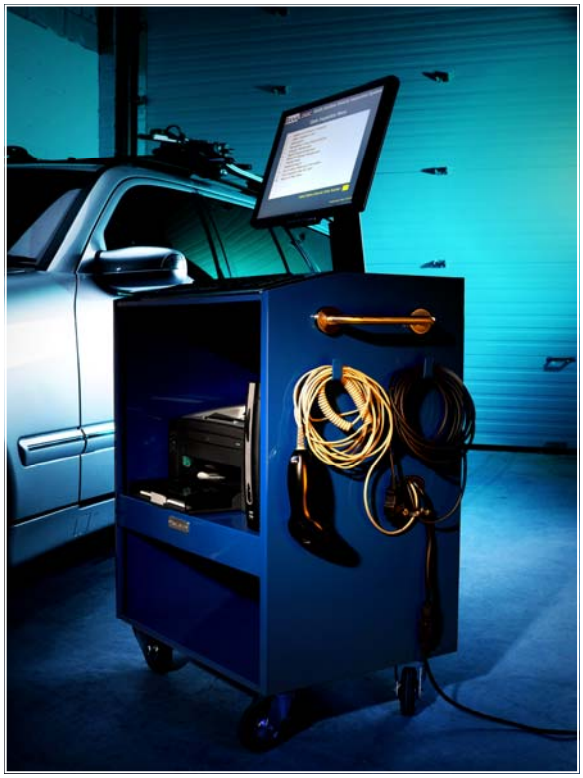
North Carolina Analyzer System
BL-A100 User's Guide



BANALOGIC

Delivering Business-Enabling Solutions and Technologies

Table of Contents

Getting Starting

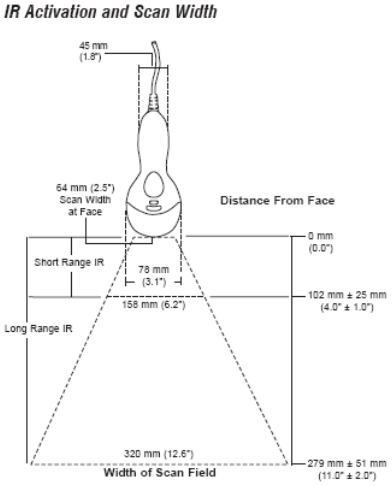
The BanaLogic BL−A100 analyzer has two configurations:

- *Safety Only*
- *OBDII & Safety*

Analyzers must be configured by your provider for the appropriate mode of operation.

Both configurations include the following:

Component	Description	
BL-A100	*See BL-A100 Technical Specification Details in next section*	
Lexmark E120n	Laser printer with 600 dpi (dots per inch) resolution, 8 meg of standard memory and USB port. Includes 150-sheet paper tray located in the front of the printer.	
Monitor	The 17" LCD monitor is mounted onto the cart using 4 standard screws. The Acer AL1716 has a 17" viewable area and is an active matrix and uses standard 110 voltage. This model may be replaced with equivalent model should supply not be available. **Dimensions:** 15" Height x 14.7" Width x 6.3" Depth **Weight**: 10.1 lb	
Cart	Full aluminum purpose-build computer cart on wheels. Colour may vary.	

Keyboard / Mouse	Standard 101 keyboard and 2 button mouse using non-USB connectors.	
Hand Scanner	MS9544 VoyagerPDF hand scanner. 	
USB Key	1 Gig USB key used for backup purposes. This key must be plugged into the back of the analyzer unit for it to function correctly. This key is quite small and is about the width of a small finger and about 1 inch in length.	

BL-A100 Technical Specification

Processor and memory
- *VIA C7™ 1GHz NanoBGA2 processor*
- *VIA CN700 NB integrated 8x AGP Graphics*
- *128KB level 1 and 128KB level 2 Cache on CPU chip*
- *256MB SO-DIMM RAM*
- *128MB Disk-On-Module Flash Memory*

Display
- *Integrated in CN700 internal AGP 8x 2D/3D/Video Accelerator*
- *Resolution up to 1600x1200x32bit color*
- *16/32/64MB frame buffer using system memory*
- *DB15-pin male CRT port support*

Network
- *Integrated in VT8237R plus Fast Ethernet Controller withVT6103PHY chip*
- *10/100Base-T Ethernet (RJ-45 connector)*

Audio
- *AC97 codec*
- *Microphone in, Speaker out Jack*
- *Build in 1W internal speaker*

Keyboard & Mouse Ports
- *PS/2 type color connector x2*

Other Peripheral Connector & Expansion
- *COM Port x2(pin 9 12V or 5V supported)*
- *Parallel Port(SPP/EPP/ECP) x1 (Printer port)*
- *USB V2.0 x4(2 on the front panel, 2 on the back panel)*
- *US Robotic PCI Internal Modem*
- *Front Panel Power button, Power LED and LAN LED*

Software support
- *Award BIOS support DMI data, WOL, soft power on/off,*
- *Drivers for major operating systems: Windows CE 5.0/6.0, Windows, XPE, and Linux*

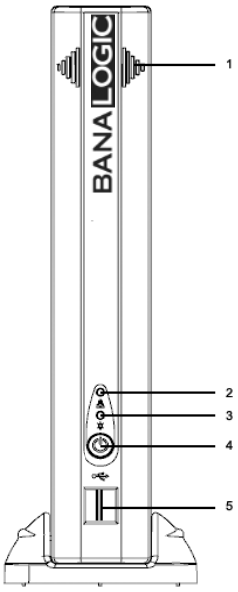
Other Features
- *Kensington Lock Slot support*
- *Reserved internal USB for wireless module*

Environmental
-*Operating temperature: 32° to 95° F (0° to 35° C)*
- *Storage temperature: -4° to 140° F (-20° to 60° C)*
- *Fan-less Design*
- *Relative humidity: 20% to 80% non-condensing*

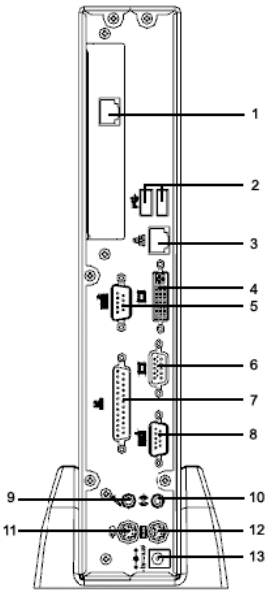
Electrical Power
- *External 48W Power Adapter DC 12V 4A*
- *Line voltage: Auto-sense 100V to 240V AC*
- *Frequency: 47 to 63 Hz, single phase*

Packing Information
- *Single box packing: 360 x 365 x 114mm, G.W.: 4.8kgs*
- *6 in one box packing: 710 x 390 x 380mm, G.W.: 29.5Kgs*

Dimension & weight
- *292(H)mm x 237(D)mm x 53(W)mm*
- *Net Weight: 3.3 KG*



Front Side View
1. *Speaker*
2. *LAN LED*
3. *Power LED*
4. *Power Switch*
5. *USB Ports*



Back Side View
1. *Modem RJ11 Port*
2. *USB Ports*
3. *Ethernet RJ45 Port*
4. *DVI Port*
5. *RS-232 DB-9 Port (COM2)*
6. *VGA Port*
7. *Parallel Port*
8. *RS-232 DB-9 Port (COM1)*
9. *Microphone Jack*
10. *Speaker Jack*
11. *PS/2 Mouse Connector*
12. *PS/2 Keyboard Connector*
13. *12V DC Power Connector*

Turning on the Analyzer

The heart of BanaLogic's solution is the Analyzer. This is the slim black box that sits in the middle of cabinet.

There are three components that must be powered on:

- ☑ Analyzer
- ☑ Monitor
- ☑ Printer

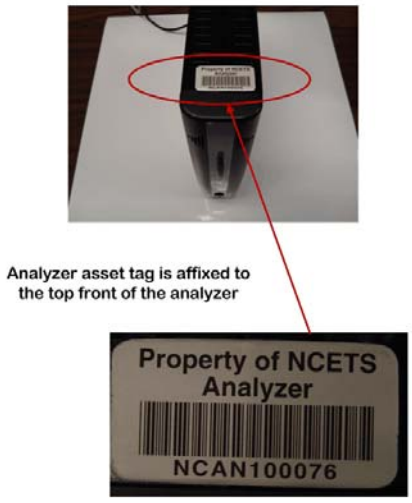
Green Light Indicates the Power on the Analyzer is ON. The button located immediately below the light is used to toggle the analyzer on and off.

Quick Start Check List

- ☑ Analyzer has been installed and configured
- ☑ Valid Inspector ID's and Access codes (Note: Training Mode may be accessed without this information)
- ☑ E-Stickers Purchased for Analyzer, and/or E-Buyers has been setup to purchase from the Analyzer.
- ☑ Paper has been added to the printer

Asset Tags/Model ID

Each analyzer is a-fixed with a unique identification number.



Analyzer asset tag is affixed to the top front of the analyzer

Analyzer Model Name identifier is located on silver tag affixed to the top and back of analyzer

Recommended Maintenance

BanaLogic's BL-A100 analyzer is a purpose built, robust embedded computer system specifically designed for the safety and OBDII emission test programs. Unlike traditional analyzer systems, the computer has no moving parts and as such can with stand the harsh industrial environment that these machines often operate under.

The only serviceable components include the scanner and printer.

- The scanner may need to be periodically "re-calibrated". This is only required when the scanner will not read a barcode (all scanner lights are functioning however the barcode is not recognized). Instructions on this can be found on Pg. 69 "Trouble Shooting Scanner Issues" the "Reset Scanner Sequence".

- For the Lexmark E120n printer the only items to be replaced are:
    - Long-life photoconductor kit
    - Toner cartridge

The long-life photoconductor kit typically lasts up to 25,000 pages. How often the long-life photoconductor kit must be replaced depends on specific printing conditions. Factors such as temperature, humidity, media type, number of pages per job, page coverage and page size may affect the actual number of pages printed.

The toner cartridge must be replaced more frequently. How often the toner cartridge must be replaced depends on the average amount of toner coverage used on print jobs. The initial cartridge in a new Lexmark E120n typically has a like of about 500 pages. Replacement toner cartridges have a life of about 2,000 pages.

Replacement printers will not come with a toner cartridge or paper

Additional printer instructions can be found on Pg.67 "Trouble Shooting Printer Issues" or in the manual which accompanies the original printer packaging.

Printer supplies can be ordered from Lexmark authorized dealers. To locate a nearby dealer, call 1·800·539·6275. The part number of the Long-life Photoconductor Kit is 12026XW and for the Toner Cartridge the part number is 12035SA.

The number of pages that can be printed with a toner cartridge is an estimate. This number will vary depending on the amount of toner required on each page that is printed.

Warranty Provision List

Detailed warranty information is contained on a separate sheet stored in the pocket at the back of this manual. This includes detailed warranty information and appropriate purchase and signature information.

A two (2) year limited warranty is included in the cost of the unit when this product is used for purposes considered to be normal usage. Exact terms and conditions as to what is covered can be found in the Limited Warranty Terms and Conditions form in the pocket of this manual.

Customer Service / Repair Center

Verizon Business
Atten: NC E-Safety Warranty Repairs
PO Box 34280
Phoenix, AZ 85067
1·888·333·0557

Manufacturer Representative

Lori Selvia
4420 Sagebush Drive
Kennesaw, Georgia
770·344·0557

Time/Cost Estimate to Repair

After contacting the customer service/repair center, if it is determined a replacement is required it will be shipped to the customer overnight (next business day) if the request is received by 4 PM MST (Mountain Standard Time) at no cost to the station owner. If it is received after 4 PM the new unit will be shipped the next business day. A return label is included with the replacement unit for the station to send the defective component within five (5) working days. There is no charge for shipping as long as you use an address within the State of North Carolina.

Verizon Business reserves the right to charge for replacement cost and shipping if the damage is due to abuse or neglect.

Non-Warranty Parts - Lexmark E120n Printer

Part Number	Description	Average cartridge yield	Approximate Cost
12026XW	Long-life Photoconductor kit	Up to 25,000 pages based on approximately 5% coverage per page	$40
12035SA	Toner Cartridge	2,000 standard pages	$95

General Usage

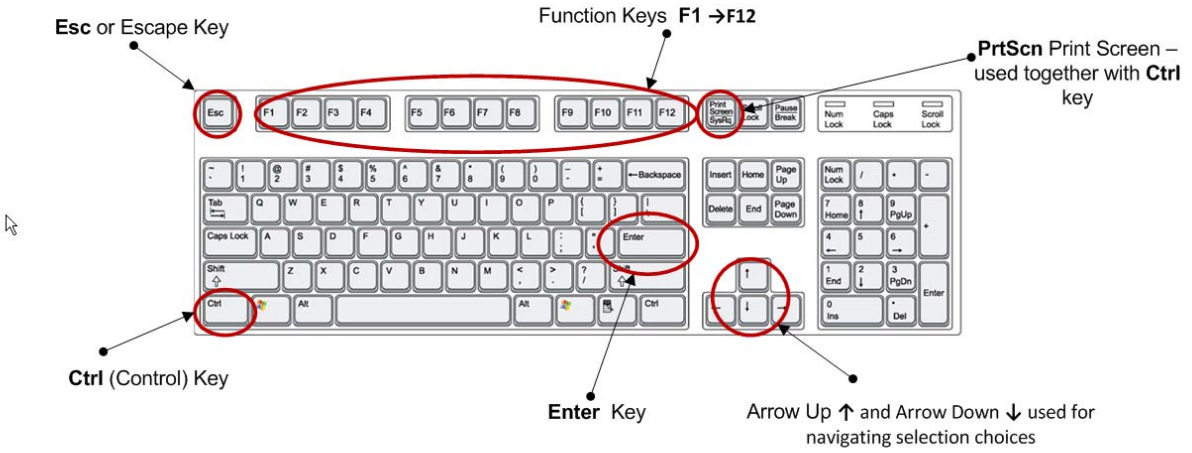
BanaLogic's North Carolina Vehicle Inspection System has been designed to operate primarily using the keyboard. Only help screens & Other Service Products (available under Station Menu) may require the use of a mouse.

- **Print screen**
  - Screens which are intended to generate a print out (i.e. inspection reports, station license, etc.) contains either a message to instruct use to press **P** to print, or contains a prompt to allow the user to enter the number of copies to be printed.
  - You may print out other screens for information using the **Ctrl**+**PrtScn** keys. There will be no message on the screen indicating printing is occurring; however after a few seconds delay you will notice the green light on the printer flashing. It may take a few seconds for the screen image to be printed.
- **Navigation**
  - The table below describes the types of screens and the general navigation features of each type.

Screen Type	Usages	Navigation
Informational	Display information only, no input is required.	There will be a message prompting for key to press to continue on. Sometimes is may be "any key" or a specific key such as **Y** or **N**. The screen will always indicate.
Single Entry Screen	Capture single input string such as VIN, license plate	For keyboard entry, the **Enter** key confirms input and proceeds to next screen. For scanned input, the system is automatically proceeding to next screen upon receiving valid input.
Multi-Entry Screen	Captures multiple pieces of data on a single screen such as vehicle information, owner information, safety items	Generally the enter key is used to navigate between fields on the screen. The **F10** key is generally used to confirm all information has been entered on the screen
List Selection	This is used whenever the user must select from a defined list of choices. For example, menu selection, vehicle make, county selection.	The ↑↓ keys may be used to navigate up and down the list. The "blue bar" is highlighting the selected choice – you may press "enter" to select the highlighted item. Alternatively you may choose the key for each item on

		the left. This will move the "blue bar" to the item immediately then you must press "Enter" to select.
Report Screens	This is used to display a report on a screen that the user can navigate to multiple pages and can print out.	**PgUp** / **PgDn** are used to navigate through multiple pages on the report. Other keys to print and return to previous screen and generally provided in text at the bottom of the screen.

Keyboard Layout



Conventions used in this user's guide is to **BOLD** the key to be pressed. Such as "Press the **F9** key to return to previous screen".

- **Aborting the Inspection Process**
  - Many screens provide the ability to abort the inspection process by using the **Esc** key. In all cases the inspector will be prompted to confirm the abort of the current inspection. No test records are recorded for any aborted tests.

Getting Help

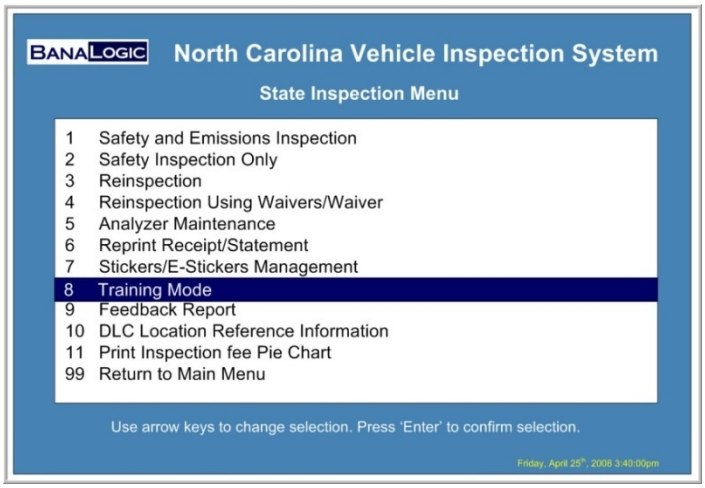
The Verizon Station Help Desk can be reached at:

1.888.333.0557

Monday – Friday 8:00am – 7:00 pm EST

Training Mode

Training mode will allow users to conduct Safety and/or OBDII inspections in a mode that will not be recorded and while allowing the user to become familiar with the software and inspection procedures. Inspectors are not required to have a license to conduct the inspection and no valid inspection report will be printed.



