up or down four lines at a time, press ◀ or ▶.

Scroll Boxes



Scroll boxes contain variables that are displayed by scrolling using arrow keys.

To select, use ▲ or ▼ to scroll to the value, and press the appropriate soft key. In the illustration the left directional arrow indicates that you can press ◀ to clear all or part of the entry.

Alphanumeric Entry



Some selections require you to alphanumeric characters. These "user-defined" selections have a blinking horizontal line (cursor) to the right of the last character.

Use ▲ or ▼ to highlight a line for editing. Press **SELECT** to edit the selected line. Display the character or number you want by rapidly pressing an **ARROW** key as many times as needed, or press and hold the **ARROW** key to rapidly scroll. To backspace, press ◀. Use ▶ to add a space. When finished, press the appropriate soft key to save the text you entered.

Check Boxes



Choose more than one option. Select (check) and deselect (uncheck) by pressing the corresponding number key

Menu Structure

This section contains a graphical representation of the menu structure with brief descriptions of the utilities in each menu.

Main Menu

Icon	Description
Battery Test	Tests a battery using the battery information you select in a series of screens.
Info *	Includes a utility to view and print test results, a total test counter, a data transfer utility, and the software version and date, and GR8 serial number for the control module.
QC Mode	Quality-control tests up to 100 batteries in succession without resetting test parameters.
Setup *	Twelve setup utilities, many of which customize your user interface. Includes administrative functions.
Help	Provides a list of topics and definitions. Also includes Midtronics Customer Service phone numbers.

Setup Menu (Admin PIN required)

Setup

Use this menu to set certain tester preferences and view options.

NOTE: The Setup access code number is **12345**.

Icon	Description
Clock	Settings to adjust date and time.
Users	Add, edit, or delete User IDs.
Shop	Allows you to add a custom header to printed test results.
Display	Settings to adjust the screen contrast and back-light time.
Coupon	If you've created a coupon in the Edit Coupon utility, use Coupon to turn it on and off.
Edit Coupon	Allows you to create and store up to three separate coupons to be printed on test results coupon at the bottom of printed test results.
Temp	Allows you to select degrees in C or F for temperature measurements.
Language	Sets the language of the display and printouts.
Format	Formats the data card to receive data. Also erases all data on the card.
Update	Updates the GR8 software using files on a data card.
Admin	Allows you to enable or disable PIN settings, clear test totals, and restore defaults. **NOTE:** The Admin function is password protected. The default code number is **12345**.
Logos	Select one or more logos to appear on printed results.

Info Menu



Use the Info Menu to manage test data, view and print test results, track tester usage and history, and internal battery State-of-Charge.

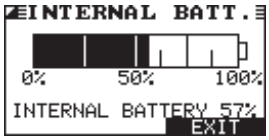
Icon	Description
	Displays the last battery test results. Sends the results to the IR printer.
	Displays the results for all QC tests in memory. Sends the results to the IR printer.
	Reports menu that includes the following type of test totals: LIFETIME, USER TOTALS, LAST 100 LOG, and TOTALS BY DECISION.
	A future optional accessory consists of an IR software and hardware package that will enable you to transfer test data to a PC.
	Displays the software version and release date, and the serial number of the control module.
	Shows the State-of-Charge of the analyzer's six AA internal batteries.

Startup

When using the **ARROW** keys to select option buttons, press **NEXT** to continue to the next step. **BACK** returns you to the Main Menu at the start of the test and to the previous screen as you progress. When using the keypad, no additional keypress is needed.

1. Turn the Power switch on.

   Following the initial power up screen, the Internal Battery Indicator showing the tester's internal batteries State-of-Charge (SOC) is displayed.



1. Following power up, select the region where the charger will be used.

   1 ⦿ USA

   2 ○ CANADA

2. Select **YES** to confirm the selection.
3. Select a administrator USER ID.
4. Enter a four-digit User ID Personal Identification Number (PIN). The default is "0000".

ENTER PIN

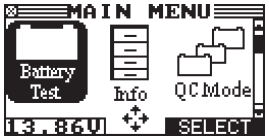
****

A greeting screen is displayed showing the User ID, the total number of tests performed, and the starting date.

USER ID	TOTAL
UNREG	0

SINCE : 8/14/2017

5. Press **NEXT** to continue to the Main Menu.



Screen will also advance to the Main Menu after a few seconds.

Test Preparation

Inspecting The Battery

Before starting the test visually inspect the battery for:

- ✓ Cracked, buckled, or leaking case. If you see any of these defects, replace the battery.
- ✓ Corroded, loose, or damaged cables and connections. Repair or replace them as needed.
- ✓ Corrosion on the battery terminals, and dirt or acid on the case top. Clean the case and terminals using a wire brush and a mixture of water and baking soda.
- ✓ Low electrolyte level. If the electrolyte level is too low, add distilled water to the level specified by the battery manufacturer, and fully charge the battery. Do not overfill.
- ✓ Corroded or loose battery tray and hold-down fixture. Tighten or replace as needed.

The preferred battery test location is in the vehicle. However, if you plan to test out of the vehicle:

- ✓ Always disconnect the negative cable from the battery first and reconnect it last.
- ✓ Always use a carry tool or strap to lift and transport the battery.

⚠ WARNING

Failure to properly install lead terminal adapters, or using adapters that are dirty or worn, may cause false test results.

When testing side-post or Group 31 batteries, always use lead terminal adapters provided with the tester—do not test at the battery's steel bolts. To avoid damage, never use a wrench to tighten the adapters more than ¼ turn.

At the start of the test, make sure all vehicle accessory loads are off, the key is not in the ignition, and the doors are closed.

Connecting to a Battery

⚠ CAUTION

Do not connect the tester to a voltage source greater than 60 Vdc.

Connect the battery test cable to the analyzer by first aligning the cable connector's 6 pins with the holes on top of the analyzer. Firmly insert the connector and tighten the locking ring.

Connect the clamps to the battery: the red clamp to the positive (+) terminal and the black clamp to the negative (–) terminal. If you connect the clamps with the wrong polarity (positive to negative or negative to positive), the analyzer displays REVERSE CONNECTION! Reconnect the clamps.

To make sure both sides of the clamps are gripping the terminals, rock each clamp back and forth. The NVS-8150 requires that both sides of each clamp be firmly connected before testing. A poor connection will prevent testing, and the analyzer will display the message CHECK CLAMP CONNECTION. If the message reappears after you have correctly reconnected the clamps, clean the terminals and reconnect.

Setting User Preferences

Before starting your test you may want to customize the use of your analyzer by setting preferences in the Setup Menu and creating a User ID. The menu has settings for the date and time, the contrast and backlight time, a utility to customize printouts for the optional IR printer, among others. The setup utilities are described in Chapter 5.

Help Menu and Soft Keys

In addition to the **HELP** soft keys available in certain screens, the NVS-8150 provides a Help Menu with a glossary of test-related definitions that you may want to review before the test. The menu also provides troubleshooting information and the phone numbers for Midtronics Customer Service in case you encounter a problem and need technical assistance.

Chapter 2: Battery Test

Use the Battery Test function to test individual batteries either in a vehicle (connected) or out of vehicle. Batteries can also be tested by rating and type.

When using the **ARROW** keys to select option buttons, press **NEXT** to continue to the next step. When using the keypad, no additional keypress is needed. Use **BACK** to return to the Main Menu at the start of the test and or the previous screen during the test.

1. At the Main Menu, highlight the Battery Test icon and press **SELECT**.
2. Select the USER ID from the displayed list.
3. Using the keypad, enter the four-digit PIN and press **NEXT**.

   To backspace use ◀. Press **EXIT** to start over by selecting another User ID.
4. Select the battery LOCATION.

   1 ⦿ OUT OF VEHICLE

   2 ○ IN VEHICLE

   A battery not connected to a vehicle is considered OUT OF VEHICLE.
5. Select the battery rating.

