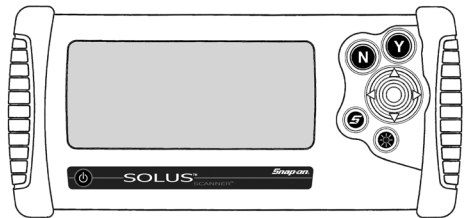
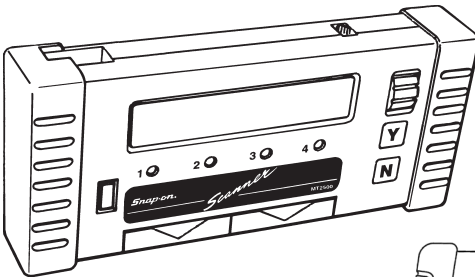
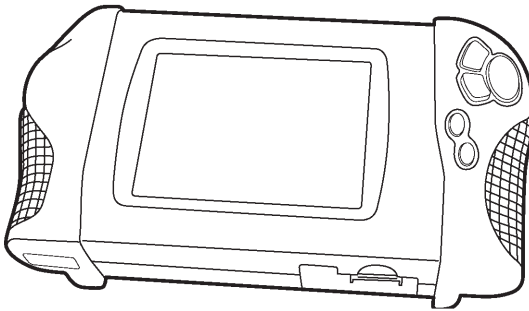


SEE APPLICABLE COVERAGE SHEETS FOR VEHICLE APPLICATIONS

Holden Vehicle Communication Manual

(Including Holden Astra, Barina and Vectra etc.)

July 2011



Snap-on[®]

Use in conjunction with the applicable Scanner User's Reference Manual
and Diagnostic Safety Manual.

**Before operating this unit, please read this manual
and any applicable Scanner User's Manual.**

Safety Notices Refer Diagnostic Safety Manual

Quick Reference Contents Listing ... page 5

**Using the Scanner Module Refer to relevant
User's Manual for
more information**

**Vehicles covered and systems covered in all sections of
software are available on the applicable coverage sheets.**

Holden Vehicle Communication Manual

(Including Holden Astra, Barina and Vectra etc.)

July 2011

**BEFORE OPERATING THIS UNIT,
PLEASE READ THIS MANUAL CAREFULLY,
ALSO PAY PARTICULAR ATTENTION TO THE SAFETY
PRECAUTIONS IN THIS MANUAL AND THE
DIAGNOSTIC SAFETY MANUAL.**

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The information, specifications, and illustrations in this manual are based on the latest information available at the time of publication. The tool manufacturer and the vehicle manufacturers reserve the right to make equipment changes at any time without notice.

All illustrations in this manual are for demonstration purposes only. They are representative images only. They do not portray actual situations and not intended for diagnostic use or actual testing.

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(Not applicable to Ethos)

Please refer to separate Key Code/BCM Linking Instructions for more information.

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Key Tips

Clearly read and implement all screens
– if in doubt re-read this Instruction Manual.

Part 1 – Vehicle Identification

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Holden Software Selection

Please refer to VCS Vehicle Communication Software Application Sheets located on the Operator's CD or in paper form in every kit for detailed information on where systems are covered.

Vehicle and System Identification – Holden Astra, Barina, Vectra etc Section

Note: This section is broken into two depending on year and holds all the Holden Astra, Barina, Calibra, Combo, Vectra and Zafira models.

The TK Barina and Viva are the exceptions which are located in the Holden not Astra section.

See applicable coverage sheets for full listing of specific systems covered by each section.