Training Mode is accessed by selecting (S) State Inspection Menu from the main menu then selecting 8 Training Mode from the State Inspection Menu.

Training mode is identical to conducting a real inspection with the following differences:

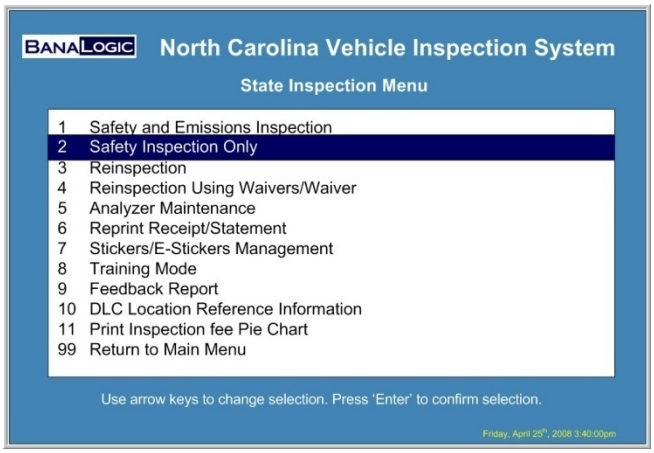
- Inspector Login is not required
- No VID contact is made
- No sticker is assigned to pass test.
- The Vehicle inspection report is denoted with training mode written in several places.

State Inspection Menu Functions

The State Inspection Menu lists the procedures available that are relevant to state inspections. Once the selection S is made from the Main Menu, the inspector-mechanic will be prompted to enter an access id and password to perform any of the inspection procedures.

Performing a Safety Inspection

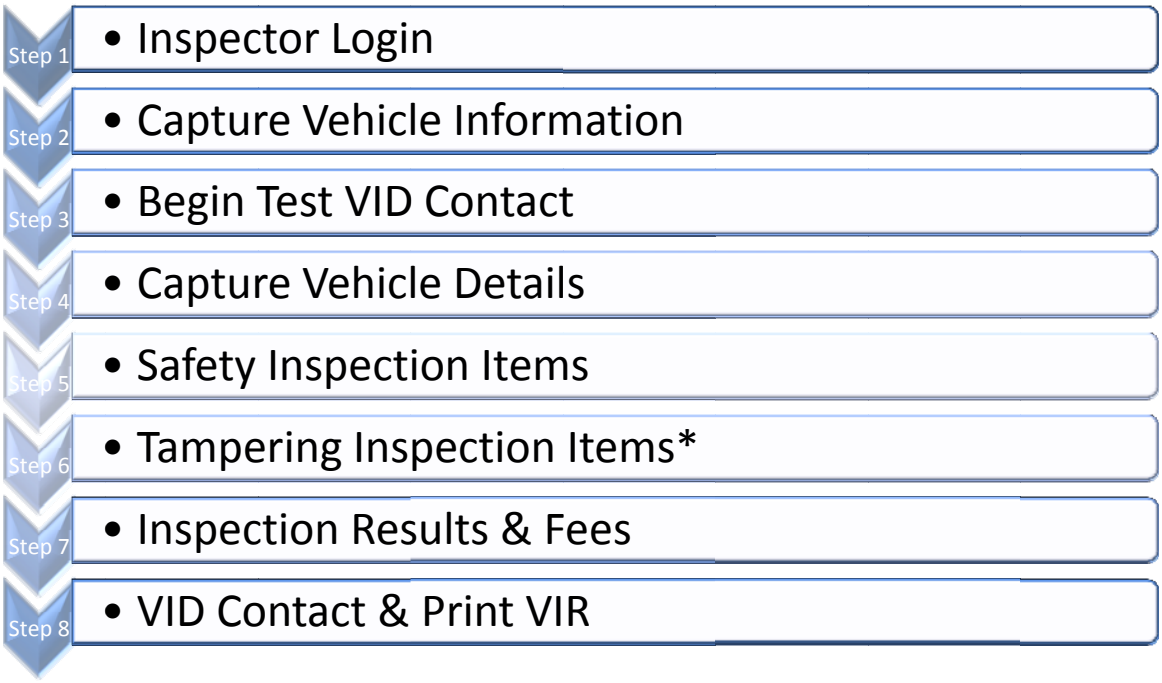
To perform an initial safety inspection for a vehicle select 2, Safety Inspection Only from the State Inspection menu.



Item #1, 4, 10, 11 are available on OBD analyzers

In order to perform a safety-only inspection the analyzer must not have a lockout and contain one or more e-stickers.

A safety inspection for a regular vehicle consists of eight basic steps:



* May not apply to all vehicles.

Type in inspector ID and press enter to continue, or scan ID from badge

The inspector must login prior to each and every inspection. The inspector can enter their inspector-mechanic license ID using the keyboard, or by scanning the bar code on the inspector badge (if applicable) using the hand-held scanner. The inspector ID is 12-digits in length.

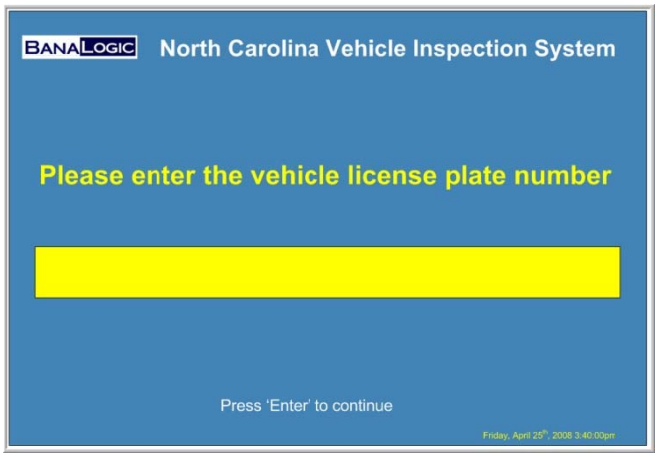
Three pieces of information are captured during this stage and this information is used to contact the VID and/or search locally for vehicle information and possible previous test records.

- Vehicle Identification Number (VIN)
- License Plate Number
- Registration Location

The vehicle identification may be scanned from the vehicle, the DMV registration card or entered manually from the keyboard. Vehicle identification Numbers that are entered from the keyboard will be prompted for a double-blind entry to ensure the VIN is entered correctly.

If the double-blind entry of the VIN does not match, the inspector will be prompted to re-enter the VIN from the start and will be prompted to enter the VIN a second time.

The second key piece of information required is the license plate. The license plate is also a double-blind entry. All values are converted to upper case.



After this information entered it is presented to the user for verification prior to contacting the VID. Once this information has been verified and entered it can no longer be changed. A test may be aborted at various places by simply using the **Esc** key.

Special VIN Validation Rules

If the VIN that is scanned or entered by keyboard contains an "I", "O" or "Q", display the following message:

"This VIN contains one of the following characters of "I", "O", or "Q" which is NOT acceptable for vehicles (including motorcycle and trailers) for model year 1983 through YYYY. Please verify the VIN has been entered correctly. Press **Y** to accept the VIN or press **N** to re-enter the VIN."*

**Present Year + 1.*

Step 3 • Begin Test VID Contact

If the analyzer is not able to connect to the VID:

- Analyzer will search local data of previous test records (this contains past 65 days of tests done on this analyzer).

If the analyzer is able to connect to the VID the VID may return any of the following responses:

VID Response	Action in the Application
No Vehicle Match could be Found	During the first attempt the application will indicate that the VIN & plate could not be found. The inspector will be prompted to verify this information is entered correctly. If there are corrections made the analyzer will make a second attempt to contact the VID and obtain vehicle information. If there is still not a match on the second attempt the application will continue on. At the end of the inspection the VIRS will contain a message indicating that the vehicle could not be found on the state host computer.
Vehicle Match but no previous test results	Basic information about the vehicle will be carried forward to future screens as default values – i.e. year, make, engine size, engine displacement, fuel type.
Previous Passed Safety Inspection	Inspector will be prompted that a previous passed inspection exists and allow the inspector to abort the test is desired.
Previous Failed Safety Inspection	Inspector will be prompted to convert the inspection to a reinspection.

Step 4 • Capture Vehicle Details

Prior to starting the safety inspection the inspector will be prompted to enter various other characteristics about the vehicle being tested to ensure the appropriate test is applied.

Information is captured in the following order:

- Registration County
- Vehicle Body Style
- GVWR (prompt for greater than 8500 lbs)

- Fuel Type
- Vehicle Model Information:
    - Model Year
    - Vehicle Odometer Reading
    - Number of Cylinders
    - Engine Displacement
    - Engine Displacement Unit of Measure
    - Dual Exhaust
- Vehicle Make

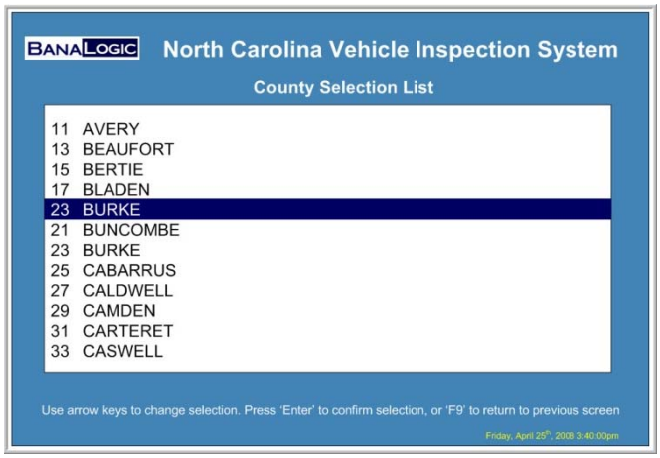
Not all information above is captured for vehicles of body style trailer.

Registration County

This screen provides a list of all counties in North Carolina ordered alphabetically. A county may be pre-selected if the VID or local database search provides previous information. A county may be selected either by:

- Using the ↑↓keys on the keyboard
- Typing in the number beside the associated county

Press the enter key to confirm the selection or **F9** to return to the previous screen.

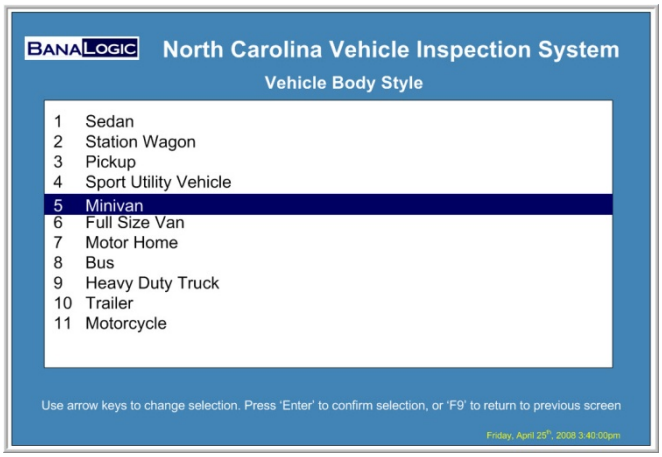


Vehicle Body Style

This screen provides a list of all possible choices for body style. A body style may be pre-selected if the VID or local database search returns previous vehicle information. A body style may be selected either by:

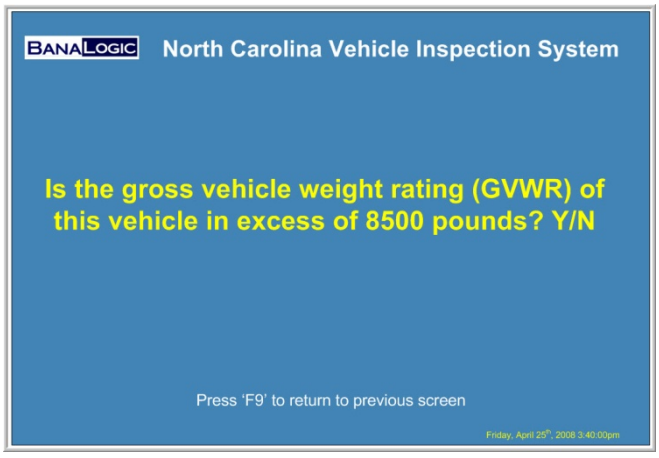
- Using the ↑↓ keys on the keyboard
- Typing in the number with the associated county

Press the **Enter** key to confirm the selection or **F9** to return to the previous screen.



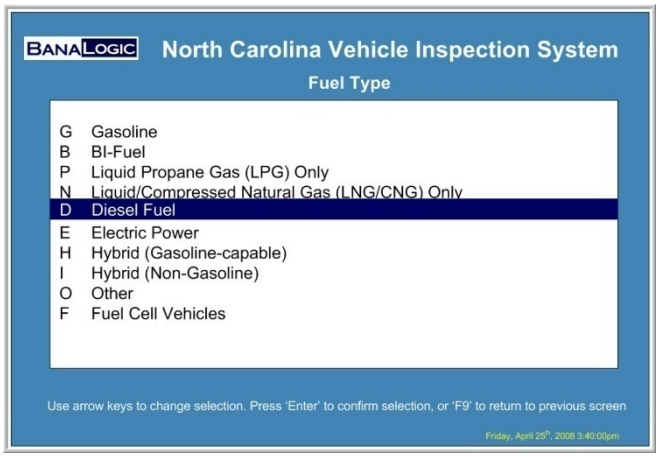
GVWR

Vehicles with a GVWR greater than 8500 lbs are considered to be heavy duty vehicles. If the vehicle weight is less than 8500 lbs there is no prompt to enter the actual weight. If a **Y** is selected the inspector will be prompted to enter the actual weight of the vehicle (without decimal places). The **F9** key can be used to return to the previous screen if the user incorrectly selected a GVWR over 8500lbs.



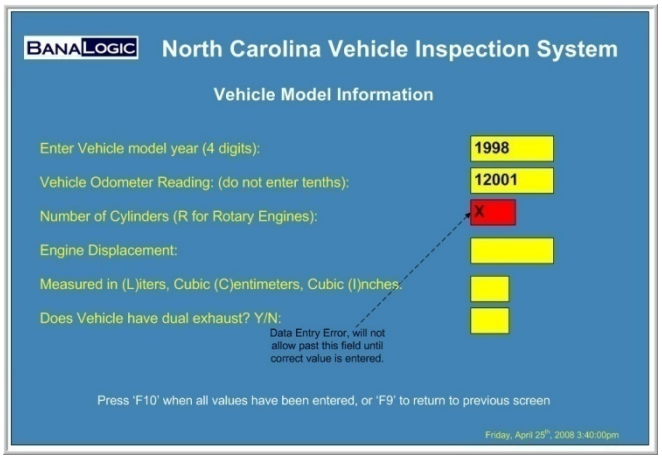
Fuel Type

The fuel type is selected from the list of choices using either the fuel type code (single letter) or using the ↑↓ keys to change the selection and press enter. The **F9** key can be used to return to the previous screen or **Esc** to abort the current inspection (and no record will be saved).



Vehicle Model Information – Non-Trailer

If the vehicle body style is anything other than trailer the following screen will be presented to the inspector. If previous vehicle information is retrieved, Vehicle Model Year, Number of Cylinders, Displacement, and Displacement unit of measure fields will be pre-filled with the default values.



Each field contains validation rules. If the validation check fails the field containing the invalid data will be highlighted in red and the system will force a re-entry. Some values may be valid, but must be verified because it is outside of an expected range. For example an older model year car with a low mileage reading etc. The user will be presented with a message and they may either correct it, or press **F10** to confirm entry of data is actually correct.