   1 ⦿ CCA

   2 ○ JIS

CCA	Cold Cranking Amps. The most common rating for starting batteries rated at 0 °F.
JIS	Japanese Industrial Standard. Shown on a battery as a combination of numbers and letters, for example: **26A17**

6. Select the BATTERY TYPE.

   1 ⦿ FLOODED

   2 ○ AGM/SPIRAL

   3 ○ AGM/FLAT PLATE

   4 ○ EFB
7. Enter the BATTERY RATING. Scroll to the rating and press **SELECT** to begin the test.

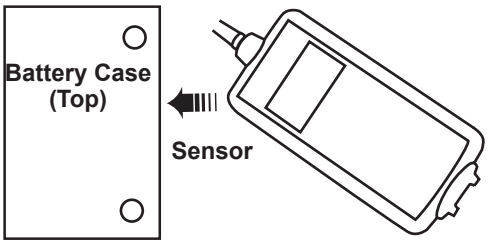
   580 ▲▼ **CCA**

   Entry range is between 100 to 3000, except for DIN and IEC, which have a range of 100 to 1000. Hold ▲ or ▼ to increase your scrolling speed.

IMPORTANT: It is important to input the correct test parameters. If you use the wrong parameters, an inaccurate test result will occur.

   For JIS, scroll to the correct JIS number.

   26A17
   26A19
   26B17
   28A19
8. If prompted, measure the ambient battery temperature by aim the IR temperature sensor on the top of the tester at the battery case. Once the temperature stabilizes, press **NEXT** to continue the test.



Additional Test Requirements

For a more decisive result the analyzer may ask for additional information or further explore the battery's condition.

System Noise Detected

Computer, ignition noise, or parasitic drain had been detected and the tester, and will attempt to retest. Make sure all vehicle loads are off, doors are closed, and the ignition is off. The analyzer will automatically retest when it no longer detects system noise. If the message reappears:

- Possibly testing too close to a noise source, such as a charger or other high-current device. Move away and retest.
- If unable to locate the noise source, fully charge the battery and retest. If the message appears after recharging, test the battery out of the vehicle.
- Disconnect the battery cables and retest.

Unstable Battery Detected

A weak battery or one that has just been charged may retain enough electrical activity to be detected by the analyzer, which will adversely affect the test results. A fully charged battery should stabilize quickly, after which the analyzer will automatically retest. Weak batteries should be charged and retested. If the battery is fully charged, check clamp connections.

Surface Charge Detected

The battery will hold a surface charge if the engine has been running or after the battery has been charged. The analyzer may prompt to remove the surface charge before it begins testing.

1. Follow the analyzer's instructions indicating when to turn the headlights on and off.
2. The analyzer will resume testing after it detects that the surface charge is removed.

Dynamic Scan Test

In some cases the analyzer may need to further analyze a deeply discharged battery. It will then conduct a Deep Scan Test.

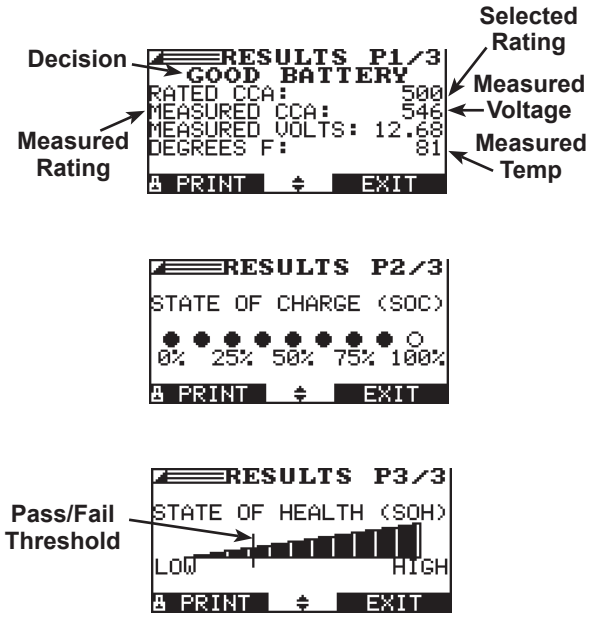
Charged Before Testing

For a more decisive result, the analyzer will ask if the battery being tested has just been charged or not. If the vehicle has just been driven, select **YES**. It will resume the test after you make your selection.

Test Results

Battery Test information is displayed across multiple screens. Use ▲ or ▼ to scroll to view each. Press **EXIT** to return to the Main Menu or **PRINT** to print out the results.

IMPORTANT: A new test will overwrite the last battery test result details. Record or print the results to retain them.



Decision	Recommended Action
GOOD BATTERY	Return the battery to service.
GOOD–RECHARGE	Fully charge the battery and return it to service.
CHARGE & RETEST	Fully charge the battery and retest. ***Failure to fully charge the battery before retesting may cause false readings.*** If CHARGE & RETEST appears again after you fully charge the battery, replace the battery. Use ▲ or ▼ to view Time To Charge estimates and the tested battery State Of Charge.
REPLACE BATTERY	May also mean a poor connection between the battery cables and the battery. Disconnect the battery cables and retest out-of-vehicle test before replacing.
BAD CELL–REPLACE	Replace the battery and retest.

IMPORTANT: The QC Mode does not produce a warranty code.

⚠ CAUTION

Never charge a frozen battery

Batteries generate explosive gases during normal operation, and when discharged or charged. Warm the battery and retest.

State-of-Charge (SOC)

The State-of-Charge is one of several important factors that affect the battery's ability to crank an engine. It is a measure of the available capacity remaining of a battery expressed as a percentage of its original rated capacity.

State-of-Health (SOH)

State-of-Health is a measure of a battery's condition relative to a fresh battery. It is based on cranking rating, open-circuit voltage, conductance (ability to deliver current) and battery temperature. The tester predicts a battery's State-of-Health based on the characterization of Toyota and Lexus OEM batteries and OEM replacement batteries.

Although a State-of-Health problem can be the result of defects in construction, most often it is a result of normal wear-out mechanisms, which are dependant on the vehicle needs, climate, and operating conditions. This results in irreversible physical and chemical changes until eventually the battery can no longer hold a charge and supply the power necessary to start the car and provide auxiliary power to the electrical system.

As the battery approaches end of life, deterioration accelerates, until it finally fails to start the vehicle. Before failing, the battery may start the vehicle under normal conditions, but may not be able to operate in more extreme conditions. Extreme heat or cold could expose a weak battery and cause it to fail.

Chapter 3: Info Menu



The Info Menu has six utilities to print and view your test data and track tester usage and history.

When using the **ARROW** keys to select option buttons, press **NEXT** to continue to the next step. When using the keypad, no additional keypress is needed. Use **BACK** to return to the Main Menu at the start of the test and or the previous screen during the test.

If **PRINT** is available, align the analyzer IR transmitter with the printer's receiver, and select **PRINT**. To return to the Main Menu, press **EXIT**.

If you have trouble printing, select **HELP**, which becomes visible when the printing progress bar appears on the display.

Print/View



Use PRINT/VIEW to view and print the results of a battery test before they are overwritten by a new test.

The printed results share the same format as the onscreen results. In addition, information related to the test option used will appear on the printed results.

View QC Test



Use VIEW QC TEST to view the results of the QC Battery Test. You can also use this utility to print QC test results before they are cleared from memory.

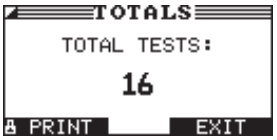
Totals



Totals tracks the number of battery tests in four categories: the Lifetime, User Totals, Last 100 Log, and Totals By Decision.

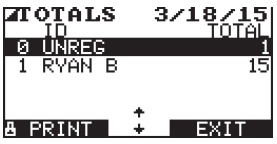
1. ⊙ LIFETIME

   Total tests since the analyzer was first used.