Export Vehicles Coverage

Australian built Holden manufactured vehicles that are exported are supported by this Holden software. This includes the following vehicles:

Vehicles supported

Lumina 3.8L 1998 – 2004

Lumina 5.7L 1999 – 2004

Caprice 5.7L 1999 – 2004

Systems supported

Engine*

Automatic Transmission

ABS (Anti-lock Brakes)

BCM (Body Control Module) (up to 2002)

Instrument Cluster (up to 2002)

ECC (Electronic Climate Control) (up to 2002)

Entering The Vehicle Identification

After you select the software, the SCANNER displays the following message (example):

```
SELECT MODEL YEAR
MODEL:
VEHICLE: 1985
ENGINE:
```

Entering the Vehicle Identification

Move the thumbpad or thumbwheel up or down to display the correct year for the vehicle you are testing. Then press **Y** to enter the model year. The display now shows the model year that you selected in the previous step and asks you to select the model name:

```
SELECT MODEL TYPE
MODEL: COMMODORE
VEHICLE: 1990
ENGINE:
```

Move the thumbpad or thumbwheel up or down and press **Y** to select the model name. The display now shows the model name that you selected in the previous step and asks you to select the engine displacement by pressing the thumbpad or thumbwheel up or down to the correct engine, some vehicles may only have one choice:

```
SELECT ENGINE DISPLACEMENT
MODEL: COMMODORE
VEHICLE: 1990
ENGINE: SCROLL TO SELECT ENGINE
```

Move the thumbpad or thumbwheel up or down and press **Y** to select the engine displacement. The display now shows the engine that you selected in the previous step.

Transmission and Air Conditioning Information

At the end of vehicle identification, the screen may display the complete model and engine identification, similar to this:

```
SELECT VEHICLE OPTIONS:
> A/T WITH A/C
  A/T WITHOUT A/C
  M/T WITH A/C
  M/T WITHOUT A/C
```

Scroll arrow to select correct option of vehicle being tested and press **Y**.

NOTE: A/T = Automatic Transmission
M/T = Manual Transmission
A/C = Air Conditioning

If the identification is correct, press **Y** to store the identification in memory. If the identification is not completely correct, press **N** to return to the start of the identification steps.

System Selection

For some vehicles, the SCANNER provides engine and transmission test capabilities. After you press **Y** to store the identification for these vehicles, the screen will display a message similar to this:

```
SELECT SYSTEM
ENGINE                ANTI-LOCK BRAKES
AUTO TRANS            AIRBAG (SRS)
```

Move the thumbpad or thumbwheel up or down to move the cursor to the desired system and press **Y**. The above display does not appear for vehicles without transmission tests.

SCANNER Connection Message

After you press **Y** to store the vehicle identification or after you select the engine or transmission system for testing, the screen display tells you how to connect the SCANNER to the vehicle. For example:

```
CONNECT DL-17 ADAPTER WITH S-9 KEY TO
17-PIN CONNECTOR UNDER RH DASH OR ON
LOWER RH DASH FACIA.
PRESS Y TO CONTINUE. OK TO RELEASE BUTTON.
```

After the SCANNER is connected to the vehicle, press **Y** to proceed to the MAIN MENU.

Part 2 – Vehicle Connection and Diagnostics

CAUTION FOR ABS AND SRS SYSTEMS

Before operating the SCANNER on airbag or ABS systems you need to be a competent airbag or ABS technician.

Before attempting any repairs on vehicles fitted with ABS or SRS Airbag systems observe all precautions the manufacturer specifies for these systems.

DO NOT RUN FUNCTIONAL TESTS FOR LONGER THAN 2 MINUTES. DO NOT LEAVE VEHICLE UNATTENDED DURING TESTS.

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Caution

CAUTION FOR ABS AND SRS SYSTEMS

Before operating the SCANNER on airbag or ABS systems you need to be a competent airbag or ABS technician.

Before attempting any repairs on vehicles fitted with ABS or SRS Airbag systems observe all precautions the manufacturer specifies for these systems.

Special Notes – Important Information

Note: Functional tests and key coding are not applicable to Ethos.

Slow to communicate

When the SCANNER is initiating communication with some vehicles it may take up to 10 seconds before codes or data is displayed on the screen. This is dependent on the vehicle being tested and not controlled by the SCANNER. Turn ignition on after connecting to vehicle and then press **Y** for next screen.

Actuator tests

When performing Actuator Tests make sure all of the on-screen instructions are followed precisely so that the test is performed correctly. Not following the procedures may produce faulty test results.

Reading Codes

When reading codes on the SCANNER – whether it is Live Data, Auto Code Read or Manual Code Read – and you are unsure about the code, try pulling a known sensor then running the code check again. Then see if the code has registered with the vehicle and been transmitted to the SCANNER correctly.