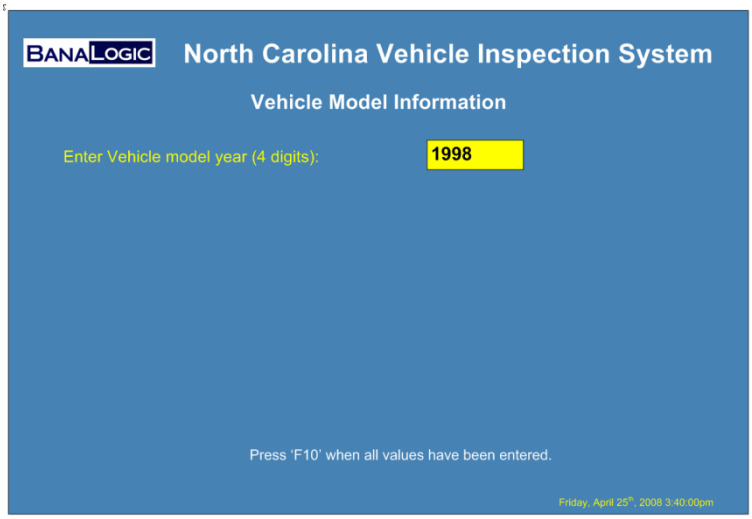
Vehicle Model Information

Field	Validation Rules
Vehicle Model Year	The vehicle model year must be four (4) numerals and the year cannot be more than the present year plus one (1). If the year entered is older than

	35 years, the analyzer shall display error message stating that this vehicle does not require an inspection due to its age. The inspection shall be aborted and no record will be written.
Odometer Reading	The current odometer reading must be numeric. If no odometer reading is available, enter "0" (zero). If the mileage is higher than ninety-nine thousand (99,000) for a vehicle five (5) years old or less a warning message will be displayed. If the mileage is less than one hundred thousand (100,000) for a vehicle fifteen (15) years old or older a warning will again be displayed and allow the inspector to confirm this is indeed correct, or allow update to the odometer reading.
Number of Cylinders	
Engine Displacement	The expected range of engine size depends on the measured in units expected. For Liters the expected value is less than or equal to 20. For CC the expected value is greater than 6000. For CI the expected value is between 75 – 800. Decimals are allowed for this field. If a value is outside the expected range a warning will be presented to the user and allow them to correct if necessary.
Measured in	**L**, **C**, or **I** are allowed values in this field. For vehicles with previous data the engine displacement is always converted to cubic centimetres.
Dual Exhaust	Only **Y** or **N** is allowed values in this field.

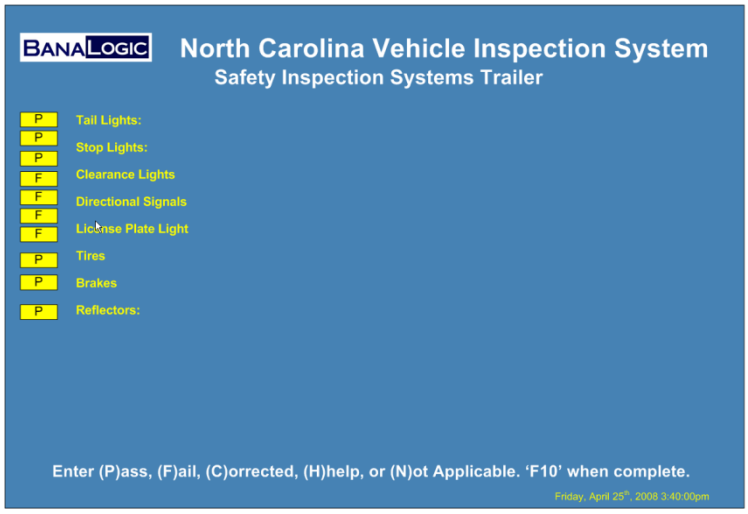
For Body Style Trailer Only

Vehicle Model Information – Body Style Trailer



Only model year is required for trailers

Safety Inspection Items – Trailers



Vehicle Make

The vehicle make only applies to non-trailer vehicles. If the vehicle make is known from a previous inspection the 4 character make is shown on the screen and provides the inspector the ability to update. For inspections with no previous vehicle data the user will be prompted to select the vehicle make from either the domestic light duty, foreign light duty, or heavy duty make list.

Domestic Light Duty

Make Code	Vehicle Make
AMER	AMERICAN MTRS
AVAN	AVANTI
BRIC	BRICKLIN
BUIC	BUICK
CADI	CADILLAC
CHEC	CHECKER
CHEV	CHEVROLET
CHRY	CHRYSLER
CONS	CONSULIER
DESO	DESOTO
DODG	DODGE
EDSE	EDSEL
EGIL	EAGLE
FORD	FORD
FRAS	FRASIER
GMC	GMC
HENR	HENRY J
HUD	HUDSON
HUMM	HUMMER
INTT	INTERNATIONAL TRAVELALL
JEEP	JEEP
KAIS	KAISER
LASA	LASALLE
LINC	LINCOLN
MERC	MERCURY
NASH	NASH
OLDS	OLDSMOBILE
PACK	PACKARD
PLYM	PLYMOUTH
PONT	PONTIAC
RAMB	RAMBLER
SHEL	SHELBY
SOLE	SOLECTRIA
STRN	SATURN
STUD	STUDEBAKER
WILL	WILLYS

Foreign Light Duty

Make Code	Vehicle Make
ACUR	ACURA
ALFA	ALFA ROMEO
ASTO	ASTON MARTIN
AUDI	AUDI
AUST	AUSTIN
BENT	BENTLEY
BERT	BERTONE
BMW	BMW
BUGA	BUGATTI
CAP	CAPRI
CITR	CITROEN
DAEW	DAEWOO
DAIH	DAIHATSU
DATS	DATSUN
DELO	DELOREAN
FERR	FERRARI
FIAT	FIAT
GEO	GEO
HILL	HILLMAN MINX
HOND	HONDA
HYUN	HYUNDAI
INFI	INFINITI
ISU	ISUZU
JAGU	JAGUAR
JENS	JENSEN
KIA	KIA
LADA	LADA
LAMB	LAMBORGHINI
LANC	LANCIA
LNDR	LAND ROVER
LEXS	LEXUS
LNCI	LANCIA
LOTU	LOTUS
MASE	MASERATI
MAZD	MAZDA
MERK	MERKUR
MERZ	MERCEDES BENZ
MG	MG
MINI	MINI COOPER
MITS	MITSUBISHI
MORG	MORGAN
NISS	NISSAN
OPEL	OPEL
PANT	PANTERA
PEUG	PEUGEOT
PORS	PORSCHE
RANG	RANGE ROVER
RENA	RENAULT
ROLL	ROLLS ROYCE
ROVE	ROVER
SAA	SAAB
SCI	SCION
STLG	STERLING
SUBA	SUBARU
SUNB	SUNBEAM
SUZI	SUZUKI
TOYT	TOYOTA
TRIU	TRIUMPH
TVR	TVR
VAUX	VAUXHALL
VOLK	VOLKSWAGEN
VOLV	VOLVO
YUGO	YUGO

Heavy Duty

Make Code	Vehicle Make
CHEV	CHEVROLET
DAF	DAF
DAIM	DAIMLER
DIAT	DIAMOND T
DODG	DODGE
DREO	DIAMOND REO
FORD	FORD
FRHT	FREIGHTLINER
FWD	FWD
GMC	GMC
INTL	INTERNATIONAL
IVEC	IVECO
JEEP	JEEP
KW	KENWORTH
MACK	MACK
MAN	MAN TRUCK
MITS	MITSUBISHI
OSHK	OSHKOSH
PTRB	PETERBILT
VOLV	VOLVO
WHIT	WHITE

Default Vehicle Make List

Step 5 • Safety Inspection Items

The vehicle type and registration location will determine the sequence of Safety Inspection prompts and whether a vehicle is subject to an idle emissions test or an OBDII scan. For vehicles subject to an OBDII inspection, the OBDII inspection will precede the safety and tampering inspection sequences.

For non-motor cycle /trailer vehicle types, a **N**ot Applicable may only be entered for Reflector, Clearance Lights, and Window Tinting items only.

For trailers a **N**ot Applicable may only be entered for Lighting Signalling Devices, and Reflector items.

For motorcycles a **N**ot Applicable may only be entered for Direction Signals

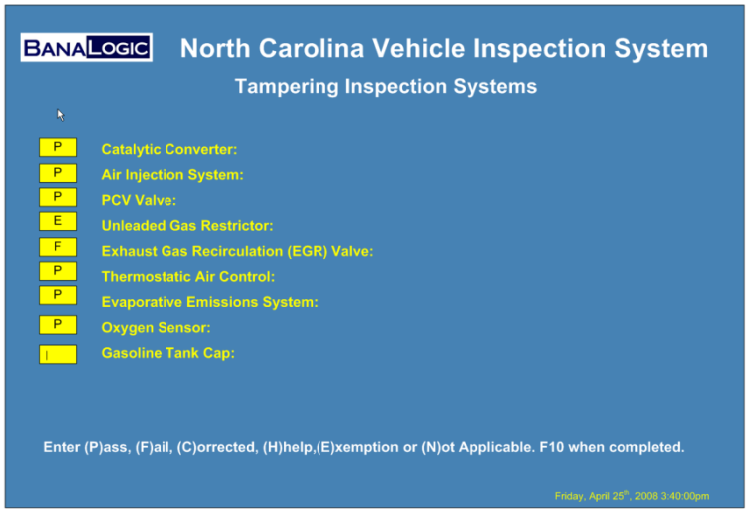
When the inspector-mechanic has completed all safety inspection items, the analyzer will display the results to the screen. Failed inspection subsystems will be listed with an **F**, not applicable inspection subsystems will be listed with an **N**, passed subsystems will be listed with a **P**, and any item which has been corrected during the course of the inspection will be listed with a **C**.

For the safety inspection item "Window Tinting," an entry of any disposition other than **N** will require a fee to be added. No fee is added for an entry of **N**.

The analyzer will proceed to the tampering inspection sequences for vehicles for which this is applicable to.

Step 6 • Tampering Inspection Items

The tampering inspection sequences will be performed for all vehicles (excluding motorcycles and trailers) for which a safety inspection is performed and the vehicle is less than 35 years old. The following display will guide the inspector-mechanic through the tampering inspection process and aid in the entry of the data required:



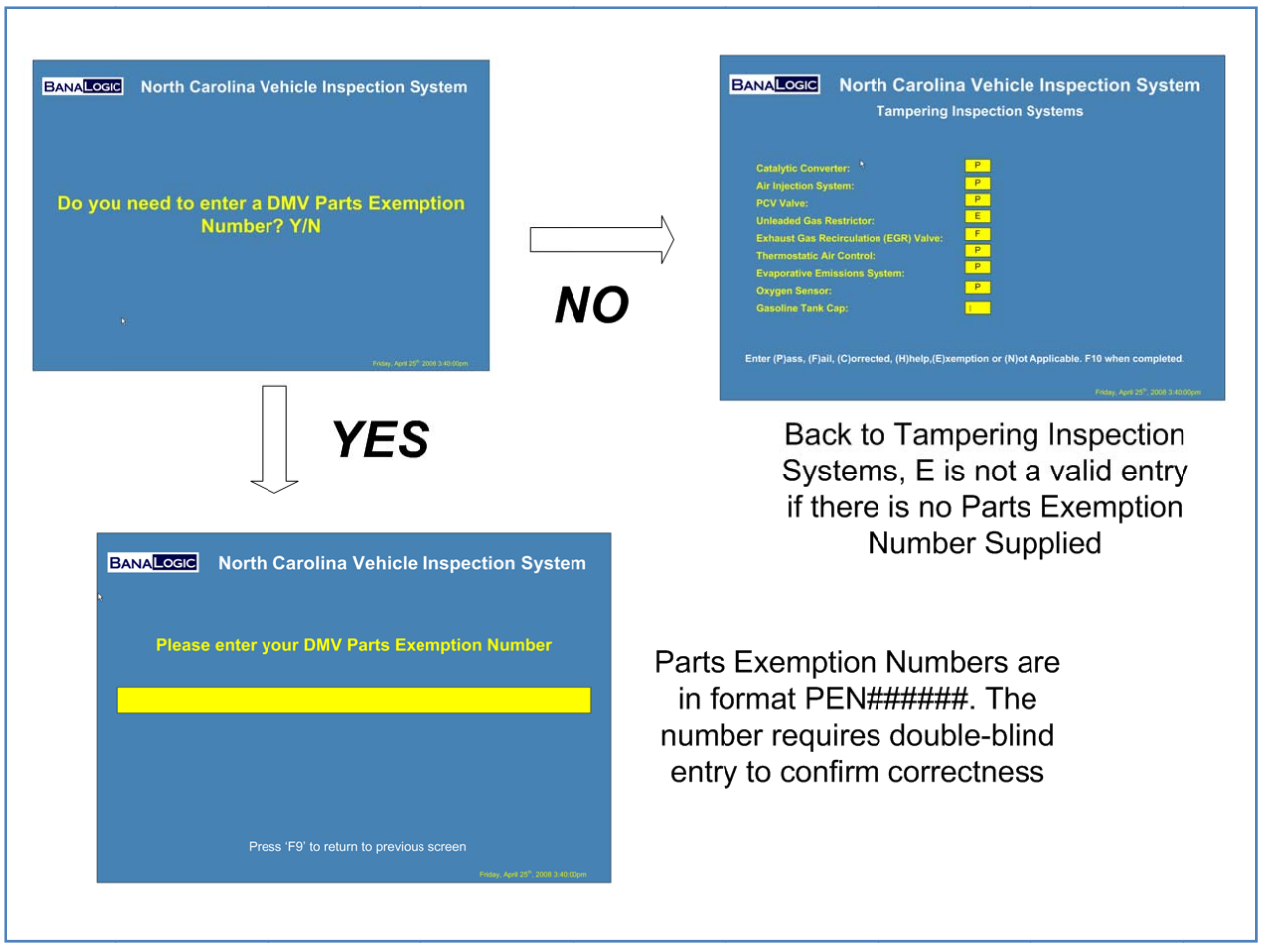
Vehicles subject to the tampering inspection may receive a "parts exemption" exempting that item(s) from the inspection. An entry of **E**, **P**, or **N** will be allowed if a parts exemption number was received upon VID contact.

For all other conditions (i.e. no VID contact, no vehicle match, Parts Exemption Number not received, etc.) where an **E** is entered, a prompt will be displayed asking if a Parts Exemption will be used.
An entry of **N** will return back to the tampering inspection menu for correction and a normal inspection to continue. Any entry of **E** for any Tampering Inspection Item will not be allowed.

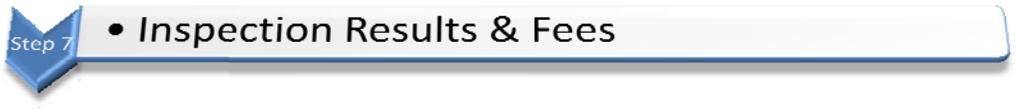
An entry of **Y** in response to using a DMV Parts exemption will display request for the Parts Exemption Number. This will require a double blind entry. Parts Exemption number can only be accepted if prefix is "PEN" followed by 8 numbers, (i.e. "PEN12345678").

Upon successful acceptance of the parts exemption number an entry of **E** will be allowed for any of the tamper inspection items.

The analyzer will treat the entry of **E** as if a **P** (Pass) was entered for that part.



Entering of Parts Exemption



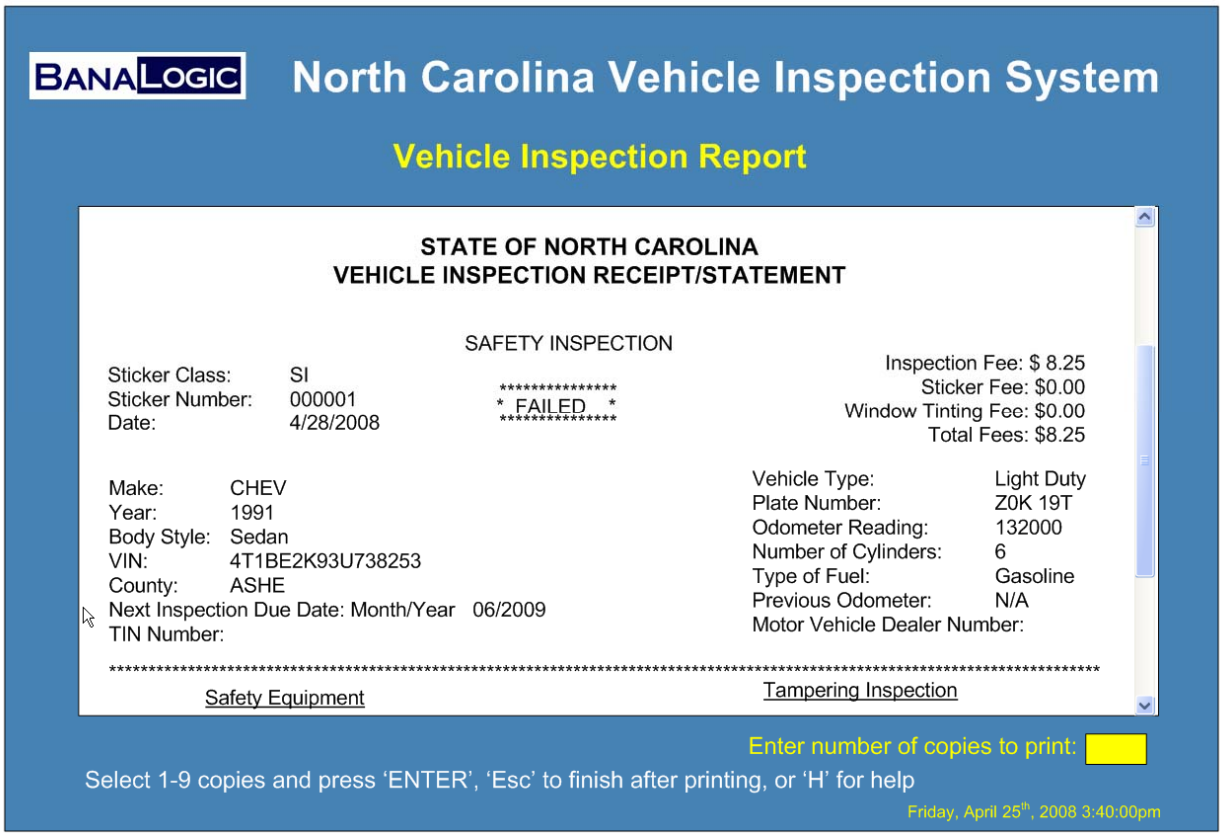
At the end of the inspection a screen will display the overall test results.