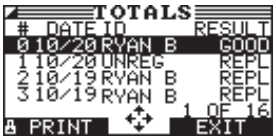
2. ⊙ USER TOTALS

   Total tests by User ID (and by UNREG user) since the first time a registered user logged in and the last time they were cleared by ADMIN.



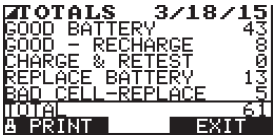
3. ⊙ LAST 100 LOG

   Last 100 tests performed by User ID (and by UNREG user); includes the date and the battery decision (GOOD, REPLACE, etc.).



4. ⊙ TOTALS BY DECISION

   Totals by battery decision since the last time they were cleared by ADMIN.



Version



VERSION displays the NVS-8150 software version, the date the software was released, and the serial number of the analyzer. The utility also allows you to print the information.

Internal Battery



INTERNAL BATTERY allows you to check the State-of-Charge (SOC) of the analyzer's six AA **(alkaline recommended)** internal 1.5-volt batteries. See Chapter 7: Maintenance & Troubleshooting.

Chapter 4: QC Mode



Use QC Mode to quickly check the measured voltage and CCA values of up to 100 batteries against user-specified voltage and CCA limits.

QC Mode decisions are is either PASS or NEEDS CHARGE. Neither decision indicates if a battery is bad, but rather if the measured voltage and CCA fall in or out of the control limits. The limits can be changed as needed during QC Mode.

The QC Mode battery decisions can be displayed or printed along with voltage and CCA limits.

IMPORTANT: The QC Mode does not produce a warranty code.

Test Parameters

When using the **ARROW** keys to select option buttons, press **NEXT** to continue to the next step. When using the keypad, no additional keypress is needed. Use **BACK** to return to the Main Menu at the start of the test and or the previous screen during the test.

1. At the Main Menu, select the QC Mode icon.
2. The analyzer will display the total number of QC tests completed out of 100. To clear the results from memory and reset the total to 0, simultaneously press ◀ and ▶. Press **NEXT** to continue.

   IMPORTANT: Be sure to monitor the number of tests performed and be ready to print the results as the number approaches 100. When the limit is reached, the analyzer indicates the memory is full and must be cleared before testing can continue.

3. Select the BATTERY RATING and press **NEXT** to continue. Scrolling increases and decreases the units by five. The range is 100 to 3000 CCA. To increase your scrolling speed, hold ▲ or ▼.

4. Select the voltage limit and press **NEXT** to start the test.

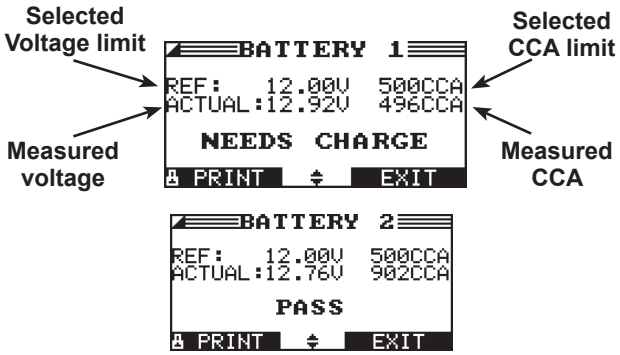
   

For the next few seconds the analyzers evaluate the battery, then displays the results. To continue testing, connect to the next battery; the test will start immediately.

QC Test Results

The analyzer displays the results, either PASS or NEEDS CHARGE, for the battery you just tested. To see previous results, use ▲ or ▼ to scroll to each screen.

NOTE: If the analyzer powered off and then on when viewing QC test results while connected to a battery, it will prompt the user to continue with the test. To continue, connect to the next battery and select **YES**.



NOTE: Use **PRINT** to print all QC test results currently saved in the analyzer.

QC Memory Full

When the number of test results stored in QC memory reaches 100 tests, the analyzer will display:

QC TEST MODE,
MEMORY IS FULL

The analyzer will not be able to continue QC testing until the memory is cleared.

NOTE: Use **PRINT** to print all QC test results saved in the analyzer.

Clearing Memory

1. Select **EXIT** to return to the Main Menu.
2. To record test information before clearing the results, see *View QC Test* in Chapter 8: Info Menu.
3. Select the QC Mode Icon.
4. In the QC Test Stats Screen press the **LEFT** (◀) and **RIGHT** (▶) **ARROW** key simultaneously to clear the results and reset the counter to 0.
5. To continue testing keeping the battery parameters from the previous test, press **NEXT** in each screen. Otherwise, repeat Test Parameter steps 3 or 4.

Chapter 5: Setup Menu



The analyzer Setup Menu has several functions available to customize your analyzer. The most important, however, is the ADMIN (administrative) function which controls user access. Setup Menu functions require an ADMIN PIN.

When using the **ARROW** keys to select option buttons, press **NEXT** to continue to the next step. When using the keypad, no additional keypress is needed. Use **BACK** to return to the Main Menu at the start of the test and or the previous screen during the test.

Clock



The CLOCK ADJUST utility has four settings. Use ▲ or ▼ to highlight the setting you want to change. Although the date and time have been set at the factory, you may want to make adjustments based your time zone or Daylight Saving Time.

TIME :	**9:07 AM**
MODE :	**AM/PM**
DATE :	**4/22/2015**
FORMAT :	**MM/DD/YYYY**

Time

1. Use ◀ or ▶ to highlight the hour, minutes, or AM or PM. To rapidly scroll, hold down ▲ or ▼.

9 : 19 / PM

2. Press **SAVE** to save the selection.

   The CLOCK/DATE ADJ menu is displayed.

Mode

1. Select the correct clock mode.

   1 ⦿ 24 HOUR

   2 ○ AM/PM

2. Press **SAVE** to save the selection.

   The CLOCK/DATE ADJ menu is displayed.

Date

1. Use ▲ or ▼ to adjust the month, day, and year.
2. Use ▲ or ▼ to select month, day, or year to adjust.
3. Press **SAVE** to save the selection.

   The CLOCK/DATE ADJ menu is displayed.

Format

1. Select the date display format.

   1 ⦿ DD/MM/YYYY (day/month/year)

   2 ○ MM/DD/YYYY (month/day/year)

2. Press **SAVE** to save the selection.

   The CLOCK/DATE ADJ menu is displayed.

Users



Use the USERS utility to create and edit a USER ID with 1 to 7 alphanumeric characters and link it to a test counter. USER IDs and their associated test totals can also be deleted.

Enter New

1. At the User ID select ENTER NEW.

   1 ⦿ ENTER NEW

   2 ○ DELETE

   3 ○ EDIT

2. Scroll to an ID placeholder. Scroll past the first line to go to the previous page or past the last line to go to the next page. To display more placeholders, use ▲ or ▼. Use ◀ or ▶ to jump up or down five lines at a time.

1 USER01
2 USER02
3 USER03
4 USER04

   Press **NEXT** to continue.

3. Use ◀ to clear the default characters. Use ▶ to add a space.

   ENTER USER ID

4. Use the keypad to enter the user PIN.

   ENTER PIN

5. Use the keypad to re-enter the USER ID and press **SAVE**.

Deleting

NOTE: Placeholder USER IDs (i.e., USER03) cannot be deleted.

1. At the User ID select DELETE.
   1 ○ ENTER NEW
   2 ◉ DELETE
   3 ○ EDIT
2. Use ▲ or ▼ to select the USER ID and press **DELETE**.
3. Press **YES** to confirm the User ID deletion or **NO** to go back one screen without deleting.

Edit

1. At the User ID select EDIT.
   1 ○ ENTER NEW
   2 ○ DELETE
   3 ◉ EDIT
2. Scroll to an ID placeholder. Scroll past the first line to go to the previous page or past the last line to go to the next page. To display more placeholders, use ▲ or ▼. Use ◀ or ▶ to jump up or down five lines at a time.