Data Refresh Rates

On some systems on Holden vehicles the rate at which live data information is updated on the screen can appear to be slow. This is normal for the communication type on these vehicles and is not a fault with the SCANNER.

DTC's (Codes) Set During Testing

On some Commodores, Calais, Ute & Statesman it is not uncommon for the engine, auto trans, ABS, BCM or even the SRS system to display DTC's related to "no theft deterrent signal" "loss of communication" or "no BCM response". These DTC's can be set during scan tool testing but do not represent a problem or fault. Clear the codes and recheck that they do not re-appear immediately. These DTC's are related to the communication *between* the various system ECU's on the vehicle.

Special Notes (cont.)

Automatic Transmission Trouble Codes

Applicable vehicles: Commodore, Calais, Statesman & Ute

Applicable models: VR 3.8L & 5.0L , VS 5.0L only.

When checking Diagnostic Trouble Codes (DTC's) for the Automatic Transmission's on these vehicles it is a characteristic of the vehicle that it will only transmit "current " DTC's to the SCANNER. That means if there is a fault present that has set a DTC, the DTC will only be displayed if the fault is still present at the time the SCANNER is communicating with the vehicle. This is a characteristic of the vehicle, not the SCANNER.

The Engine system will display any codes set whether they are current or not. It is good practice to check both Engine and A/trans codes when diagnosing the powertrain.

However any DTC's that are set will be recorded in **DTC HISTORY** and can be accessed using the SCANNER by selecting DTC HISTORY on the appropriate menu.

Graph Mode

Note that not all vehicle systems will be able to be displayed in the Graph Mode due to the communication type. It may also take several attempts to establish communication in Graph Mode. This is not a fault of the scan tool or the vehicle.

Using Graph Mode with VR, VS, VT, VX or VY series vehicles:

The ABS system on Commodore/Calais and Statesman does not support the use of Graph Mode due to the communication protocol of the ABS system itself.

Barina SB 1.2L CFI and 1.4L CFI

If when attempting to communicate with the 1.2L or 1.4L CFI (C12NZ or C14NZ, 1995 to '97) engines the SCANNER stays at the "IN PROGRESS" screen indefinitely, re-ID the vehicle as a 1994 model and attempt communication. The connector message may indicate to use the Opel-2 adaptor, but use the DL-16 adaptor with the S-7 key the same as the post 1995 models. If the "NO COMMUNICATION" message appears on screen follow normal no communication procedures.

Special Notes (cont.)

Apollo 2.2L & 3.0L and Nova 1.6L & 1.8L

Note: Side power using the battery power or cigarette power lead is required on these models when using Toyota-1 or Toyota-2 adaptors. No communication with engine running will occur without side power.

Barina SB 1.6L C16XE Engine

This C16XE Engine is a manual code system when using later style software. Refer to Connector Types in Connecting the Scanner section for bridging instructions.

Statesman & Ute VS V8 Automatic Transmission

During model year 1997 for these two vehicles the automatic transmission changed.

The data parameter "TCC ____ (ON/OFF) was deleted from the data parameter list. If a VS Statesman or VS Ute V8 is tested and the TCC (ON/OFF) parameter is displayed but does not appear to change when the TCC is engaged then check the TCC FDBK parameter and observe whether this changes when the TCC engages and disengages. If the TCC FDBK changes but the TCC (ON/OFF) does not then the TCC (ON/OFF) is not supported for that vehicle.

1998 and later models will not display this parameter in the data list.

Apollo Auto Trans

O/D SWITCH – must be on before starting tests on Apollo auto trans.

Starting Commodores

On some Commodores the vehicle may not start with the SCANNER leads connected. Remove these leads, start the vehicle and reconnect the leads. If a Code 31 appears (Theft Deterrent Signal missing) clear at conclusion of test.

No Start on Late Commodore and Captiva Models (Alloytec or Diesel Models)

Note: swapping Scanner systems or use of incorrect Scanner key can cause no start situations as vehicle goes into Theft Deterrent Mode. Switch off IGN and disconnect Scanner for approx. 30 minutes to reset.