If North Carolina is not using the "Open Market Safety-Emissions Inspection Fee" the application will automatically calculate and assign the appropriate test fee from the values provided by the VID. This calculation is based on the appropriate inspection fee, sticker fee (if applicable), and window tint fee (if applicable).

However, if North Carolina is using the "Open Market Safety-Emissions Inspection Fee" the application will allow the inspector-mechanic to enter the desired inspection fee. The appropriate overall test fee will then be calculated by the analyzer based on the inspection fee entered by the inspector-mechanic, the sticker fee from the VID, and the window tint fee from the VID. The sticker and window tint fees will not be displayed and the inspector-mechanic will not be able to change these values. There is a maximum allowable safety-emissions inspection fee provided from the VID.

If the overall result of the inspection was a 'Pass' and an e-sticker authorization was issued then the analyzer will calculate a "Transaction Identification Number" (TIN). The TIN will be generated and printed on all copies of the VIRS. At this point the inspection record has been permanently recorded. Should anything happen after this point the inspection record can be retrieved using the State Inspection Menu, Reprint Receipt/Statement menu option.

The analyzer will initiate a phone call to the VID. After the analyzer has attempted to initiate a phone call to the VID, successful or not, the analyzer will display the VIRS for printing.



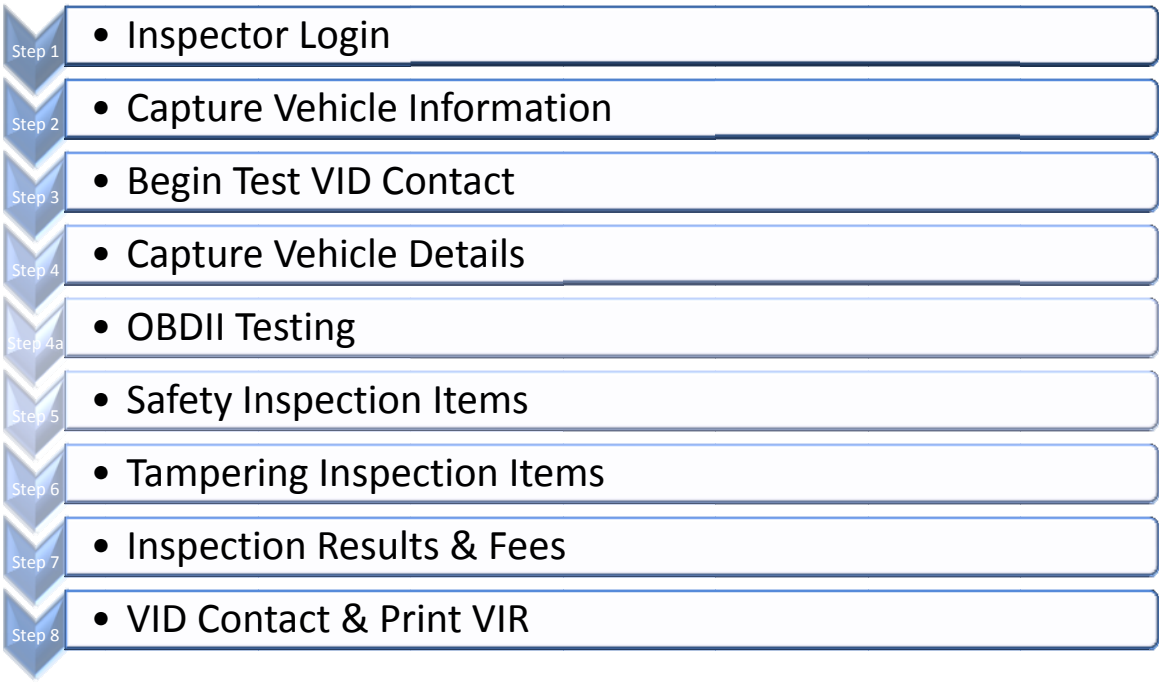
The inspector must attempt to print at least one copy of the inspection record prior to using the Esc to return to the State Inspection Menu.

Safety and Emissions Inspection

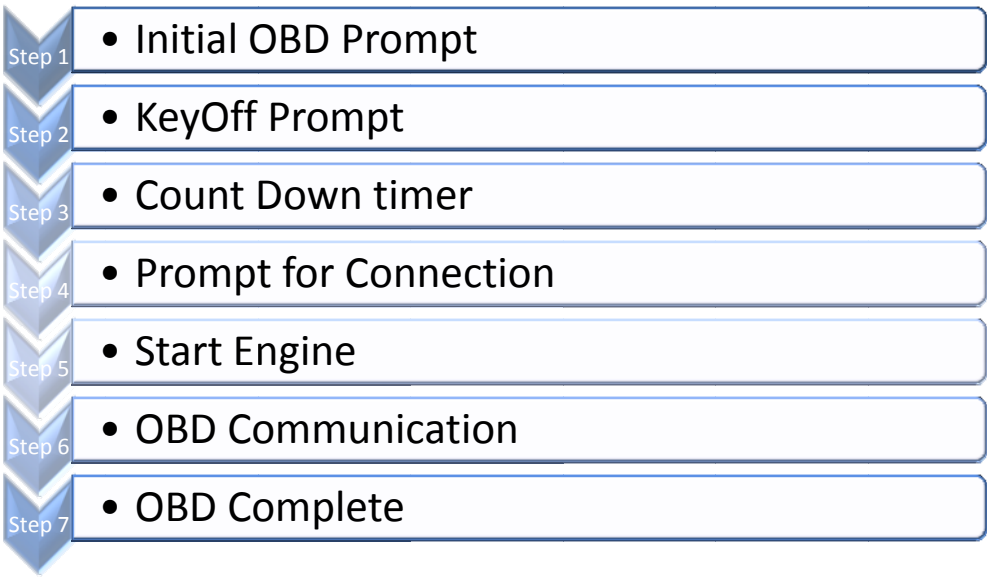
The safety and emission inspection option is invoked by selection 1 from the State Inspection Menu. This option is only available on OBDII analyzers.

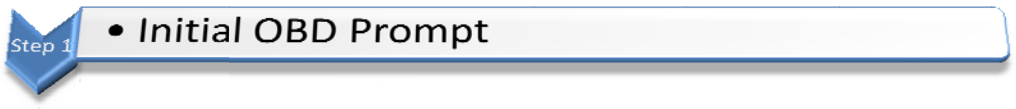
The safety and emission inspection process is identical to the safety inspection process with the addition of the OBD test step.

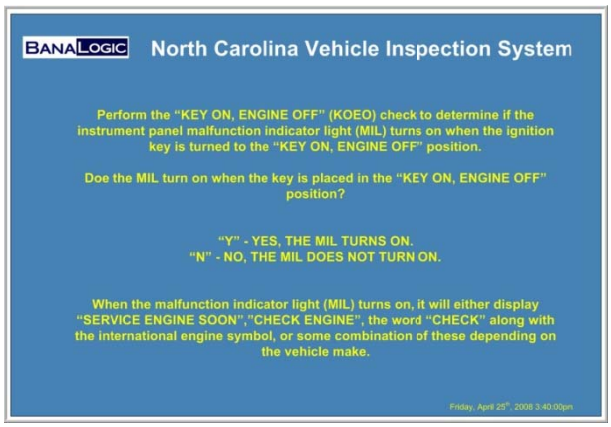
An OBDII inspection for a regular vehicle consists of nine basic steps:



Only Step #4a is different in the OBDII inspection. The OBD inspection process in step 4a is shown in more detail:







Step 3 • Count Down Timer

The count down timer will force the inspector to wait 12 seconds with the ignition key remaining at the off position.

Step 4 • Prompt for Connection

At this screen the user is instructed to connect the OBDII cable. There are three possible choices:

1. **H** for Help provides DLC (Data Link Connector) location look-up information.
2. **A** will abort the test if the connector cannot be found. No test record will be written.

3. **C** is to be used if the connector is found but is damaged or inoperable. The test will continue on with the safety and tampering portions but the overall result will always be a fail. The motorist may need to get "Waiver" from the DMV if this vehicle requires an OBD test but cannot receive one due to the connector.

After the OBDII connection has been made the inspector will be prompted to start the engine.

During Step 6 the analyzer attempts communication with the OBDII computer on the vehicle. If there is a problem communicating with the vehicle the inspector will be presented with a screen indicating this error. The inspector must attempt communication 3 times before being allowed to abort a test.

The system will prompt the user when the OBDII portion of the test has been completed. No results of the OBDII portion of the test will be displayed (unless aborted for readiness). The test will then continue to the safety and tampering inspections (if required) for an initial inspection.

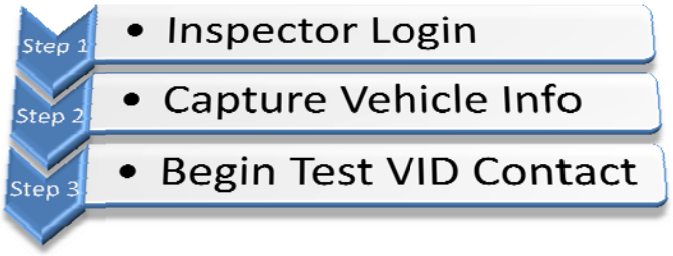
For an OBDII reinspection, you may not be prompted for the safety items if all items on the previous inspection were a pass.

Reinspection

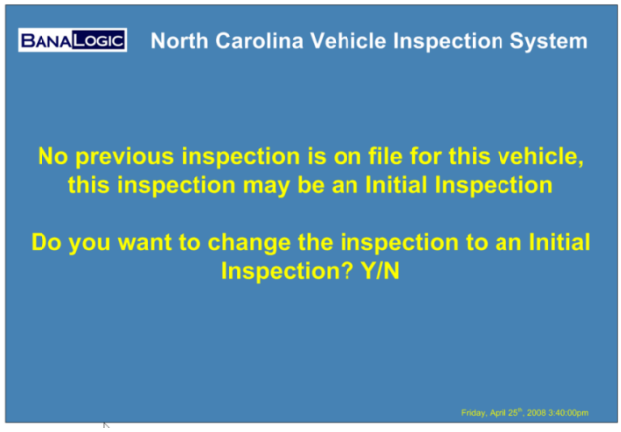
A reinspection sequence is initiated by selecting 3 from the State Inspection Menu. The reinspection is initiated in the same way as an initial inspection except that the test record is marked with the reinspection flag.

For OBDII analyzers, inspectors will have the choice of a Safety-Emissions Reinspection or a Safety-only Reinspection.

The first three steps of a reinspection are identical to an initial inspection:



The call to the VID will attempt to find a vehicle match that will bring the previous test information to the analyzer. Failing VID communication or failing to find a match on the VID, the analyzer will attempt a local search of tests to locate previous inspection data. The system will search through



previous test records done within the past 30 days (effective 1/1/2009 this will extend to 60 days).

If no previous test record is either returned from the VID or found locally the inspector will be prompted to convert to an initial inspection. By selecting “N” the current test record will be aborted.

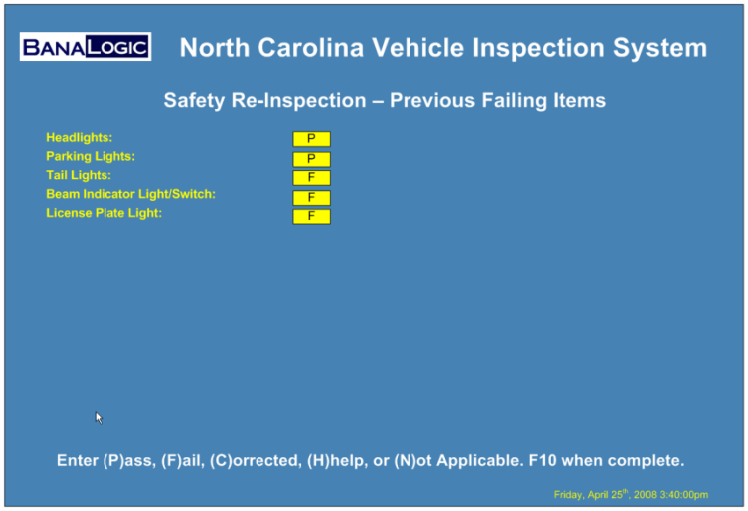
For Safety-Only Reinspection steps 4 through 8 with the following changes will be performed.

Step 4 • Capture Vehicle Details

No details about the vehicle can be changed during the reinspection process with the exception of entering an updated odometer reading. The inspector will be prompted to enter the odometer reading prior to continuing to the safety portion of the test.

Step 5 • Safety Inspection Items

Only those safety inspection items which received a fail on the previous inspection record will be presented to the inspector for reinspection. In the following example 5 items failed the previous inspection.

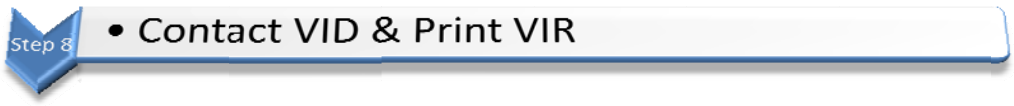


Step 6 • Tampering Inspection Items

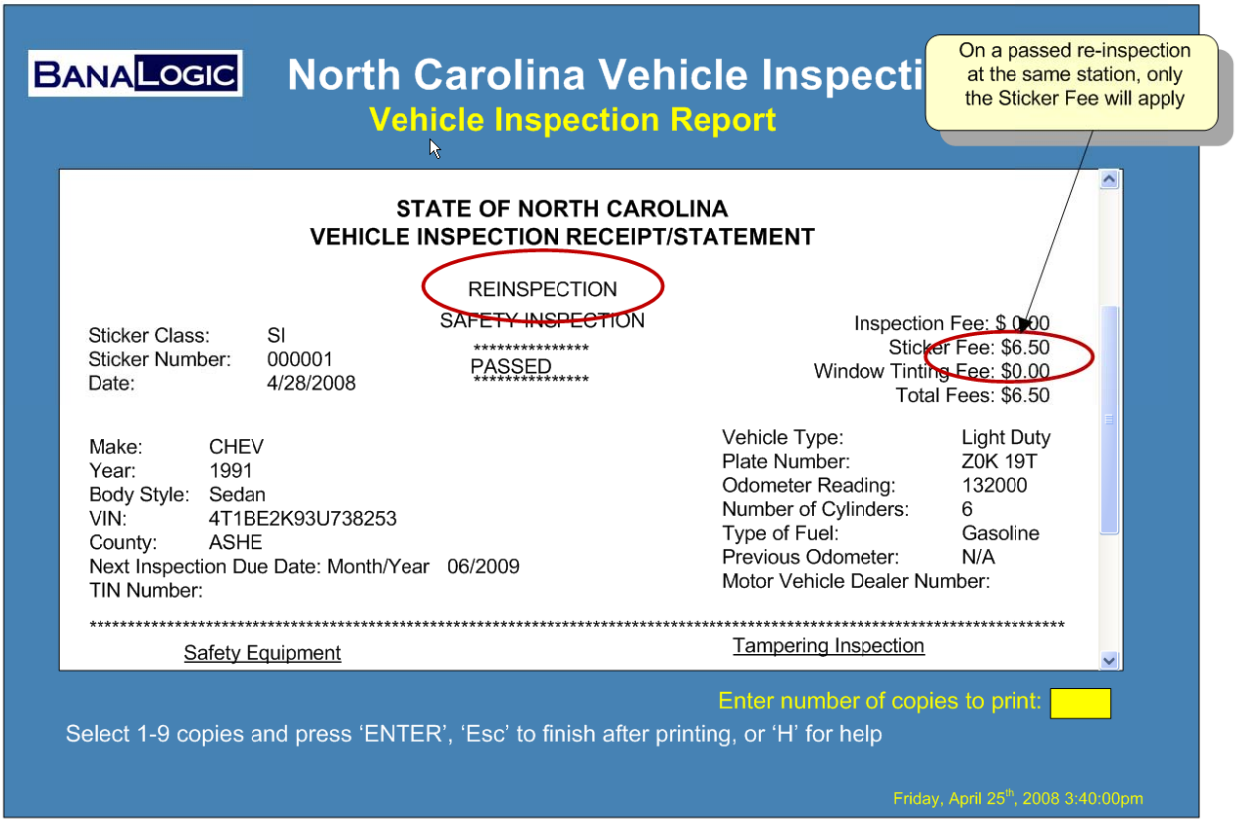
Tampering, like the safety inspection items, are only presented if a fail was registered in the previous inspection.