1 USER01
2 USER02
3 USER03
4 USER04

   Press **NEXT** to continue.
3. Use ◀ to clear the default characters. Use ▶ to add a space.

   ENTER USER ID

4. Use the keypad to enter the user PIN.

   ENTER PIN

5. Use the keypad to re-enter the USER ID and press **SAVE**.

   The EDIT USER ID screen is displayed and can be edited.

Shop



Use to create a header for printed test results with the business location information. Three information screens contain eight (8) lines of text with a maximum of 17 characters per line.

Screen 1	Screen 2	Screen 3
1–WORKSHOP NAME __	5–COUNTRY __	9–
2–STREET NAME	6–PHONE NUMBER	10–
3–CITY	7–FAX NUMBER	11–
4–ZIP CODE	8– WEBSITE.COM	12–

1. Press ▲ or ▼ to highlight the line to change. The cursor will be to the right of the last character in the line. (Or not visible if all character spaces are filled.)
2. To erase a character, press ◀.
3. To Insert a character press the alphanumeric key associated with the character as many times as needed. Use ▶ to insert blank spaces. Pause momentarily to automatically move the cursor to the right.
4. Press **SAVE**.

Display



Use the DISPLAY option to adjust the contrast of the text on the display and the backlight time.

Contrast Level

1. Use ▲ or ▼ to select CONTRAST LEVEL and press **NEXT.**

CONTRAST LEVEL	**10**
BACKLIGHT TIME	**60**

2. Press **ADJUST** key to display the numerical scroll box.

   10 ▲▼ **(1-10)**

3. Press ▲ or ▼ to change the value up or down, or press the corresponding number key. The contrast level is 0 (lightest) to 10 (darkest).
4. Press **SAVE**.

Backlight Time

1. Use ▲ or ▼ to select BACKLIGHT TIME and press **NEXT.**



2. Press **EDIT** to display the option's numerical scroll box.



3. Press ▲ or ▼ to change the value up or down, or press the corresponding number key. Press ◀ to erase a character. Backlight time is from 0 to 60 seconds.
4. Press **SAVE**.

Coupon



Use COUPON to turn on or off the option to include a user coupon with the printed test results following a battery test or diagnostic charge. This function can also be used to create a custom user coupon.

1. Select the correct Coupon option.
   - 1 ⦿ COUPON 1
   - 2 ○ COUPON 2
   - 3 ○ COUPON 3
   - 4 ○ NO USER COUPON PRINTED
2. Press **SAVE** or **BACK** to return to the SETUP menu.

Edit Coupon



Use this utility allows to create promotional coupons or messages for your customers that will print at the bottom of every test result. Two information screens contain eight lines of text with a maximum of 17 characters per line.

To create and edit a coupon, use same procedure described in the *Shop* section of this chapter. Use the template in the Appendix of this manual to plan and center text.

Temp



Use the TEMP utility to set the units of measure to either Celsius or Fahrenheit.

- 1 ⦿ DEGREES C
- 2 ○ DEGREES F

3. Press **SAVE**.

Language



Use LANGUAGE to select the default language used for the display and printouts.

1. Select the correct Language option.
   - 1 ⦿ ENGLISH
   - 2 ○ ESPAÑOL
   - 3 ○ FRANÇAIS
2. Press **SAVE**.

Format



Select this utility to format an SD-type data card to receive data or erase all data on the card. The analyzer will warn you before formatting the disk and ask if you want to continue.

Update



Use this utility to update the analyzer software using an inserted data card.

Admin



Use ADMIN to adjust user-specific functions within the tester. It can also be used to clear test totals and restore settings to factory defaults.

The default Admin password "**0000"** (four zeros).

Select the ADMIN icon to access of administrative functions:

- 1 ⦿ OPTIONS
- 2 ○ CHANGE ADMIN PIN
- 3 ○ CLEAR TEST TOTALS
- 4 ○ RESET DEFAULTS

Options

In the OPTIONS section there are four functions that allow you to control user access to the analyzer and to the Admin Menu itself. Each option is easily enabled or disabled by turning it ON or OFF. To save your settings after each selection, press **SAVE**. To return to the administrative functions list without saving, press **BACK**.

1 – USER ID
Select this setting to enable (ON) or disable (OFF) the USER ID login screen.

NOTE: When you turn off the USER ID, the USER PIN option is automatically turned off.

2 – PIN
Select this setting to enable (ON) or disable (OFF) the USER PIN login screen.

3 – UNREG. USER
Select this setting to enable (ON) or disable (OFF) unregistered login access to the analyzer when option **1 – USER ID** is ON. When the option **2– PIN** is ON, the PIN for USER ID **UNREG** is **0000** (4 zeros).

4 – ADMIN
Select this setting to enable (ON) or disable (OFF) the ADMIN PIN login screen that allows access to the Setup Menu.

Change Admin PIN

Use this function to change the five-digit Administrator PIN. Re-enter it a second time and then press **SAVE**. The default PIN is **12345**. Call Midtronics at 1.800.776.1995 for a forgotten or missing Administrator PIN.

Clear Test Totals

Use this function to clear the test totals by User ID and battery test decision. The analyzer will prompt the user to verify the counter should be reset to 0 before it continues.

NOTE: This will not clear the Lifetime Total and the Last 100 Log.

Reset Defaults

Use this function to reset Administrative options to the original factory settings. It will clear all registered users and restrict access to the analyzer. Use the default UNREG USER ID/ PIN and the default Administrator PIN.

Logos



Use the Logos utility to select one or more logos to appear at the top of your printed test results. The print default is all three logos.

1 ✓ TOYOTA

2 ✓ LEXUS

1. To deselect, remove the check marks by pressing the associated number key that corresponds to the number (1, 2, or 3) preceding the logo.
2. Repeat step 1 to select a logo.
3. Press **SAVE**.

Chapter 6: Software Update (MUW)

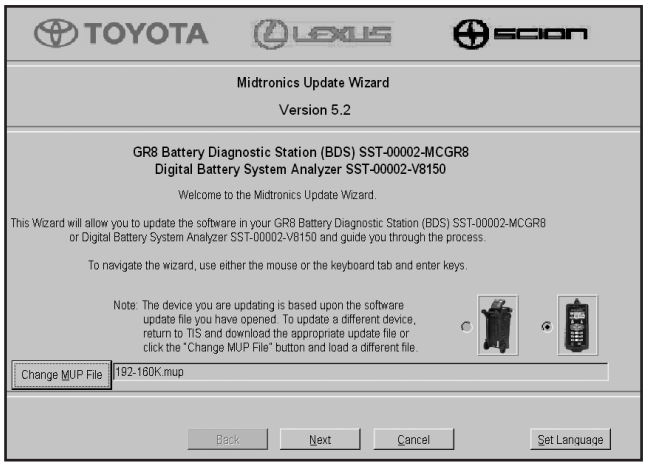
The MUW (Midtronics Update Wizard) is a TIS-based system that allows you to update the software in your analyzer when new software revisions are released. The process requires the software update cable (00002-A1080). This process will take approximately 10 to 15 minutes to complete. You can press the **"Cancel"** button to stop the process at any time except when actually updating the analyzer with the new software.

Using The Update Wizard

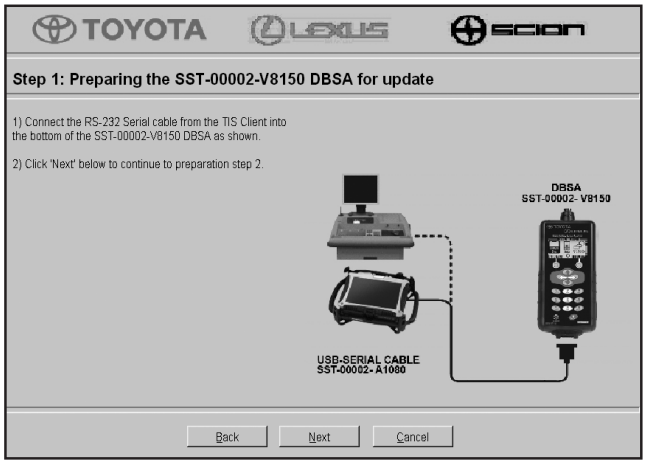
1. To launch the MUW from the TIS client navigate to:

   TIS>Diagnostics>Tools & Equipment>Battery Diagnostics>Available Software Updates

   on the TIS homepage. Click on the link to the most current Production Revision. The screen shown below will appear.