Waiting Times

Sometimes the Scanner may need to wait for a period of time (eg 10 seconds) before pressing the **Y** or **N** button. These times must be followed as closely as possible or the function being performed may not occur.

Special Notes (cont.)

CAN-1B adapter

ONLY FOR VCI CARTRIDGE

(Not required for MODIS, SOLUS or SOLUS PRO)

When testing Holden Commodore/Statenman VZ/WL and VE/WM series CAN systems with a Scanner and VCI cartridge the CAN-1B adapter will need to be used. (MODIS and SOLUS do not require the CAN-1B as they have this function in-built.) When the CAN-1B adapter is used the Scanner will need to “download” an operating program to it to enable it to communicate with the vehicle being tested, this may take up to 30 seconds during which time the Scanner may appear to be inactive. This is normal operation with the CAN-1B adapter.

If more than 1 minute has passed and the Scanner is still displaying “IN PROGRESS” remove the adapter from the vehicle for 10 seconds, reinstall the adapter, re-ID the vehicle and re-attempt communication.

This download is required for each different system eg: Engine, A/Trans etc. Follow Scanner on-screen instructions informing you to disconnect the CAN-1B adapter from the vehicle’s diagnostic socket and reconnect before entering new system to be checked. Failure to do this will produce incorrect readings.

What is CAN?

Controller Area Network, or CAN for short, is a system employed when multiple electronic controllers are used and they need to share information. It is used in many different areas apart from automotive applications. It is however becoming popular among the automotive manufacturers and is appearing on more vehicles. In order for a scan tool to communicate with the CAN system it must become part of the CAN system, so a special adapter is used as an “interface” between the vehicle and the scan tool.

CAN-1B & Vehicle Low Battery Voltage

If the Scanner with VCI cartridge and CAN-1B adapter are being used on a vehicle where the vehicle battery may not be at full charge and the vehicle is started the vehicle system voltage may drop low and cause the CAN-1B adapter to reset and lose the download program. It may cause the Scanner to appear to be “frozen” or not updating data information. To recommence communication exit to the MAIN MENU for the vehicle being tested and reselect TEST MENU. Then select CODES or DATA, this will reprogram the CAN-1B adapter (which can take up to 30 seconds) and recommence communication.

Service Indicator Resetting Procedures

The following vehicles can have their service indicators manually reset by doing the following procedures.

HOLDEN TS ASTRA

- Switch ignition OFF.
- Press and hold down the trip meter reset button.
- Turn the ignition ON and keep the button held down (approx. 2 seconds) until the flashing 'InSP' changes to '—' in the display.
- Release the reset button.
Odometer and trip meter will then reappear.

HOLDEN VT / VX SERIES

- Turn ignition off.
- Hold down the UP and DOWN buttons of the trip computer.
- Turn the ignition on while still holding down both buttons.
- Release the buttons after 3 seconds (RESET will be flashing).
- Press the MODE button until the service due screen appears on the LCD (usually 1 press).
- Hold down the UP and DOWN buttons for greater than 3 seconds until a beep is heard.
- Release both buttons.
- Turn ignition off then on again.

HOLDEN VY/VZ SERIES

- Turn ignition off.
- Hold down the UP and DOWN buttons of the trip computer.
- Turn the ignition on while holding down both buttons.
The UP and DOWN buttons must be held for 2 seconds after the ignition is turned on.
The active reset reminder is displayed.
- To reset the displayed service reminder, press and hold the set button for 3 seconds. A confirmation beep sounds upon reset.

Connecting the SCANNER to the Vehicle

This section of the manual gives you drawings of the vehicle diagnostic connectors and tells you which adapter to use. The carmakers are listed alphabetically for quick-reference.

After you identify the vehicle, the SCANNER display tells you where to find the diagnostic connector and which vehicle adapter to use.

Connect the test adapter to the vehicle — Use the specific vehicle connector information displayed on the screen and in this section for connector location and hookup.