Step 7 • Inspection Results & Fees

The inspection results and fees are identical to the initial inspection; however, inspection fees may not apply if the reinspection is done at the same station within the allowed timeframe.



The VID contact and printing of the VIRS are identical to the initial inspection. The only difference is on the actual VIRS print out there is an indicator on the report to indicate this test is a re-inspection.



Waivers

A reinspection Using Waivers/Waiver sequence is available on the OBD analyzer configuration only and is initiated by an entry of 4 from the State Inspection Menu.

The inspector-mechanic will be presented with a "Waiver" issued by a DMV Enforcement Officer prior to initiating the reinspection Using Waivers/Waiver sequence. A vehicle must have been reinspected with the most recent inspection having an overall inspection disposition as "fail" (except for vehicles that could not be tested due to too many OBDII monitors set to not-ready) before a waiver can be issued and the initial inspection must have occurred not more than sixty (60) days prior. This 60-day requirement will be a function performed by North Carolina DMV at the time of waiver issuance and not a function of the analyzers. If waiver is granted the motorist will return to the inspection station where the vehicle failed to pass the previous inspection. The inspector-mechanic will use the analyzer to enter the waiver authorization number to complete the inspection and issue an e-sticker authorization.

There are 5 types of waivers:

1. Safety-Emissions Reinspection using a Repair Waiver
2. Safety-Emissions Reinspection using a Non-Communication Waiver
3. Safety-Emissions Reinspection using a Not-Ready Waiver
4. Safety-Emissions Not-Ready Waiver Initial Inspection
5. Safety-Emissions Reinspection using a Damaged/Missing DLC Waiver

Previous Inspection Results That Must Be Meet to Accept Waiver Number

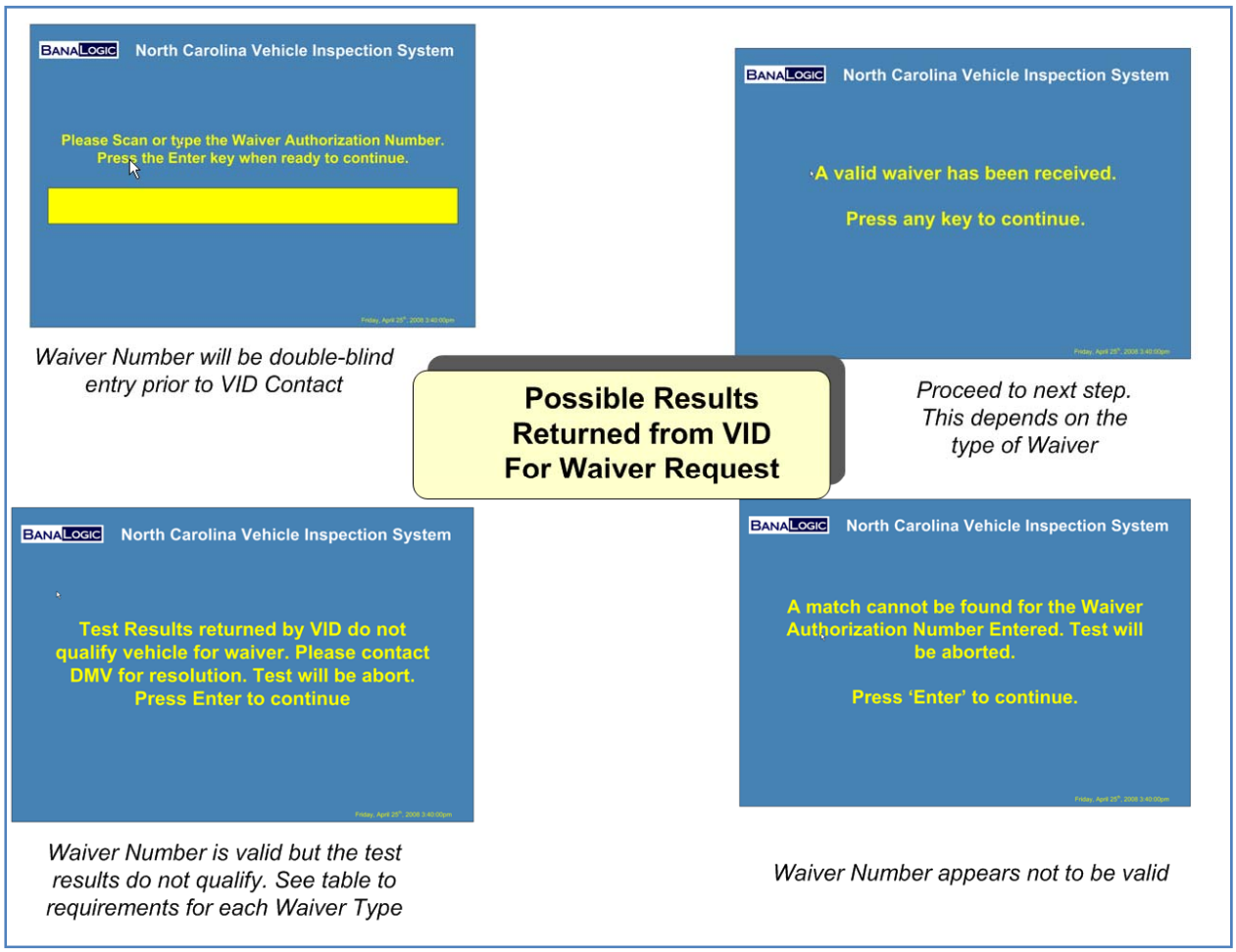
Reinspection or Waiver Type	Safety Inspection Disposition	Tamper Inspection Disposition	OBDII Inspection Disposition	OBDII Ready Results
Reinspection Repair **RER**	Pass	Pass	Fail	Pass or Fail
Reinspection Non Communication **NCR**	Pass	Pass	No Response/Communication	-
Reinspection Not Ready **NRR**	Pass	Pass	Readiness Aborted	Fail
Waiver for Not Ready **NRI**	-	-	Readiness Aborted	Fail
Waiver for Damaged/Missing **DLC DDR**	Pass	Pass	Inoperable Connector	-

For Waiver type RER, NCR, NRR, or DDR:

- Only the current odometer reading will be collected
- The analyzer will proceed to complete the e-sticker authorization issuance and print the VIRS.

For Waiver type NRI:

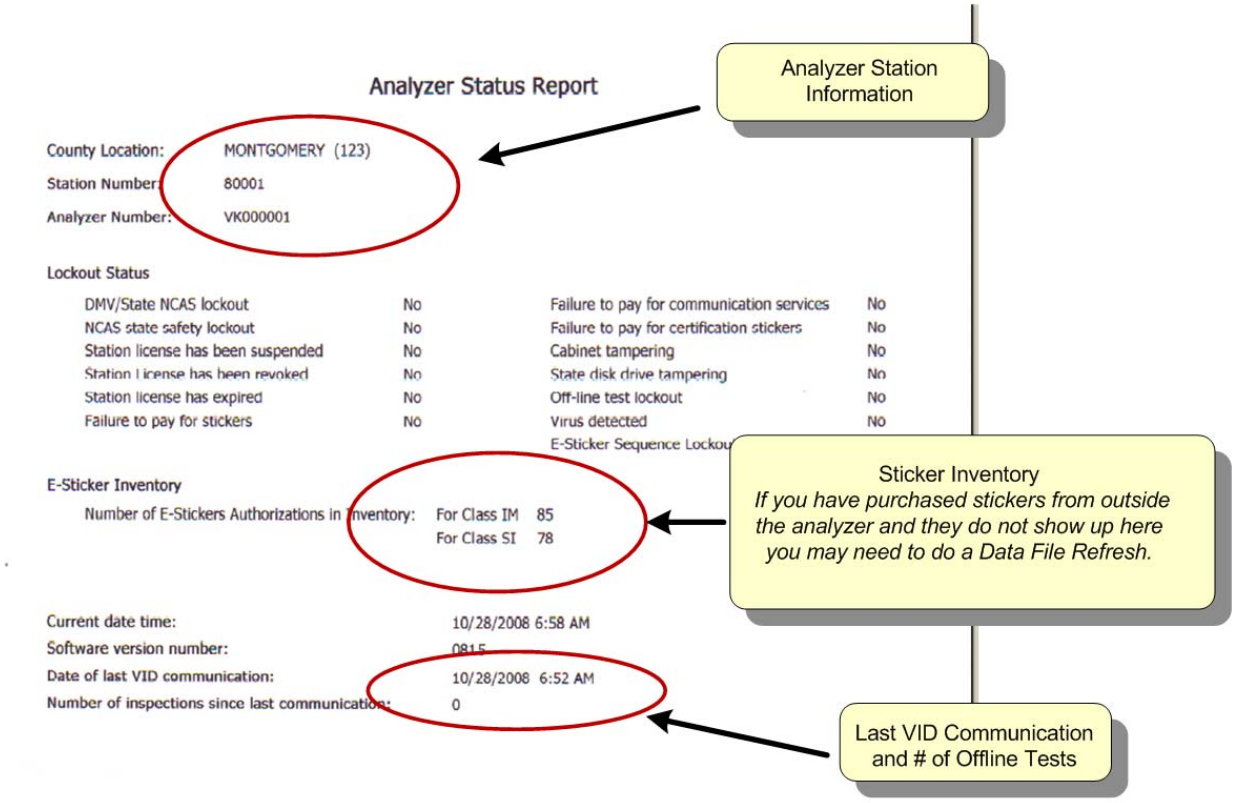
- The current odometer reading will be collected.
- An OBD test sequence will be completed without regard to the monitor readiness status.
- The analyzer will proceed to the safety and tampering inspection sequences as in an initial emission inspection.
- If the vehicle fails the overall test results a Fail will be record and printed on the VIRS.
- If a subsequent Waiver Authorization number is required to pass the vehicle the new waiver authorization number will be recorded in the test record and printed on the VIRS.
- The test end procedures are the same as an initial emission test. A call shall be placed to the VID in the same manner as the conclusion of an initial inspection.



Analyzer Maintenance

The analyzer maintenance menu is activated by an entry of 5 from the State Inspection Menu. This presents a set of analyzer maintenance functions that may be performed by the inspector-mechanic.

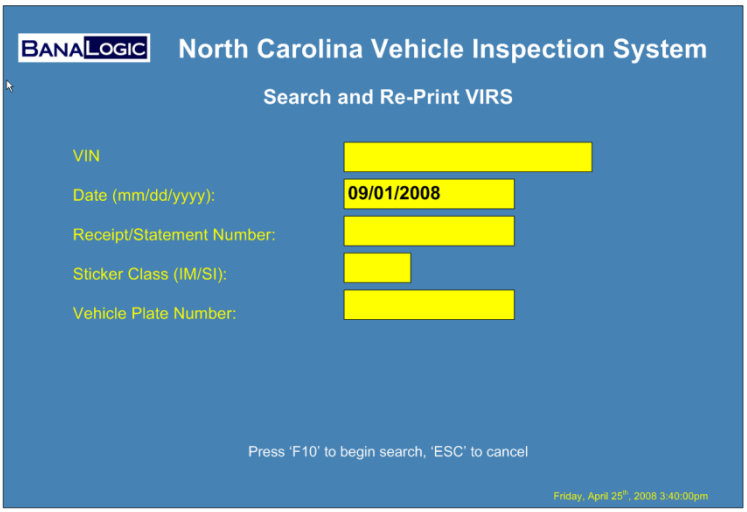
For OBDII and safety-only analyzers this menu function provides only for the status of the analyzer.



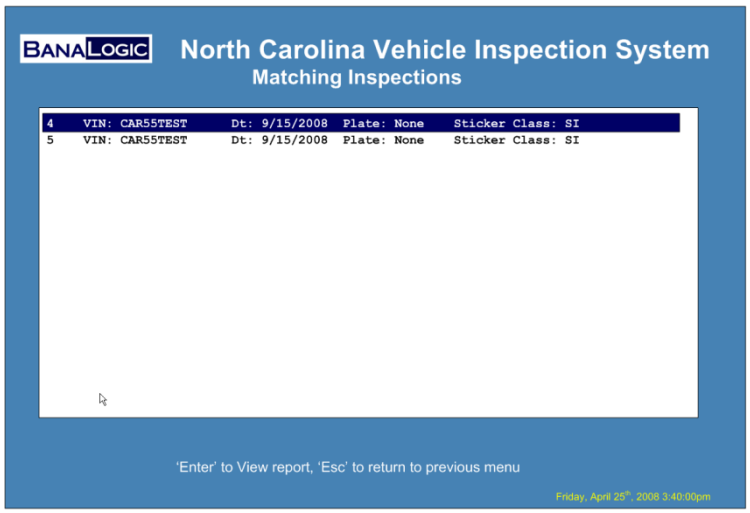
Re-Print Inspection Report

Search and Reprint Receipt/Statement function is activated by an entry of **6** from the State Inspection Menu. This function permits the inspector-mechanic to search the test records on the analyzer and print duplicate receipt/statements for previous inspections completed on this analyzer.

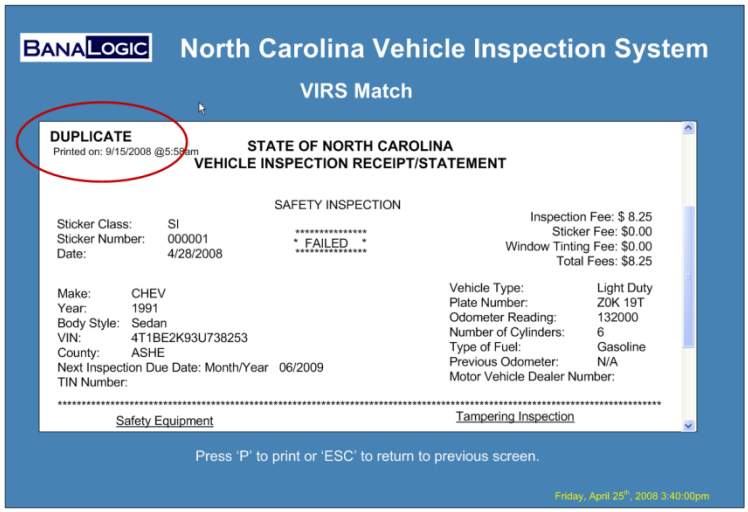
The analyzer will not require the completion of all fields, but at least one (1) field must be completed and **F10** pressed to begin the search.



If more than one test record matches the search criteria a list will be presented to the inspector to navigate through. The ↑↓keys are used to change the selected test record. The **Enter** key is used to display the inspection report.



The inspection report displayed is identical to the initial report with the exception of the word “Duplicate” printed on the upper left corner of the report. If only one record matches the search criteria, the matching inspection list is by-passed and the VIRS is displayed immediately after the search is executed.



E-Sticker Management

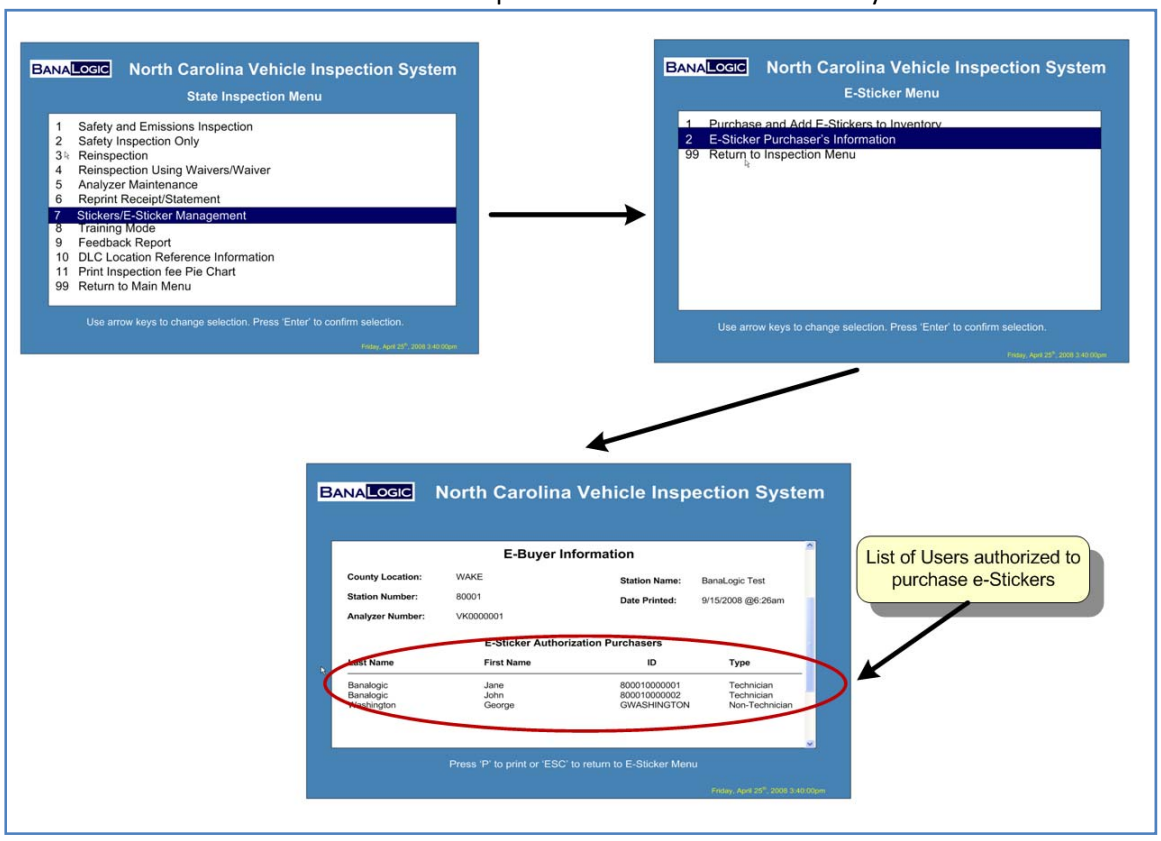
E-sticker authorizations purchased using methods other than through the analyzer will be downloaded to the analyzer upon the next data file refresh.