2. Connect the USB-Serial cable from the TIS client to the DB-9 connector on the bottom of the battery analyzer.



   Click the **NEXT** to button to continue.

3. If an data card is installed, remove it until the software update is complete.



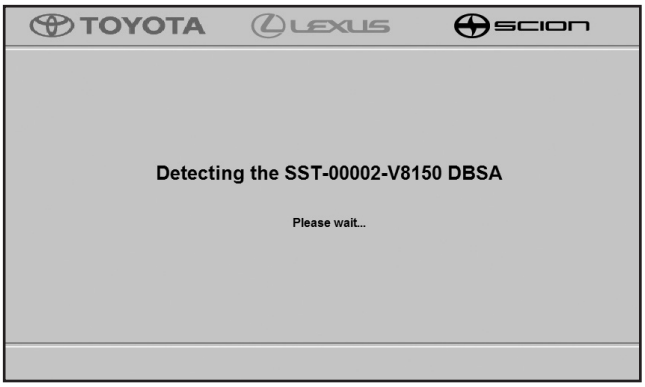
   Click the **NEXT** to button to continue.

4. Press the power button on the analyzer to turn it on. Click the **NEXT** to button to continue.

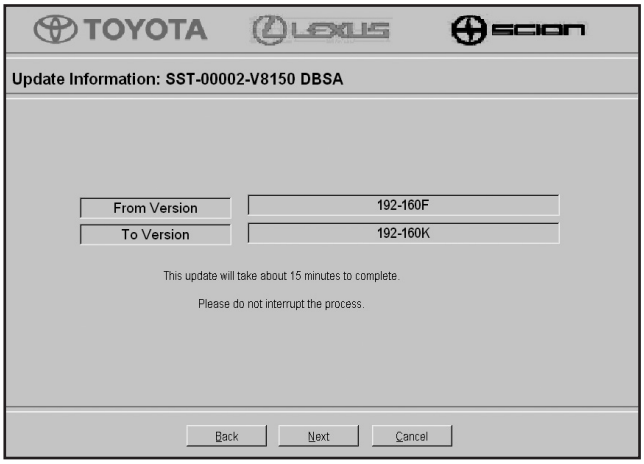
> **NOTE:** Please ensure that the internal analyzer batteries state-of-charge is sufficient to perform the 15 minute update.



5. The software will attempt to detect the analyzer.

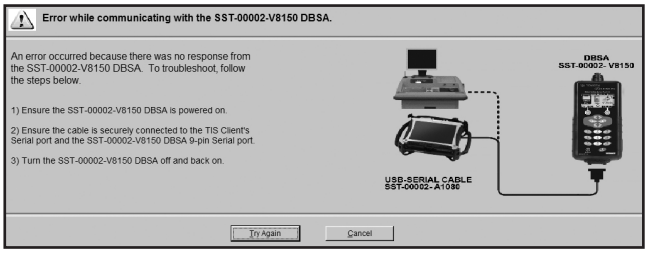


6. Once a connection has been established, the Midtronics MUP file and version information will be displayed.



Click the **NEXT** button to begin the update process.

If there's a communication problem, the MUW will display an error message with troubleshooting tips:

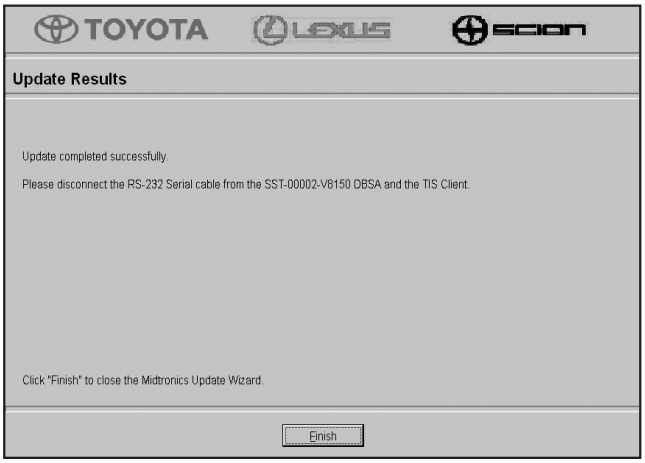


After troubleshooting, click **TRY AGAIN** to continue.

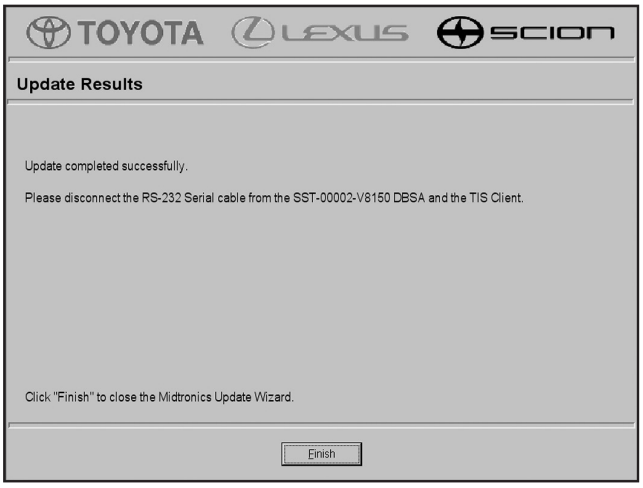
7. The update to your analyzer will begin.

   The updating process can take 10 to 15 minutes to complete.

NOTE: Do not interrupt the process.



8. When the has been completed successfully, the following screen is displayed.



9. Click **EXIT** and disconnect the USB-Serial cable from the TIS client and the DB-9 connector on the bottom of your analyzer.

Chapter 7: Maintenance & Troubleshooting

IR Printer

The printer included with the tester is a portable thermal printer with an infrared interface. Battery voltage and head temperature compensation is used to provide constant print quality. The printer uses ***rechargeable*** batteries, not replaceable batteries, and comes with a **CHARGER** that is **NOT A POWER SUPPLY**. Therefore, if the batteries do become discharged, they must be charged for up to four hours to be fully charged. The printer will not function properly by simply plugging the charger in. For best results, follow these instructions.

The printer must only be used with (00002-A0900) charger. Using an unapproved source may void the warranty.

NOTE: To conserve battery charge, the printer will turn off after two minutes of inactivity. For frequent printer use, leave the charger plugged in at all times.

Power On Procedure

When the **STATUS** indicator is off, the printer is off. A brief press of the **MODE** button turns on the printer and turns on the **STATUS** light (green). A brief press of the **MODE** button turns the printer off. When charging the printer batteries, make sure that the printer is off.

Installing the Batteries

The printer uses four AA, NiMH (Nickel Metal Hydride) **rechargeable** batteries rated at 1.2 volt, 1600 mAH. (One set of batteries is included with the kit.)

NOTE: Be sure to purchase rechargeable batteries as specified. ***Using the printer charger with regular alkaline batteries will damage the batteries and the printer and will void your warranty.***

1. Turn the printer face down.
2. Lift the latch on the battery compartment door and remove the door.
3. Insert new batteries, making sure the positive and negative terminals are positioned correctly.
4. Insert the door's tabs into the slots on the printer and close the door, making sure the latch locks.

Charging The Batteries

Before using the printer for the first time, ***fully charge the batteries overnight for 16 hours.***

1. Make sure the printer is OFF (the green status light is off).
2. Connect the charger to the printer, then plug the charger into a standard AC power outlet.
3. After a few seconds, the printer's green LED will flash about once per second while the batteries are charging. When the batteries are fully charged, the LED will stop flashing.