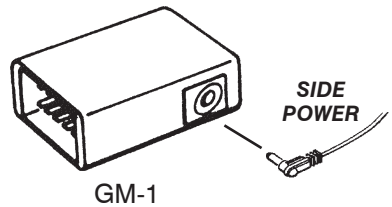
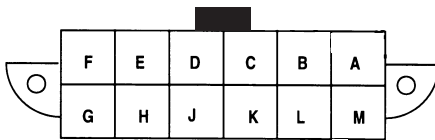
Connect the power cable to the vehicle — (*Not* required when using the DL-16 adapter.) Plug the cigarette lighter power cable into the vehicle lighter or attach the battery power cable.

Turn ignition on after connecting to vehicle and then press **Y** for next screen.

CAUTION: Ensure vehicle identification as entered on the SCANNER is same as the vehicle connected to the SCANNER. Ensure correct adaptor is connected to correct vehicle pins as failure to observe above can damage the diagnostic test equipment and the cost of repairs is not covered by warranty.

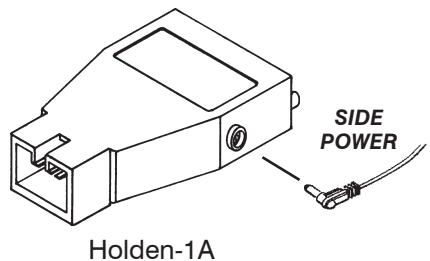
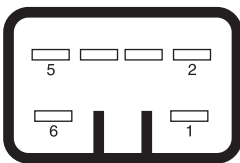
Connector Types

Holden vehicles use seven types of diagnostic connectors as detailed below. Refer to SCANNER connector message for connector locations.



12-pin connector can be located under the dash board or for Astra LD under the front passenger seat.

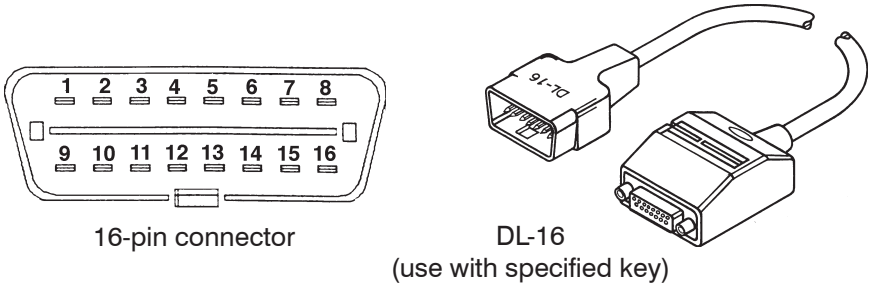
Figure 3:1 Use GM-1.



VN & VP series Commodore, 6-pin connector located under left side dash.

Figure 3:2 Use Holden-1A.

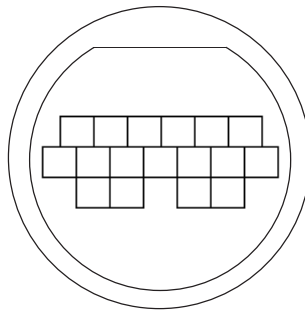
Connector Types



16-pin connector

DL-16
(use with specified key)

Figure 3:3 Use DL-16 with specified key.

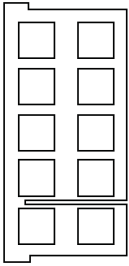


17-pin connector

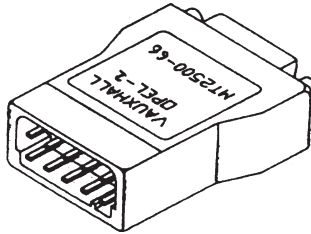
17-pin connector on Apollo JM/JP located under right side dash above brake pedal with a grey cap and word DIAGNOSTIC on it.

Side power to adaptor must be used.

Connector Types

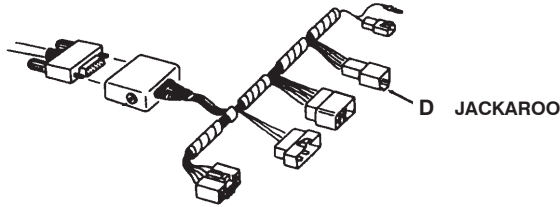


10-pin connector



Vauxhall/Opel-2

Figure 3:5 Use Opel-2.