E-sticker authorization inventory will be maintained both on the analyzer, as well on the VID. For each passed inspection, the analyzer will decrement the inventory of e-sticker authorizations by one for it's respective inspection class. If for some reason e-sticker authorizations were removed from an analyzer through a repair process or other means, the VID will repopulate the analyzer with the proper number of e-sticker authorizations for each class of inspections upon a successful data file refresh.

E-sticker authorization books for Emission Inspections and Safety Inspections are issued with fifty (50) e-sticker authorizations to a book. Inspection station owner/managers/authorized buyers may purchase a book of a particular class for addition to the analyzer inventory.

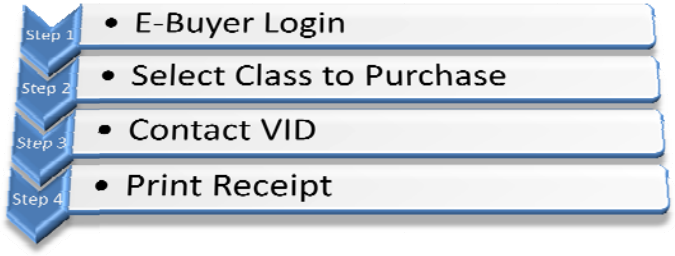
Prior to having the ability to purchase e-sticker authorizations from either the analyzer or website, each inspection station must set up an account through DMV. These accounts will allow automated billing to take place for e-sticker authorization purchases.

To find out the list of users authorized to purchase stickers from the analyzer:

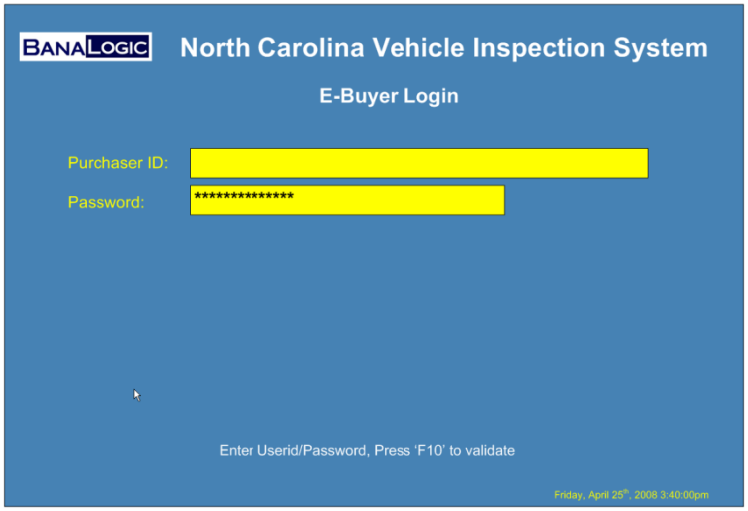


Purchase Additional E-Stickers

The purchase of E-Stickers is a 4 step process:



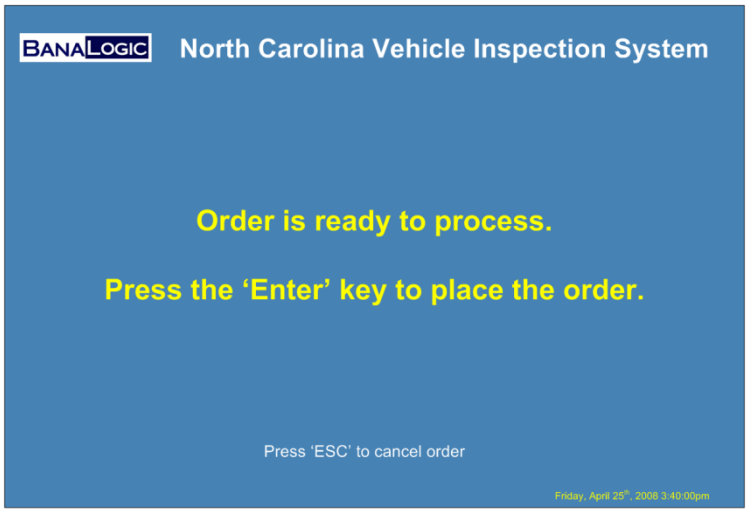
For purchasers that are also technicians the E-Buyer ID and password are the same as the inspector login credentials.



The following screen allows for the purchase of IM or SI e-sticker authorizations. For Safety-Only stations, only SI stickers are allowed to be purchased.

If the current e-sticker inventory is equal to or greater than 50 for the selected class the analyzer will display the following message and then return to the state inspection menu.

"Additional e-sticker authorizations cannot be obtained at this time for the inspection Class selected. Press the Enter Key to Continue".



This is the last chance to cancel the order.

Step 3 • Contact VID

In contacting the VID the system will either deny or authorize the purchase of additional e-stickers. If the e-sticker purchase is successful the local inventory will be updated and a receipt will be displayed.

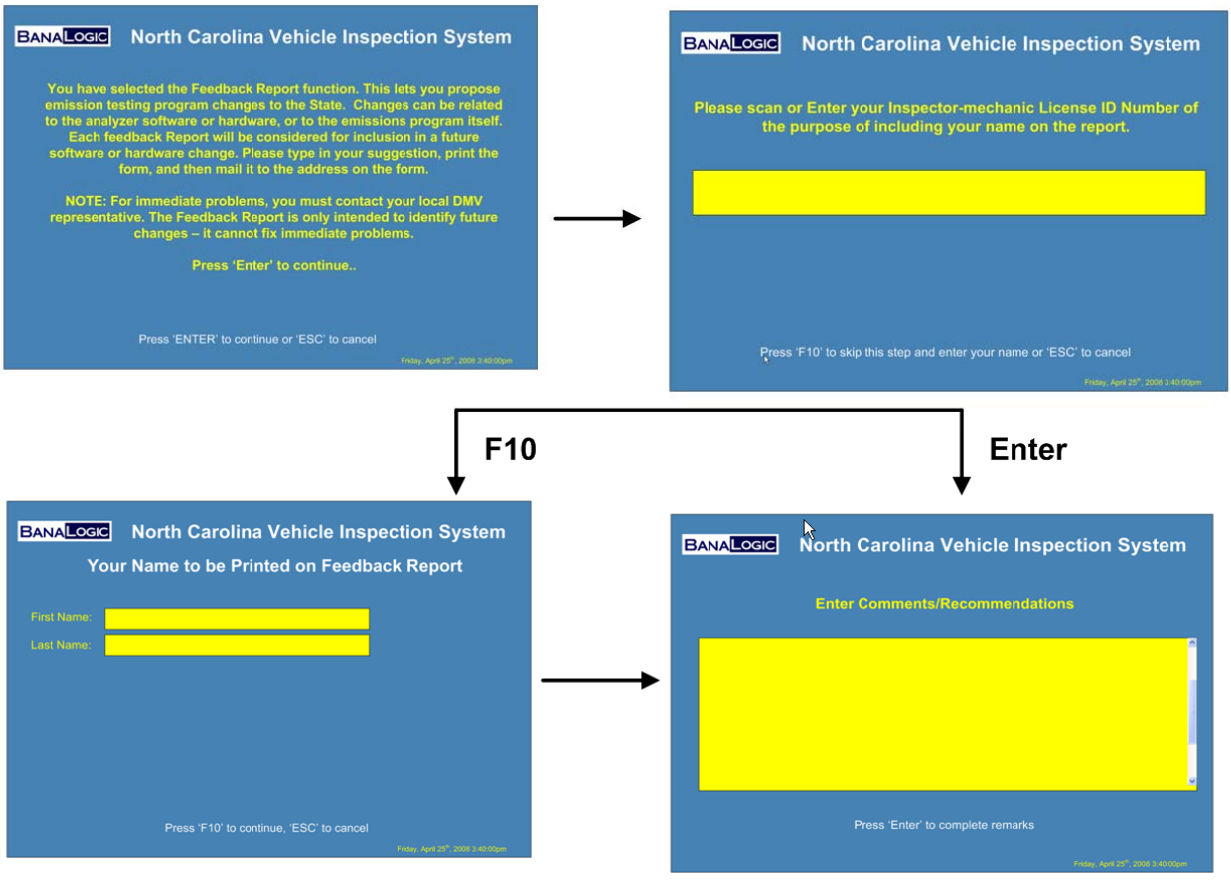
Step 4 • Print Receipt

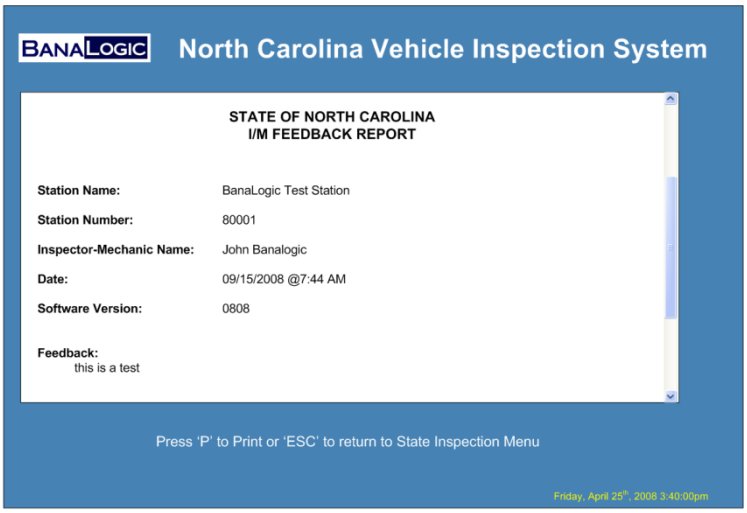
Sample Receipt from E-Sticker Purchase

Feedback Report

Feedback Report function is activated by an entry of **9** from the State Inspection Menu. The Feedback Report function allows the inspector-mechanic to propose changes to the analyzer software or hardware.

For immediate problems, you must contact your local DMV representative. The Feedback Report is only intended to identify future changes – it cannot fix immediate problems.





The feedback report should be printed and mailed to:

North Carolina Division of Air Quality

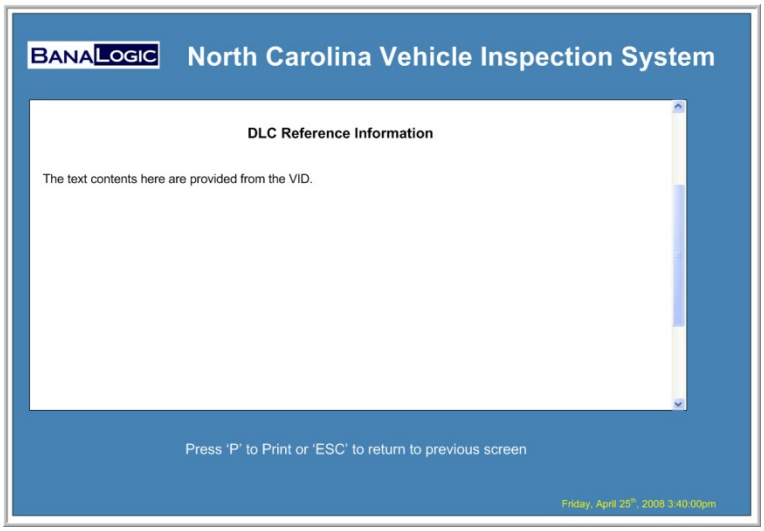
Mobile Source Compliance Branch

1641 Mail Service Center

Raleigh, NC 27699-1641

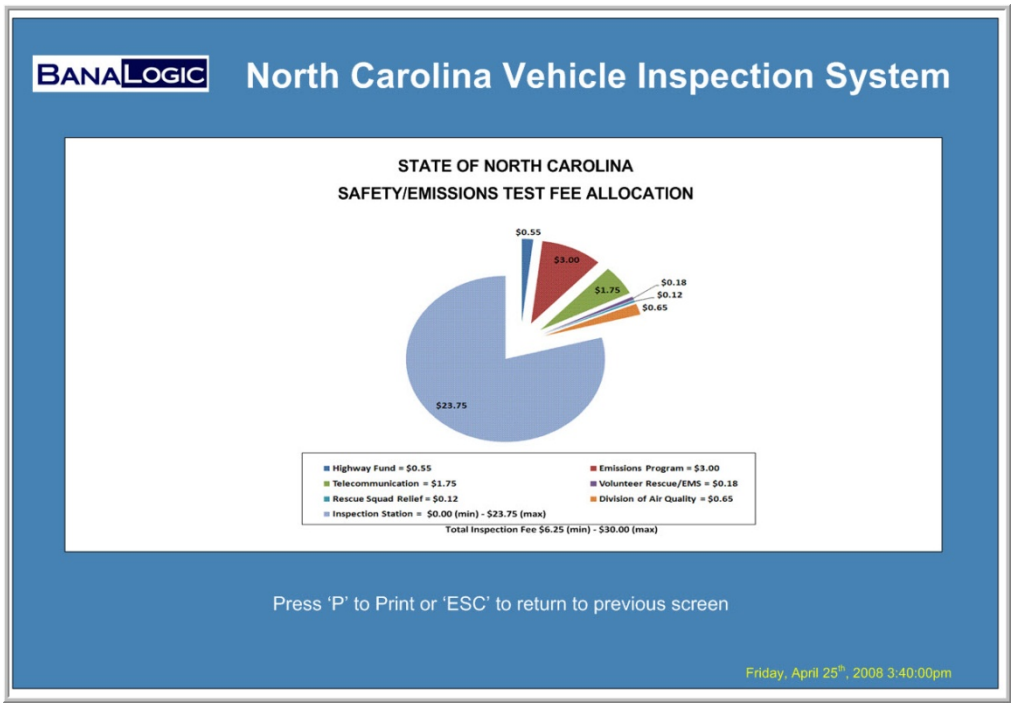
DLC Location Reference Information – OBDII Only Analyzer

DLC location reference information is displayed upon selection of **10** from the State Inspection Menu. The analyzer will be designed to provide assistance to the inspector with references for OBDII connector locations using the DLCREF file. After selection of this menu item, the contents of the DLCREF file will be displayed on the analyzer screen. The content of the DLCREF file is maintained and updated from the VID.



Print Inspection fee Pie Chart – OBDII Only Analyzer

Selection of option **11** of the State Inspection Menu will print a stand-alone safety/emissions inspection fee pie chart. This menu item is applicable to OBDII Only analyzers.



Station Menu Functions

The Station menu contains procedures for updating data files from the VID, networking diagnostics, lockout updates, and review of communication logs.

Network Communication Diagnostics

Network communication provides three levels of diagnostics:

- Comm Port
- Phone Line
- VID Communication

If you are experiencing issues with communication you should attempt to perform each of these diagnostics in sequence. You will be directed on how to proceed on each screen based on the diagnostic result.

Modem Serial Port Diagnostics will determine if the serial port on the analyzer is functioning.

Dial Tone Check will test out the phone line. This function performs a basic pick-up of the phone and listens for the dial-tone.

Network Diagnostics will contact the VID and perform basic loop-back Testing.

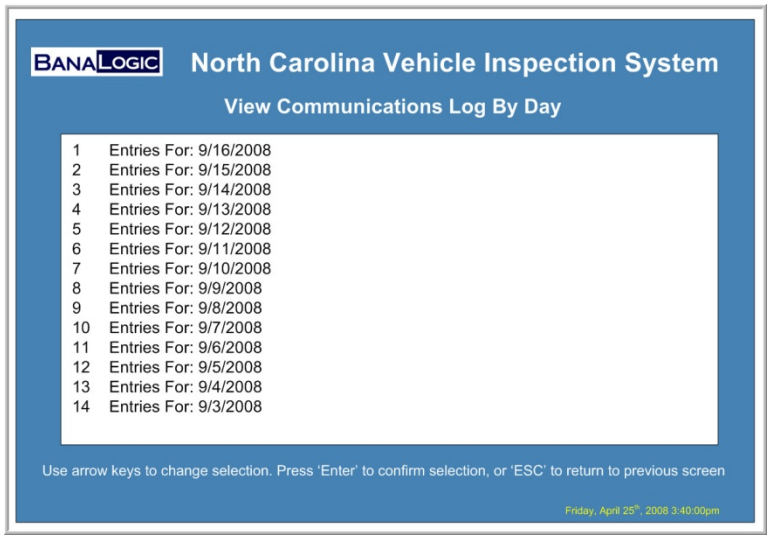
Data File/Lockout Status Refresh

This feature allows station personnel to place a request to the VID to, update key analyzer data files, such as reference tables, inspector-mechanic information, lockout status, program data, and e-sticker authorization purchases.