Power On Self-Test

Once the printer batteries are charged, a printer self-test can be performed. The self test will check most of the printer functions (printer mechanism, control circuitry, firmware version).

With the printer LED off, hold down the **MODE** button for approximately two seconds, then release. The printer will turn on and print a self-test report. The printer is now ready for use.

Printing Data And Screen Images

In addition to the option of printing data whenever the **PRINT** command appears, you can print screen images by simultaneously pressing the **7** and **9** buttons on the tester.

IMPORTANT: When starting a new test, the last battery test in memory is overwritten. Record or print the results to retain them.

Printing Data

1. Aim the analyzer's IR data transmitter directly at the printer's IR receiver (below the **MODE** button). If the analyzer is moved away from the printer or aimed in the wrong direction, partial data or gibberish may print. The maximum distance for reliable transmission between the ports is 17" (45 cm).
2. Press **PRINT**. Keep the analyzer's IR data transmitter aligned with the printer's IR receiver until printing is complete.

Printing Screen Images

1. Align the IR data transmitter and receivers as described in step 1 above.
2. Simultaneously press the **7** and **9** keys. Be sure to keep the analyzer's IR data transmitter aligned with the printer's IR receiver until printing is complete.

Paper Feed and Tear Procedure

When the printer is on, you can manually feed paper by pressing and holding the **MODE** button for more than one second.

When removing the printout from the printer, pull the printout toward the front of the printer and tear from one side to the other across the serrated edge.

Replacing The Paper Roll

The IR printer uses thermal paper in a roll with the dimensions 2.25 in x 85 ft (57 mm x 25.9 m). Replacement rolls can be purchased at most office supply stores.

1. Open the paper cup lid, and when the printer is turned on, remove the remaining paper using the **MODE** button. ***Do not pull the paper through the printer mechanism.***

2. Reel off a few inches from a new roll of paper and check that the end has a clean, straight edge.
3. Slide the leading edge of the paper into the entry point of the mechanism just below the roller, with the leading edge of the paper feeding forward from the bottom of the roll.
4. The printer will detect the paper and will feed it through to the correct position for printing.

If the paper becomes creased or out of alignment, cut the end of the paper roll and feed out the creased paper using the **MODE** button. Reload the paper, ensuring that the paper has a clean straight edge.

Printer Storage

If the printer is frequently used, ***the charger can be plugged in at all times***. If the printer is used infrequently, make sure to charge the batteries at least every two to three weeks. If the batteries are uncharged for long periods of time, they will need charging before use. Eventually, the batteries may no longer accept a charge and will need to be replaced.

The charge life of the battery pack is approximately 6000 lines (59 ft or 18 m) of continuous printing, depending on how often they are used and how well they are maintained. When they fail to hold a charge or last only a short time after charging, replacement AA NiMH rechargeable batteries are generally available anywhere batteries are sold.



NOTE: Be sure to purchase rechargeable batteries as specified. ***Using the printer charger with regular alkaline batteries will damage the batteries and the printer and will void your warranty.***

For more printer troubleshooting information, refer to the following troubleshooting guide.

Printer Troubleshooting

The **STATUS** light indicates the source of most printer problems. If troubleshooting doesn't solve the problem, call Midtronics Customer Service at 1.800.776.1995.

Problem	Solution
Printer will not print. STATUS light is off.	• Turn on the printer by pressing and holding the **MODE** button. The **STATUS** light should be on (green). If the **STATUS** light does not illuminate, follow the instructions in the next box.
STATUS light remains off after pressing the MODE button.	• The batteries must be installed and partially charged to print. • Make sure the batteries are properly installed and that they are the correct batteries (1.2 V, 1600 mAH, NiMH **rechargeable** only). Regular AA batteries will not supply enough power for the printer to function properly and will damage the printer if used with the supplied charger. **Remember: THE CHARGER IS NOT A POWER SUPPLY!** • If the batteries are of the correct type and properly installed, charge the printer overnight.
STATUS light is on, but printer won't print.	• Open the paper cup and ensure that the roll is installed correctly and that there are no foreign objects inside the paper cup. If the paper looks OK, try removing the roll and reinstalling the paper. • If the printer still doesn't print, press the **MODE** button to turn off the printer. Run a self-test on the printer by pressing the **MODE** button for three seconds. Once you release the button, the printer should print a self-test.
STATUS light flashes continuously.	• Replace the paper.
STATUS light flashes three times and pauses (ongoing).	• Make sure batteries are installed correctly, and charge the printer overnight.
Printout has missing information, or other characters.	• Something may be interfering with the IR data transmission. Make sure that the printer and tester are not in direct sunlight or directly below a fluorescent light and try printing again. OR • Charge the printer overnight. Batteries with an insufficient charge may cause inconsistent printouts.
Printout is gibberish.	• If the batteries become weak, printing will become faint, erratic, or not possible at all. Turn off the printer and charge the batteries for at least 15 minutes before attempting further printing. • Check to see what configuration your printer is in. The printer is set up at Midtronics to operate in IrDA mode, which is compatible with the analyzer's communications protocol. Run a self-test on the printer by pressing the **MODE** button for three seconds. Once you release the button, the printer will print out a self-test. Near the top of the printout, under the heading INFRARED PORT, it should say IRDA PHYSICAL LAYER. If it says 33Khz ENCODED, configure your printer for IrDA mode by following these steps: 1. Make sure the printer is off. 2. Press and hold the **MODE** button. After about five seconds the **STATUS** light will flash five times. 3. Now release the **MODE** button and briefly press it once. Wait until the light flashes once. 4. Next, briefly press the **MODE** button twice, then wait. After a short delay, the **STATUS** light should flash twice and the printer should power on. 5. Turn the printer off again by briefly pressing the **MODE** button. 6. Press and hold the **MODE** button. After about five seconds the **STATUS** light will flash five times. 7. Release the **MODE** button and briefly press it four times. Wait until the light flashes four times. 8. Briefly press the **MODE** button once, and then wait. After a short delay, the **STATUS** light should flash once and the printer should power on in IrDA mode. 9. Line up the IR port of the tester with the IR receiver port on the printer. Make sure the printer is on, and try printing again.

Test Cable Maintenance

The test cables that come with your analyzer are consumable items. Cables are like tires in that the more you use them and the harder you drive them, the shorter their useful life. Here are a few things you can do to protect your test cables from damage and premature wear:

Cleaning Clamps

- The grease, dirt, and sulfation that build up on battery terminals are highly corrosive and can damage the clamps over time. Before connecting the clamps, ensure accurate test readings and protect the clamps by cleaning the battery case and terminals using a wire brush and a mixture of water and baking soda.
- Periodically clean the clamps using a mixture of baking soda and water, or a mild hand-soap, and a small bristle brush.

Handling Test Cables

- Always connect and disconnect the clamps to the battery by opening and closing the clamps. Never pull on the test cables to remove the battery clamps. Pulling can damage the Y-junction, the cables, and the clamps to the extent that the analyzer may produce lower-than-expected conductance readings or fail completely.
- Never carry the analyzer by the cables. Carrying the analyzer or swinging it by the cables puts unnecessary strain on the cables and can result in premature failure. Handle the analyzer with care to get the maximum use from the product.
- The 4-foot test cables are engineered to enable you to perform a full system test while sitting in the driver's seat. When not using the full length of the test cables, keep them coiled with about an 8-to-10-inch diameter.

Storing Test Cables

- Never wrap the cables around the analyzer; this puts unnecessary strain on the test cables. The strap on the back of the NVS-8150 can be used to secure the cables when the analyzer is not in use. Store the cables in the compartment in the carrying case.

Because the test cables are the "tires" of the analyzer, they have a certain life expectancy and will wear out eventually. However, the abuse examples cited above are not covered under warranty. To ensure the best performance and longest life of the test cables, attach and remove them with care, and carry the analyzer and cables together.