Multi-2

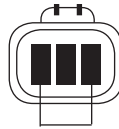
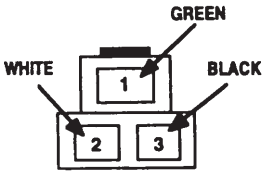


Figure 3:6 Use Multi-2-D 3-pin connector with battery power cable to side of adapter.

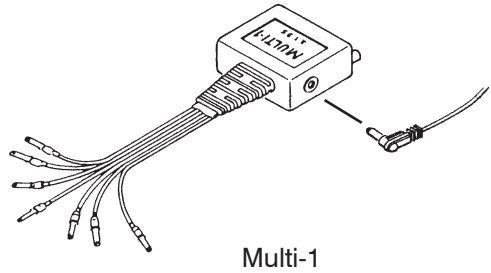
Jackaroo Automatic Transmission 1992 – 1995

To connect the SCANNER to this system the Multi-2 along with the Dae-1 must be used. They are connected to a GREEN 3 pin connector located behind the right hand side of the console near the heater. The connector is on the end of a loom and may be tucked behind ducting.

Connector Types



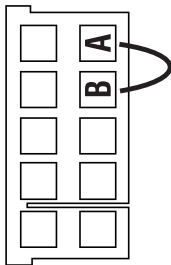
(Use multi-1 and white terminal converters.)



3-pin connector on Rodeo & Jackaroo 2.6L

Figure 3:7 Use Multi-1.

Barina SB 1.6L C16XE Engine Manual Code Connector Bridging



Bridge A and B terminals as per Scanner instructions.

Entering Late Model Commodore Identification

When entering the vehicle identification once the vehicle is entered there will be several choices, for example:

```
SELECT MODEL TYPE      HOLDEN
MODEL:   COMMODORE VS
VEHICLE: 1996
ENGINE:
```

Pressing **Y** here will allow selection for the systems for that vehicle, for example:

```
SELECT   ENGINE DISPLACEMENT
MODEL:   COMMODORE VS
VEHICLE: 1996
ENGINE:  (SCROLL FOR OPTIONS)
```

Then when scrolling (by pressing thumbpad up or down):

```
SELECT   ENGINE DISPLACEMENT
MODEL:   COMMODORE VS
VEHICLE: 1996
ENGINE:  3.8L ENGINE & A/TRANS
```

Select **Y** at above for the Engine and A/Trans systems.

```
SELECT   ENGINE DISPLACEMENT
MODEL:   COMMODORE VS
VEHICLE: 1996
ENGINE:  3.8L DTC HISTORY
```

Select **Y** at above for the Engine and A/Trans DTC History.

```
SELECT   ENGINE DISPLACEMENT
MODEL:   COMMODORE VS
VEHICLE: 1996
ENGINE:  3.8L ABS, SRS & BCM
```

Select **Y** at above for the ABS, SRS (Airbag) and BCM (Body Control Module) systems.

Some models may have more selections, ensure the correct option is selected for the system to be tested.

Holden Aust. and Vectra, Astra, Barina, Calibra Software Selection

– Engine and Auto Transmission

The SCANNER supports Live Codes & Data, Auto Code Read and Manual Code Read for Holden engines and automatic transmissions. For Commodores/Calais/Ute 3.8L & 5.0L VR, VS, VT, VTII & VY Statesman 3.8L & 5.0L VR, VS, WH & WK the SCANNER supports **DTC History** for engine and automatic transmission. See later in this section for details.

For vehicle that use a Powertrain Control Module (PCM) the SCANNER will list engine and auto trans as separate menu selections *BUT* DTC History has only one selection and is applicable to both engine and auto trans.