At the completion of a data file refresh the screen will display the updated station license for optional print.

Print a Communications Log

The communications log is provided for general diagnostics and support. You may be directed to access this function by technical support. Communications log will record all attempts to contact the VID and the resulting status message. Communication logs are organized by day. Logs may be quite large depending on the number of tests conducted during a day.



To select a communications log for printing use the ↑↓ keys to scroll through the list, or press the number on the left of the menu corresponding to the day you wish to review. Only 14 days of communication logs are retained on the analyzer.

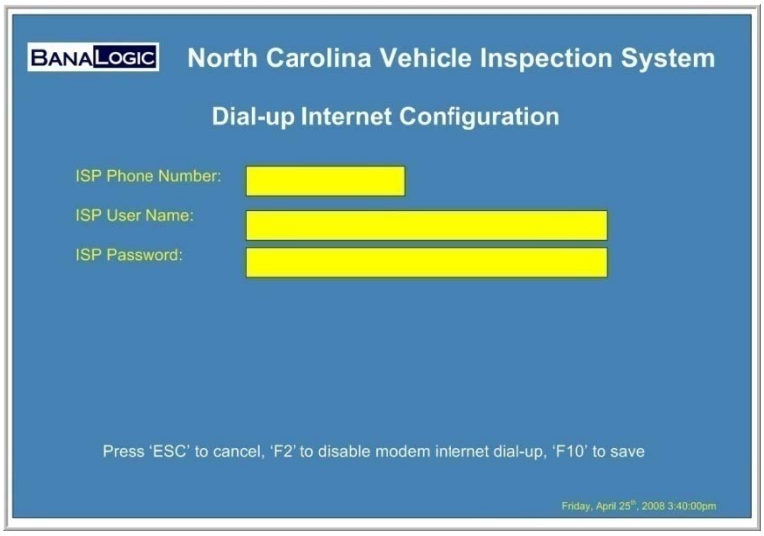
Print a Station License

Selection of this menu item allows station personnel to print a Station License Report. The purpose of the license report is to produce a document that must be posted in a public place at the station. The report displays station information and lists all inspector-mechanics employed at the station.

Other Service Products

The other service products menu is accessed using **5** from Station Menu. This menu item allows access to the ALLData online services. Dial-up internet access & a subscription to the ALLData online service is required to use this feature.

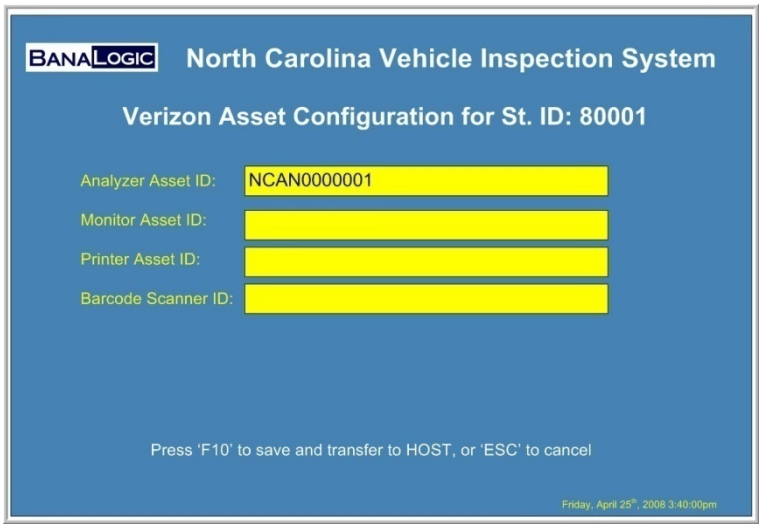
The first time you access this menu function you will need to setup the internet configuration parameters. Once this is done there is no need to setup the internet configuration again unless your provider data changes.



Upon entry of any of the first four menu items, the system will dial-out and authenticate to your internet service provider. Only when you exit the "Other Service Products Menu" will the modem disconnect.

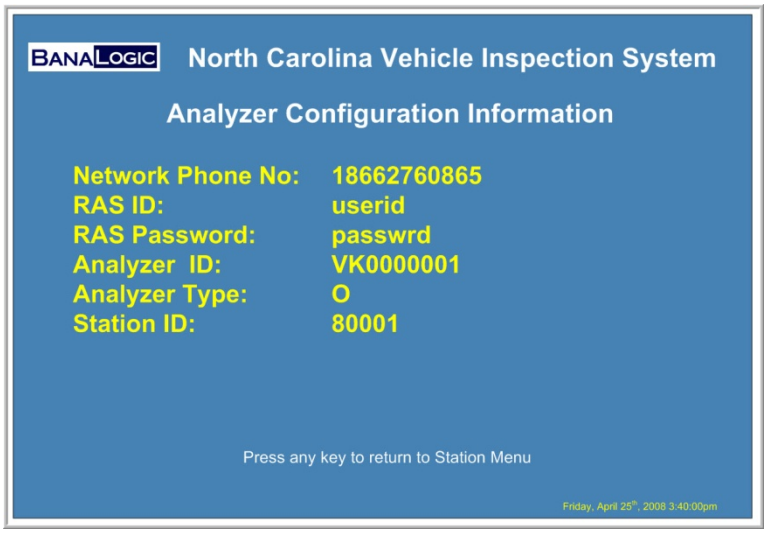
Asset Tracking

The asset tracking screen is used by Verizon Business to maintain an inventory of equipment in the field. You may be asked to access this function while on a support call or during the replacement of equipment. There is no need to access this function at any other time.



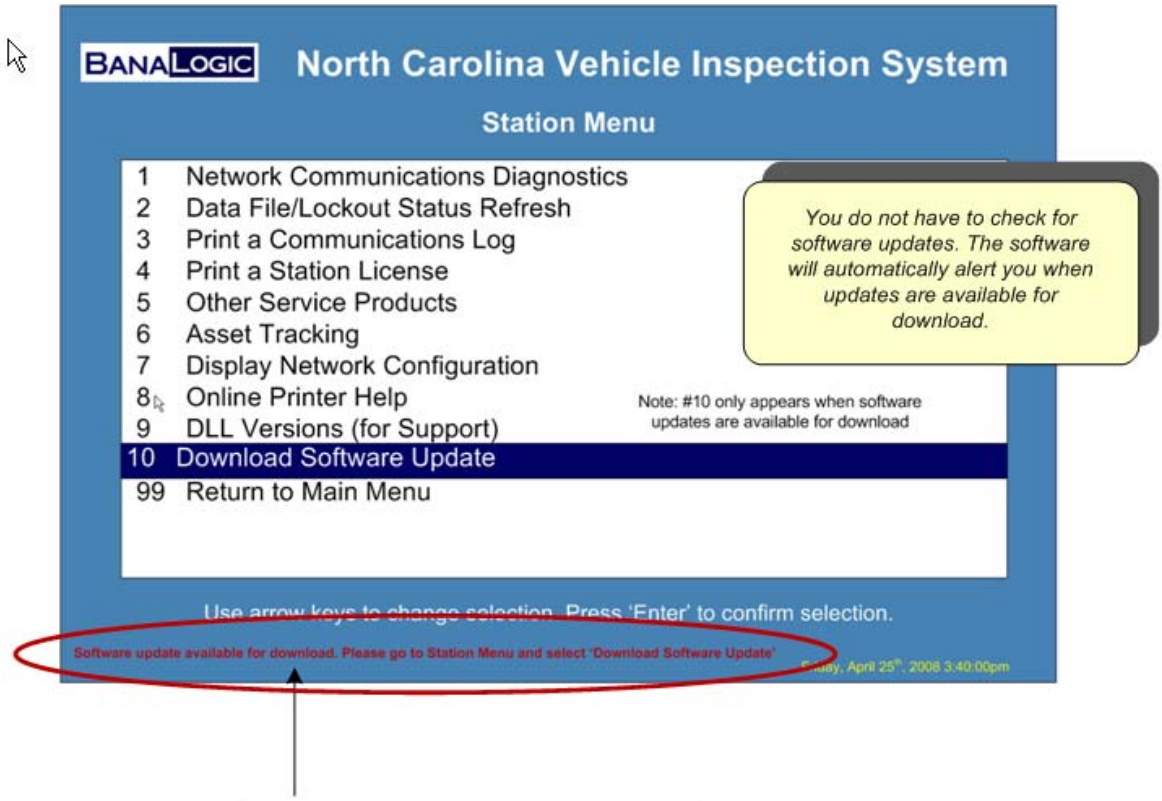
Display Network Configuration

The display network configuration option is accessed by selecting **7** from the Station Menu. This function is strictly used for support purposes. The support center may direct you to access this menu function during a technical support call.



Download Software Update

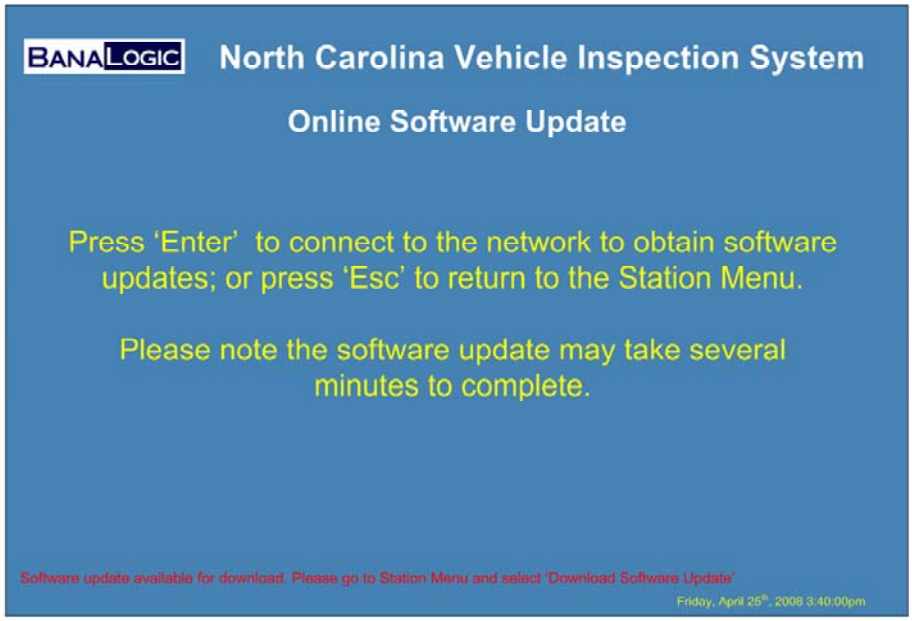
BanaLogic's BL-A100 analyzer in conjunction with the Verizon VID has the ability to download software updates automatically. The system will automatically determine if a software update is required and will notify the inspector through a flashing message in the bottom left corner of the screen.



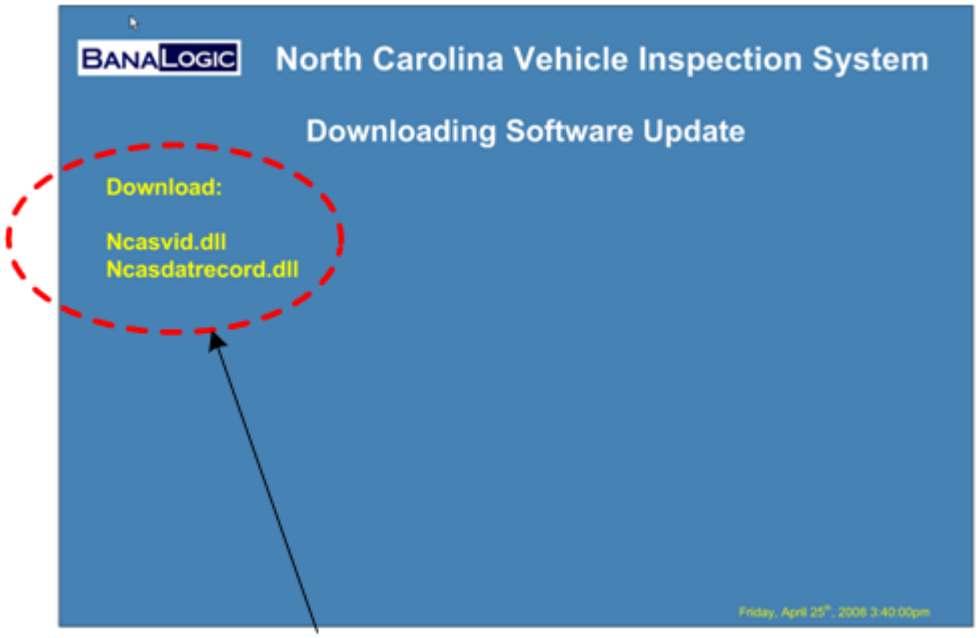
When a software update is available this message flashes in the bottom left of every screen until the update has been retrieved.

Only when there are software updates available for download does the menu function #10 Download Software Update appear on the Station Menu. You should only initiate the software update function when you have some time that the analyzer will not be used. Depending on the nature of the software update, phone line quality, etc. It can take upwards of 20 minutes to complete.

To initiate the update process simply go into the Station Menu and choose "Download Software Update". The following message will be displayed to users:



Once the software update process has started the screen will be updated as each of the files is downloaded. The actual files to be downloaded will vary and depends on the nature of what has changed for the update.



You will see one or more files listed here (depending on number of files for the software update). As the file is download the next file being processed it listed.

Once the software update is completed, you will be prompted to re-boot the analyzer.

After the analyzer has been rebooted it may take several seconds before the black screen is replaced with the main menu. Please be patient while the analyzer updates the software internally.

To check the software version after an update: From the Station Menu, Choose Analyzer Maintenance, and Analyzer Status Report. The software version is listed at the bottom of the report.

Background Information on Vehicle Emissions

Emissions from today's vehicles are lower than ever before, and the U.S. emissions standards are the most stringent in the world. However, as the number of vehicles on the road and the miles that they are driven each year continue to increase, vehicle transportation still contributes significantly to the air quality issues.

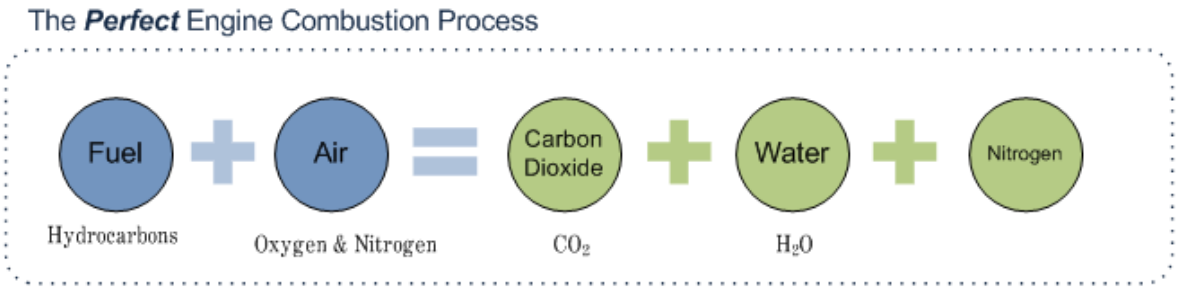
Sources of Auto Emissions

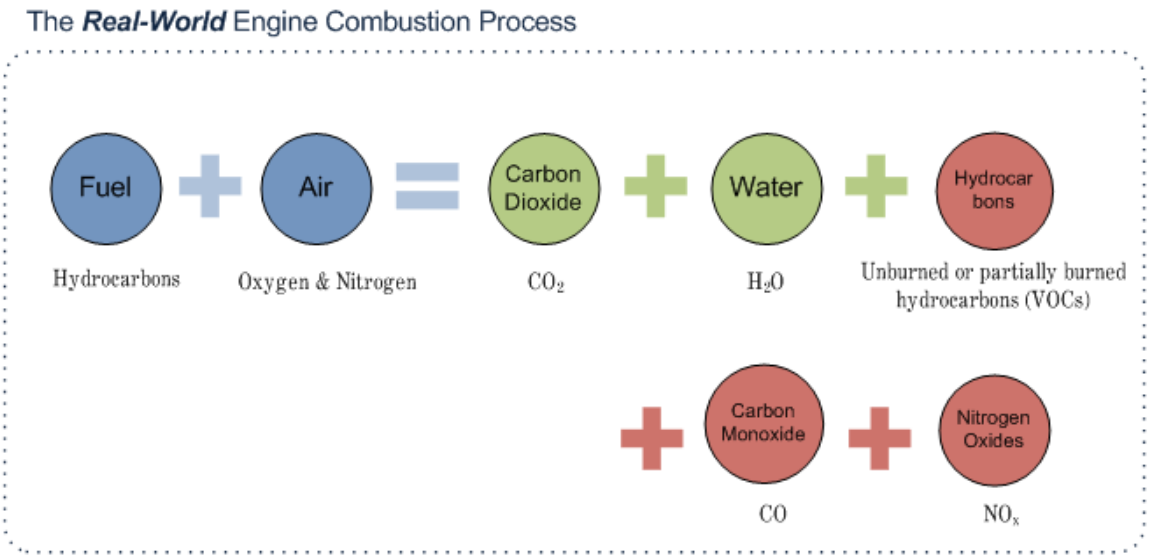
The power to move a car comes from burning fuel in an engine. Pollution from cars comes in three ways:

- By-products of the combustion process (tailpipe exhaust)
- Evaporation of fuel during the refuelling process
- From the vehicle fuel system.