If an inspection or a change in test results indicate that the test cables need to be replaced, please call Midtronics Customer Service at 1.800.776.1995.

Testing Cable Set Resistance

If the analyzer frequently displays a CHECK CLAMP CONNECTION! message, you may have an intermittent open circuit along one or both of the battery test cables. You can verify if there's an open with a simple test.

The test requires an ohmmeter and a wire or paper clip if the ohmmeter probes are too large to insert into the pin holes. You will also need to a pencil or plastic marker to keep the clamp jaws apart.

You will be testing the continuity of the following end points:

- The positive (red) clamp jaw with teeth and its corresponding pin hole.
- The positive (red) clamp jaw without teeth and its corresponding pin hole.
- The negative (black) clamp jaw with teeth and its corresponding pin hole.
- The negative (black) clamp jaw without teeth and its corresponding pin hole.

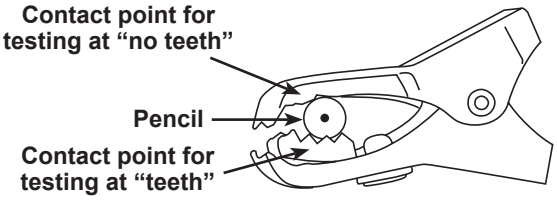
Test Procedure

1. Grip a pencil with the clamp. Do not grip the metal part of the eraser or any area that may conduct current.
2. Insert a probe tip into the hole designated "no teeth" for the color of the clamp you're testing.
3. Touch the bottom of the clamp (no teeth area) with the other probe tip. Wiggle the battery test cables. The resistance reading should be less than 1 Ω.
4. Repeat the test for the "teeth side" of the circuit, this time touching the teeth instead of the bottom of the clamp. Insert the other probe tip into the "teeth" pin hole. Wiggle the battery test cables. The resistance reading should be less than 1 Ω.

If the resistance readings are higher than expected, contact Bosch at 1.800.933.8335 to order replacement cables.



Cable Connector Contacts



Clamp Jaws Contacts

NVS-8150 Internal Batteries

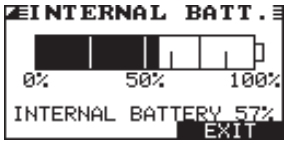
The analyzer uses six AA, 1.5-volt batteries **(alkaline recommended)** that allow testing of batteries discharged down to 1 volt while supplying power while the menu is active. The analyzer can test batteries discharged down to 5.5 volts when the internal batteries are not functioning. However, the analyzer can only test vehicle batteries reliably when its six batteries are above 5.5 volts.

NOTE: To conserve the internal batteries, the analyzer will turn off after 30 seconds of inactivity.

Internal Battery Status

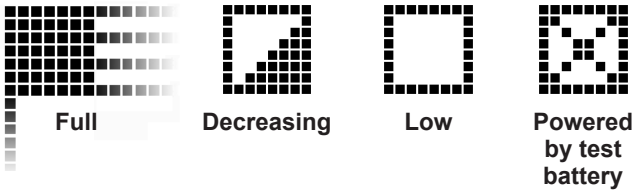
After you turn on the analyzer, the first screen after the bootup will indicate the State-of-Charge (SOC) of the analyzer's six AA **(alkaline recommended)** internal 1.5-volt batteries (*Figure 16* in Chapter 3. To continue to the Main Menu, press **NEXT**.

You can also access the Internal Battery Status in the Info Menu (Chapter 8). To return to the Info Menu, press **EXIT**.



Internal Battery Indicator

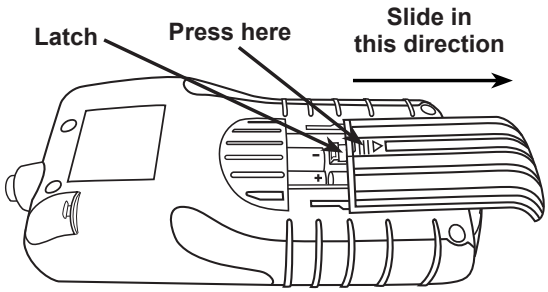
The square in the upper left corner of the display indicates the charge level of the battery pack. The square is black when the battery pack is fully charged. It gradually changes to white as the charge level declines. The analyzer will display a warning message when the batteries need replacing.

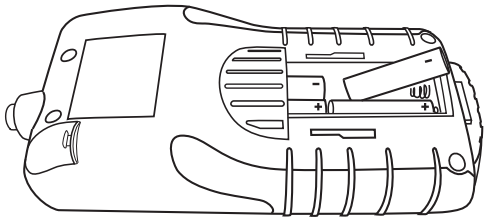


Replacing Analyzer Batteries

To replace the batteries:

1. Turn the analyzer face down.
2. Press gently on the ridges above the arrow on the battery compartment cover.
3. Slide the cover in the direction of the arrow and remove the cover.
4. Remove the discharged batteries.
5. Insert new batteries. Make sure the positive and negative terminals are positioned correctly.
6. Insert the door's tabs into the slots on the analyzer and slide the door closed, making sure the latch locks.





NVS-8150 Troubleshooting The Display

Problem	Solution
Display doesn't turn on when the POWER button is pressed.	Check the connection to the vehicle battery. The vehicle's battery may be too low to power the analyzer (below 1 volt). Fully charge the battery and retest. The analyzer's six AA batteries may need to be replaced. Follow the directions in Chapter 12 and replace the batteries **(alkaline recommended)**. If problems persist and troubleshooting does not solve the problem, call Midtronics Customer Service at 1.800.776.1995.
The screen contrast is too low.	The contrast may be set too low in the Utilities Menu. See Chapter 7: *Setup Menu* for instructions on increasing the contrast level. The analyzer's six AA batteries may need to be replaced. Follow the directions in Chapter 12, and replace the batteries **(alkaline recommended).**

Appendix A: Glossary

ADMIN: A utility in the Setup Menu, which is accessible only by the NVS-8150 ADMIN(istrator) when the ADMIN PIN is enabled. ADMIN controls USER ID and USER PIN access to the NVS-8150, as well as the utilities that customize the analyzer's features. The utility also allows the Administrator to clear test totals, reset system defaults, change the ADMIN PIN or enable/disable it.

ADMIN PIN: ADMIN **P**ersonal **I**dentification **N**umber. A series of five numbers in the range of 00000 to 99999 that accesses the Setup Menu. The ADMIN PIN can be enabled and disabled by ADMIN.

AGM/Flat Plate: Absorbed **G**lass **M**at. These batteries contain cells of flat lead plates separated by a matrix of glass fibers. The fibers hold electrolyte like a sponge, making the battery non-spillable. The flat plate design makes the battery resemble standard lead acid batteries.

AGM/Spiral: Absorbed **G**lass **M**at. **Spiral** is the plate configuration. AGM/Spiral Batteries contain cells of rolled lead plates between a matrix of glass fibers. The fibers hold electrolyte like a sponge, making the battery non-spillable. The battery, which resembles a six-pack, is used in automotive and some specialty applications.

Alphanumeric Keys: Keys that allow you to enter either numerical or alphabetical information or both, depending on the input requirements.

Battery Type: Refers to the battery's chemistry; see **AGM** as an example.

Clock: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows setting the time, mode (AM or PM), date, and format (month, day, year).

Cold Cranking Amps (CCA): A rating system that indicates a new, fully charged battery's ability to deliver current for 30 seconds at 0 °F (-17.8 °C) before the battery voltage drops below 7.2 volts.

Conductance: The ability of a battery to conduct current. It is a measurement of the plate surface (unimpaired by sulfation and other defects) available in a battery for chemical reaction, which determines how much power the battery can supply.

Coupon: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that enables and disables the printing of up to three custom coupons created with the **Edit Coupon** utility in the **Setup Menu**.

Directional Arrows: Arrows on the bottom of the analyzer's display that tell you which keypad arrows to use to navigate through the analyzer's screens, make selections, and enter data.