Live Codes and Data

For live Codes & Data vehicles there are four different Engine and Automatic Transmission test menus' available. The SCANNER will automatically display the correct one for the vehicle being tested. An example of each follows:

Type 1:

```
MAIN MENU—ENGINE
>CODES & DATA
CUSTOM SETUP
FUNCTIONAL TESTS*
```

(* Not all vehicles have this option)

Type 2:

```
MAIN MENU—ENGINE          OTHER SYSTEMS
>CODES ONLY                DATA (NO CODES)
CUSTOM SETUP
FUNCTIONAL TESTS*
```

(* Not all vehicles have this option)

Type 3:

MAIN MENU—ENGINE	OTHER SYSTEMS
>TEST MENU	
CUSTOM SETUP	

Type 4:

MAIN MENU—ENGINE	OTHER SYSTEMS
>CODE FUNCTIONS	DATA (NO CODES)
CUSTOM SETUP	

Type 1: Codes & Data

Depending on whether the engine or transmission system is selected the SCANNER will display engine or transmission data together with any engine or transmission codes transmitted by the vehicle on the screen. Any codes that are present are displayed, along with its description, at the top of the on-screen data list, if there are no codes present the SCANNER will display (NO CODES PRESENT). For descriptions and explanations of the various data parameters displayed see part 5 of this manual.

NOTE: When a code is transmitted by the vehicle to the SCANNER the code will indicate there may be a problem either in the indicated sensor/actuator or in the WIRING for that sensor/actuator.

A sample of a screen display with no codes present.

```
RPM___825 O2 (mV)___898 INTEGRATR__102
**   CODES & DATA.   OK TO DRIVE.   **
(NO CODES PRESENT)
OPEN/CLSD LOOP__CLSD O2 STATUS__RICH
```

Sample of a screen display with codes present.

```
RPM___825 O2 (mV)___898 INTEGRATR__102
**   CODES & DATA.   OK TO DRIVE.   **
22 THROTTLE POSITION (TP) SENSOR
33 MAP SENSOR HIGH
OPEN/CLSD LOOP__CLSD O2 STATUS__RICH
```

CAUTION: It is strongly recommended that, after viewing “Codes only” or “Codes & Data”, you view and take note of “DTC History/Code History” before clearing any codes (if vehicle system is supported).

Type 2: Codes Only and Data (No Codes) Menu

The type 2 menu is similar to the Codes & Data menu except that Codes are displayed separately to the Data.

CODES ONLY

This selection will display any codes transmitted by the vehicle. All codes are displayed with the codes number and description.

CAUTION: It is strongly recommended that, after viewing “Codes only” or “Codes & Data”, you view and take note of “DTC History/Code History” before clearing any codes (if vehicle system is supported).

NOTE: When a code is transmitted by the vehicle to the SCANNER the code will indicate there may be a problem either in the indicated sensor/actuator or in the WIRING for that sensor/actuator.

DATA (NO CODES)

This selection displays engine or transmission data that is transmitted to the SCANNER by the vehicle. For descriptions and explanations of the various parameters displayed see the Australian Data Parameter manual.

Type 3: Codes and Data Test Menu

```
MAIN MENU—ENGINE          OTHER SYSTEMS
>TEST MENU
CUSTOM SETUP
```

When type 3 TEST MENU is selected, the SCANNER will then display another menu similar to the following examples.

```
TEST MENU
>CODES ONLY                DATA (NO CODES)
O2 MONITORS*              FREEZE FRAME*
PENDING CODES*
```

(* Not all vehicles have these options)

CODES ONLY

This selection will display any codes transmitted by the vehicle. All codes are displayed with the codes number and description.

NOTE: When a code is transmitted by the vehicle to the SCANNER the code will indicate there may be a problem either in the indicated sensor/actuator or in the WIRING for that sensor/actuator.

CAUTION: It is strongly recommended that, after viewing “Codes only” or “Codes & Data”, you view and take note of “DTC History/Code History” before clearing any codes (if vehicle system is supported).

DATA (NO CODES)

This selection displays engine or transmission data that is transmitted to the SCANNER by the vehicle. Some transmission systems do not have this selection. For descriptions and explanations of the various parameters see the Australian Data Parameter manual.

O2 MONITORS

This option allows access to 9 different tests that look at various ways the Oxygen Sensor is working. Not every vehicle supports all of the tests. Refer to the OBD-II and EOBD Vehicle Communication Manual for specific information on these tests.