The Combustion Process

Most vehicle fuels including gasoline, diesel, natural gas, and ethanol are mixtures of hydrocarbons. Hydrocarbons are compounds that contain hydrogen and carbon atoms. In a "perfect" engine, oxygen in the air would convert all of the hydrogen in fuel to water and all of the carbon in the fuel to carbon dioxide (carbon mixed with oxygen). Nitrogen in the air would remain unaffected. However the reality is the combustion process is not "perfect," and automotive engines emit several types of pollutants:





Exhaust Pollutants

- **Hydrocarbons (HC):** Hydrocarbon emissions result when fuel molecules in the engine do not burn or burn only partially. Hydrocarbons react in the presence of nitrogen oxides and sunlight to form ground-level ozone, a major component of smog. Ozone can irritate the eyes, damage lungs, and aggravate respiratory problems. It is our most widespread urban air pollution problem. Some kinds of exhaust hydrocarbons are also toxic, with the potential to cause cancer.

- **Nitrogen Oxides (NOx)**: Under the high pressure and high temperature conditions in an engine, nitrogen and oxygen atoms in the air we breathe react to form various nitrogen oxides, collectively known as NO_x. Nitrogen oxides, like hydrocarbons, are precursors to the formation of ozone. They also contribute to the formation of acid rain.

- **Carbon Monoxide (CO)**: Carbon monoxide is a product of incomplete combustion and occurs when carbon in the fuel is partially oxidized rather than fully oxidized to carbon dioxide. Carbon monoxide reduces the flow of oxygen in the bloodstream and is particularly dangerous to persons with heart disease.

- **Carbon Dioxide (CO_2)**: Carbon dioxide does not directly impair human health, but it is considered a "greenhouse gas". In other words, as it accumulates in the atmosphere, it is believed to trap the earth's heat and contribute to the potential for climate change.

Evaporative Emissions

- **Hydrocarbons**: Hydrocarbons also escape into the air through fuel evaporation. With today's efficient exhaust emission controls and today's clean burning gasoline formulations, evaporative losses can account for a majority of the total hydrocarbon pollution from current model cars on hot days when ozone levels are highest. Evaporative emissions occur from fuel vapors escaping from the fuel system or while the vehicle is being refuelled.

What Has Been Done to Control Automobile Emissions?

The original Clean Air Act of 1970 gave the U.S. EPA broad authority to regulate motor vehicle pollution, and the Agency's emission control policies and requirements have become progressively more stringent since then.

EPA standards dictate how much pollution automobiles may emit per mile they are driven, and the automotive engineers and scientists decide how best to achieve these limits. For example, the emission reductions of the 1970's were achieved because of fundamental improvements in engine design, plus the addition of charcoal canisters to collect hydrocarbon vapours and exhaust gas recirculation valves to reduce nitrogen oxides.

The advent of the "first generation" catalytic converters (or "catalysts") in 1975 significantly reduced hydrocarbon and carbon monoxide emissions. The use of converters provided a huge indirect benefit as well. At the time, gasoline contained lead ("leaded fuel") that reduced the effectiveness of catalysts, and as a result 1975 also saw the widespread introduction of "unleaded" gasoline. This resulted in dramatic reductions in ambient lead levels and alleviated many serious environmental and human health concerns associated with lead pollution.

The next major milestone in vehicle emission control technology came in 1980 and 1981. In response to tighter standards, manufacturers equipped new cars with even more sophisticated emission control systems. These systems generally included "three-way" catalyst (which converts carbon monoxide and hydrocarbons to carbon dioxide and water, and also helps change nitrogen oxides to elemental nitrogen and oxygen) plus the introduction of on-board computers, systems to better control fuel, and oxygen sensors. This equipment helped to further optimize the efficiency of the catalytic converter.

The 1990 Clean Air Act required manufacturers to further reduce vehicle tailpipe and evaporative emissions and to increase emissions control system durability. These requirements led to the use of more sophisticated on-board computers, widespread use of electronic fuel control, and new computerized diagnostic systems to notify drivers when an emissions control system may be malfunctioning.

Starting in 2004, vehicles emissions are again being reduced in compliance to EPA's Tier 2 emission standards. These standards require that all new vehicles achieve a 96-99% reduction (from pre-emissions control levels) in hydrocarbon, carbon monoxide and nitrogen oxide emissions, effectively eliminating almost all pollutants from today's vehicles.

How Much Does A Vehicle Emit?

What a vehicle emits depends on many factors, including the emission control system on the vehicle, the effectiveness of the control system, the way you drive, and the number of miles you drive.

Over the years manufacturers have designed vehicles and engines to reduce the amount of emissions emitted during its lifetime. A new 1965 car produced about a ton of smog-forming hydrocarbons during 100,000 miles of driving. Standards in the 1990's reduced new car emissions to about 50 pounds of hydrocarbons. By 2010, new cars will emit only about 10 pounds of hydrocarbons in 100,000 miles.

What Has Emission Control Meant for Air Quality?

Efforts by government and industry since 1970 have greatly reduced vehicle emissions. In those same years, however, the number of vehicles on the road and the number of miles we drive have more than doubled. The increase in vehicles and the number of miles driven not only leads to traffic congestion issues, but also offset some of the environmental benefit that the overall emissions reduction programs have achieved. In addition, the manner in which vehicles are driven, and things like poor vehicle maintenance or tampering with a vehicle's emission control devices can also take away from these reductions. In fact, a major portion of ozone-forming hydrocarbons can be attributed to a relatively small number of “super-dirty” cars that are poorly maintained and/or whose emission control systems are not working properly.

With much of this in mind and with ozone continuing to present urban air pollution problems, the U.S. EPA Tier 2 vehicle emission control programs emphasize extremely significant hydrocarbon and nitrogen oxide reductions. Consequently, the role that drivers and owners can play is becoming more important. By driving in a more responsible, eco-friendly manner, drivers can reduce the amount of fuel they use by up to 25%, as well as reduce the amount of emissions their vehicle produces. Drivers can also help by keeping their cars well maintained, their tires properly inflated, and by having their vehicle serviced if the vehicle's Malfunction Indicator Light comes on.

Health Impacts of Vehicle Exhaust

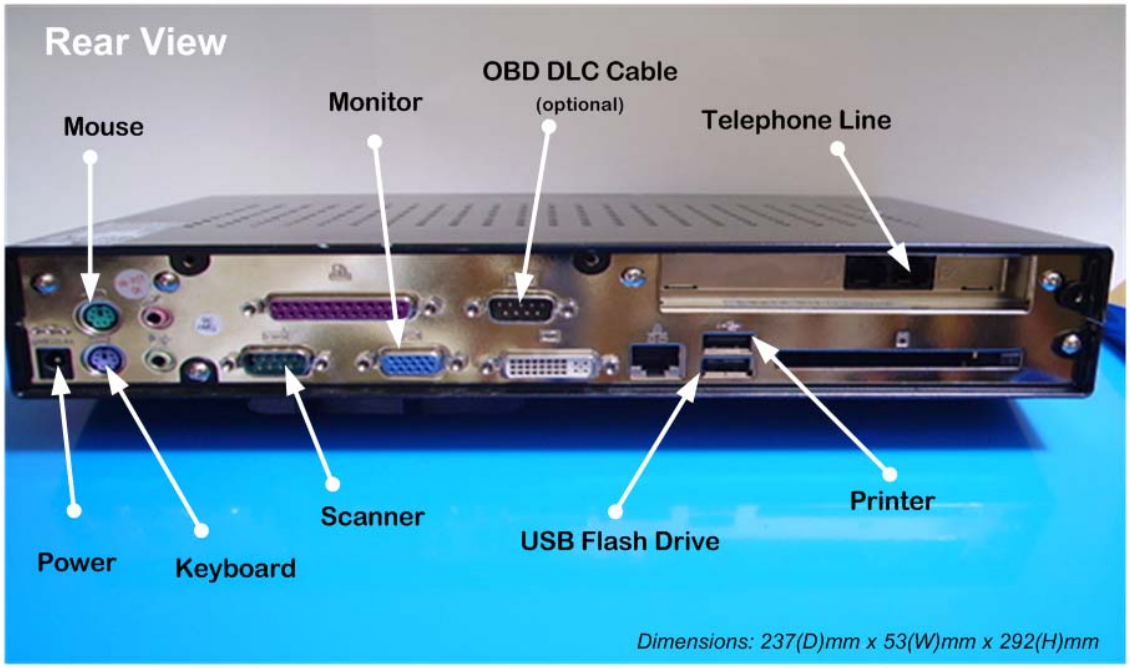
The most obvious health impact of vehicle emissions is on the respiratory and cardiovascular systems. Exposure to air pollutants can lead to increased susceptibility to respiratory infections, abnormal heart rhythms, and inflammation in arteries, veins, capillaries, and possibly even a heart attack.

Children and the elderly are sensitive groups that are at higher risk from air pollution, especially children with asthma or other lung diseases. The elderly and others with heart or lung diseases such as asthma and congestive heart failure are at high risk.

Symptoms to watch out for include coughing, wheezing, shortness of breath, chest tightness, chest pains, palpitations, and/or unusual fatigue.

Replacing the Analyzer

The BanaLogic BL–A100 analyzer has no user serviceable components. Removal of the analyzer enclosure or alterations of the analyzer in any way will void the manufacturer's warranty. In the event there is an issue with the analyzer that requires replacement, you will be shipped a new analyzer already configured with your station information. You will be provided with directions on how to return the broken analyzer. For additional information please refer to the "Need Help?" Online menu option from the main menu.



Never force connections. Most connections only fit in one direction, forcing will bend of break connections.

The following table shows a close-up diagram to help identify each of the connections:

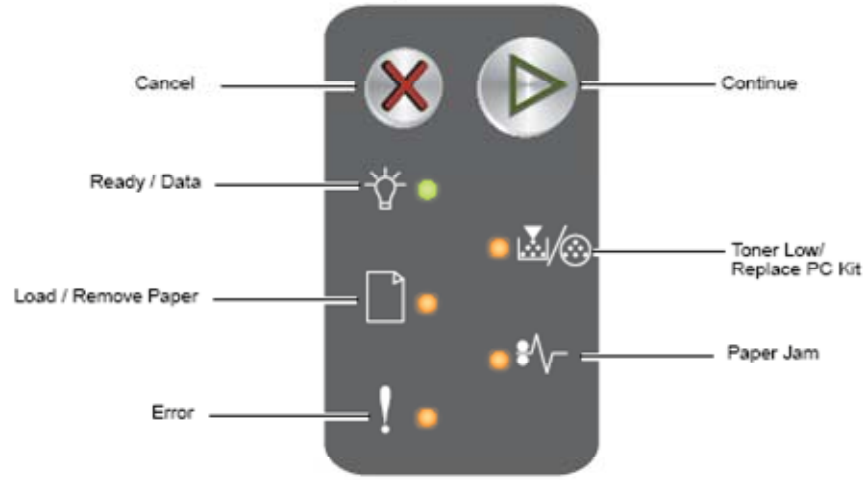
	Mouse & Keyboard Connectors
	Monitor Connection
	USB Printer Connection
	Phone Line Connection – may be a different color each as gray or white
	Serial Connection for hand scanner – likely to be gray in color

Trouble Shooting Printing Issues

The printer used is the Lexmark E120n. The following is the front-panel you will see on the printer.

The network model (Lexmark E120n) has six lights and two buttons.

Note: The Continue button also functions as a light on the E120n model.

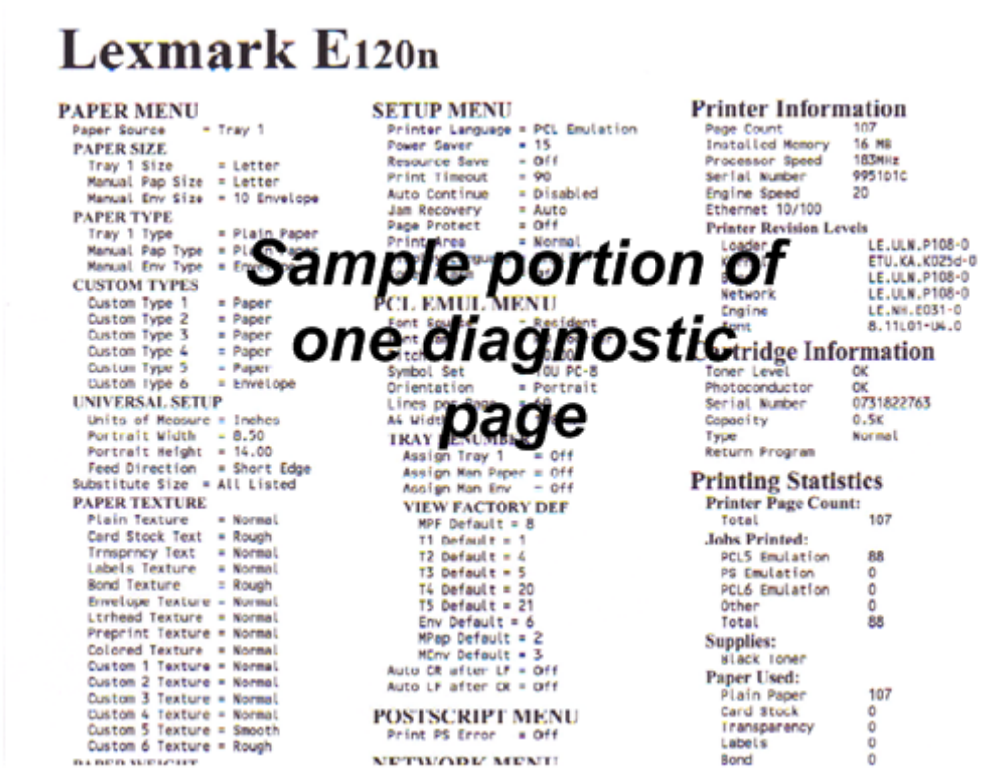


- Press and release Continue to resume printing.
- Press the Continue button from the Ready state to print menu and network setup pages.
- Press and release Cancel to cancel the current job.
- Press and hold Cancel until all lights come on to reset.

If you are experiencing printing issues check the front panel to see if any of the lights indicate further trouble.

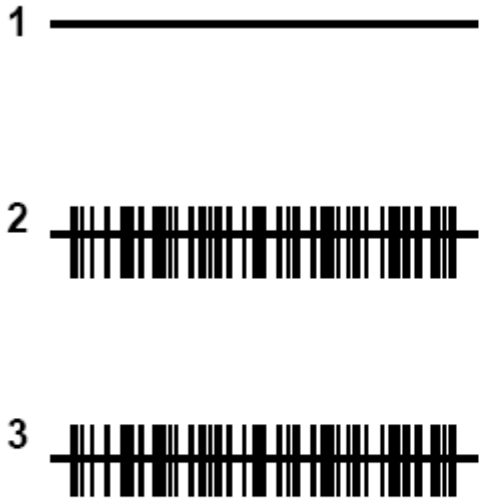
The printer manual from Lexmark to help diagnosis general printer problems can be found at: http://www.lexmark.com/publications/pdfs/2007/e120/ug_en.pdf

To test if printer is able to print at all, press the green arrow located on the top right of the above panel. This should print out two diagnostic pages. If this is unable to print (and all other orange lights are off) this may indicate a hardware issue with the printer.



Trouble Shooting Scanner Issues

How to use the Scanner



- Auto trigger activates the laser
- Place the laser line on the bar code
- Press the CodeGate button to transmit the data

Figure 10.

Reset Scanner Sequence

If your scanner is not functioning as expected, you may be directed by your support center to “reset” the scanner to factory defaults. It is accomplished by doing the following:

1. Power up the scanner
2. Scan the enter/exit configuration mode bar code (you will hear 3 beeps)
3. Scan the bar code to recall defaults (you will hear 1 beep)
4. Scan the enter/exit configuration mode bar code (you will hear 3 beeps) to save the new configuration.

Enter/Exit Configuration Mode

Recall Defaults

Connecting the Scanner