Display: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows adjustments to analyzer display's contrast level and backlight time.

Dynamic Conductance: Advanced Midtronics test technology that uses multiple inputs, tests, advanced processing, and filtering for better test accuracy.

Dynamic Scan Test: A test that further analyzes a deeply discharged battery to determine whether the battery should be replaced or if it has a chance to be recovered.

Edit Coupon: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows the creation of a promotional coupon or message for your customers that prints at the bottom of test results. The utility has two information screens with up to eight lines of text and a maximum of 17 characters per line.

EFB/Enhanced **F**looded **B**attery is an enhanced version of standard wet-flooded technology. The primary benefits of EFB technology are improved charge acceptance and greater cyclic durability when operating in a reduced state of charge (typical of Stop Start applications).

Electrolyte: A solution of water and sulfuric acid used in lead acid batteries to conduct current.

Flooded: Also called "wet cell." A type of battery that contains cells with grids of lead plates immersed in electrolyte. The flooded lead-acid battery is used in most cars.

Format Disk: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that formats an SD card.

In-Vehicle Test: A test conducted on a battery connected to the vehicle.

Info Menu: Includes the Print/View and QC Test Utilities, a total test counter, data transfer utility (future option), the analyzer software, and serial number.

Internal Batteries: The analyzer's six AA **(alkaline recommended)** internal 1.5-volt batteries.

Internal Battery Indicator: An square in the upper left corner that indicates the charge level of the analyzer's internal batteries. At full charge the square is black and it gradually becomes white as the batteries discharge. An X in the box indicates that the battery is powered by the automotive battery being tested.

Internal Battery Status: A full-screen depiction of the State-of-Charge of the analyzer's internal batteries. The screen is available at bootup and through the Info Menu.

IR Printing: The transmission of a wireless infrared signal from the NVS-8150 to a receiver on the IR printer to print test results. You can print results by pressing **PRINT**, when available, or by simultaneously pressing the **7** and **9** keys.

IR Temperature Sensor: An infrared sensor on the top left corner of the analyzer that is used to measure the temperature of the battery under test.

JIS: Japanese **I**ndustrial **S**tandard. A rating system for Japanese OEM batteries, which is shown on a battery as a combination of numbers and letters (for example: **80D26**).

Keypad Arrows: Arrows that allow you to navigate through the analyzer's screens, to select options, and to input data. The keypad arrows to use are indicated by the **Directional Arrows**.

Language: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is available, that allows the selection of English, Spanish, or French as the analyzer's user interface.

Logos: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that enables or disables the printing of one or more logos (Toyota, Lexus) at the top of test results.

Main Menu: Contains the primary functions of the analyzer: Battery Test and QC Mode. Also contains the Info, Setup, and Help Menus.

MUW: Midtronics **U**pdate **W**izard. Software available on the TIS system that allows you to update the NVS-8150 software.

Out-of-Vehicle Test: A test conducted on a battery disconnected from the vehicle.

Placeholder USER ID: A default USER ID, such as USER02, that occupies a place in the analyzer's memory for the creation of personalized USER IDS.

Print Screen: A function that allows you to print a hardcopy of a screen image by simultaneously pressing the **7** and **9** keys.

Print/View: A utility in the Info Menu that allows you to view and print the results of the battery test before they are overwritten when you start a new test.

QC Mode: A test mode in the Main menu that allows you to quickly check the measured voltage and CCA values of up to 100 batteries against the voltage and CCA limits that you provide. This mode differs from the Battery Test in that the decision is either PASS or NEEDS CHARGE. Neither decision will tell you that a battery is bad, but rather that the measured voltage and CCA fall in or out of your control limits.

Remote Post: Jumper post available under the hood when the battery is hidden in the vehicle.

Setup Menu: A utility menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that customizes the functionality of the analyzer. Menu options include setting the date and time, creating custom coupons and messages for printed test results, adjusting the display contrast, and controlling access to the analyzer.

Shop: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows the creation of a header for printed test results showing business location information. The utility has three screens with up to 12 lines of text and a maximum of 17 characters per line.

Side Post: Posts located on the side of the battery case.

Soft Keys: Two keys located below the analyzer's display that are linked to screen commands

State-of-Charge (SOC): The amount of charge in the battery. SOC is used to determine if the battery needs to be charged.

State-of-Health (SOH): A measure of a battery's condition relative to a fresh battery, i.e., whether it needs to be replaced.

Temp: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows the selection of the temperature units of measurement: Fahrenheit or Celsius.

Top Posts: Posts on the top of the battery case.

Transfer: A future optional utility (with an icon in the Info Menu) that will transfer test data stored in the NVS-8150 to a computer. The utility will consist of a software and hardware package.

Update: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, the updates the analyzer software via an SD card.

USER ID: A login name (**Id**entification) containing a maximum of seven alphanumeric characters used to access to the NVS-8150. USER IDs can be enabled and disabled by the NVS-8150 ADMIN(istrator).

USER PIN: Personal **I**dentification **N**umber. A series of four numbers in the range of 0000 to 9999 that is used to authenticate USER IDs and gain access to the NVS-8150. USER PINs can be enabled and disabled by the NVS-8150 ADMIN(istrator) without disabling the USER ID, if required.

Users: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, the allows the creation, editing, and deletion of USER IDS and USER PINS.

View QC Test: A utility in the Info Menu that allows you to view and print the results of the QC Mode Battery Test.

Appendix B: Templates

Header Template

Line 1																	
Line 2																	
Line 3																	
Line 4																	
Line 5																	
Line 6																	
Line 7																	
Line 8																	

Coupon Template

Line 1																	
Line 2																	
Line 3																	
Line 4																	
Line 5																	
Line 6																	
Line 7																	
Line 8																	

PATENTS

This product is made by Midtronics, Inc., and is protected by one or more U.S. and foreign patents. For specific patent information, contact Midtronics, Inc. at +1 630 323-2800.

LIMITED WARRANTY

Midtronics products are warranted to be free of defects in materials and workmanship for a period of one (1) year from date of purchase. Midtronics will, at our option, repair or replace the unit with a re-manufactured unit. This limited warranty applies only to Midtronics products, and does not cover any other equipment, static damage, water damage, overvoltage damage, dropping the unit, or damage resulting from extraneous causes including owner misuse. Midtronics is not liable for any incidental or consequential damages for breach of this warranty. The warranty is void if owner attempts to disassemble the unit or to modify the cable assembly.

SERVICE

To obtain service, contact Midtronics at 866-592-8052. Have your model and serial numbers ready. This first step is critical as we will trouble-shoot the problem(s) over the phone, and many problems are resolved during this step. If the problem cannot be resolved, then the Customer Service Agent will issue you a Return Material Authorization (RMA). This number becomes your tracking number. The final step is to return the unit to Midtronics freight prepaid (you pay), to the attention of the RMA number obtained.

In USA:
Midtronics, Inc.
Attn: RMA # xxxxx (this is the RMA number that you must obtain from Midtronics)
7000 Monroe St.
Willowbrook, IL 60527

In Canada:
Midtronics c/o FTN (FTN is Fed-ex Trade Networks –this is NOT a Midtronics facility)
Attn: RMA # xxxxx (this is the RMA number that you must obtain from Midtronics)
7075 Ordan Drive
Mississauga, ON L5T1K6

Midtronics will service and return the unit using the same type of service as received. If Midtronics determines that the failure was caused by misuse, alteration, accident, or abnormal condition of operation or handling, purchaser will be billed for the repaired product and it will be returned freight prepaid with shipping & handling charges added to the invoice. Midtronics products beyond the warranty period are subject to the repair charges in place at that time. Optional re-manufacturing service is available to return our products to like-new condition. Out-of-warranty repairs carry a 3-month warranty. Re-manufactured units purchased from Midtronics are covered by a 6-month warranty.

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