FREEZE FRAME

When the first DTC or Diagnostic Trouble Code is set the PCM will log various data parameters from the engine data list. These parameters can assist in determining what may have set the DTC. If there are no DTC's set then there is no Freeze Frame data recorded by the PCM.

PENDING CODES

This selection will display any pending codes transmitted by the vehicle. Pending codes are set by operating conditions are not within normal range and that have not met all the criteria for setting a code. For example some sensor readings not within normal range may require a specific number of drive cycles , engine running time or engine operating before they set a code.

NOTE: When a code is transmitted by the vehicle to the SCANNER the code will indicate there may be a problem either in the indicated sensor/actuator or in the WIRING for that sensor/actuator.

Type 4:

Vehicles with this type of menu selection will have Auto Code Read in the CODE FUNCTION selection and DATA (NO CODES) will display engine data only with no codes. No transmission data is available on these systems.

MAIN MENU—ENGINE
>CODE FUNCTIONS
CUSTOM SETUP

OTHER SYSTEMS
DATA (NO CODES)

For descriptions and explanations of the various parameters see the Australian Data Parameter manual.

The DATA (NO CODES) selection will display engine data that is transmitted to the SCANNER by the vehicle.

Functional and Actuator Tests (Not applicable to Ethos)

The SCANNER supports actuator or functional tests for some live data vehicles, there are various tests available under this menu option. The tests available for each vehicle is dependent on what tests that vehicle supports, *not every vehicle supports every Functional Test.*

The SCANNER provides on screen instructions on how to perform the tests. Some tests are performed with the ignition on and some with the engine running, follow the on screen prompts to perform the tests available for the vehicle being tested.

During testing you must monitor the selected actuator/solenoid with a meter or by listening for actuator/solenoid activation. The engine controller does not monitor the selected actuator/solenoid. A completed test does not mean the actuator/solenoid was activated. The SCANNER can only monitor the engine controller ON/OFF commands to the actuator/solenoid.

Engine Functional Tests 3.8L & 5.0L Commodore/Calais/Ute/Statesman/Monaro

Note: During these functional tests the SCANNER on-screen instructions may indicate to scroll thumbwheel up or down. Using the MODIS/SOLUS this is done by pressing the thumbpad up or down. If the on-screen instructions indicate to scroll ½ a turn, do this on the MODIS/SOLUS by pressing the thumbpad approximately 5 times in the applicable direction.

Commodore engine or Powertrain Control Modules (PCM) from VR onwards are capable of bi-directional communications with a scan tool. This allows the scan tool to override the regular PCM controls (under certain conditions) and command actuators to function or resets to be performed.

CAUTION:

**DO NOT RUN THESE TESTS FOR LONGER THAN 2 MINUTES.
DO NOT LEAVE VEHICLE UNATTENDED DURING TESTS.**

A mix of 6 Functional Tests are supported on the Holden software for the 3.8L and 5.0L engines:

FUEL PUMP RELAY	(VR to VY)
ENGINE FAN	(VR 3.8L only)
LOW ENGINE FAN	(VS to VY)
HIGH ENGINE FAN	(VS to VY)
RESET IDLE AIR CONTROL (IAC)	(VR to VY)
RESET FUEL TRIM CELLS	(VR to VY)

Note that not all vehicles support all tests.

Fuel Pump Relay and Fan Tests

The Fuel Pump Relay and Fan tests control the ON and OFF command to the fuel pump relay or radiator cooling fan/s. These tests can be performed with the engine running or with just the ignition ON.

Once the test has been entered the thumbpad or thumbwheel is used to turn the actuator on and off. When testing VT/VX/VY models ensure the MODIS/SOLUS thumbpad is pressed approximately 5 times in the applicable direction. If the test is not activated re-try pressing the thumbpad.

NOTE: even though the ON of OFF command has been sent to an actuator it doesn't mean the actuator has actually switched. Confirm the operation of the actuator by listening to it or checking with a voltmeter. Ensure the vehicle ignition is switched off for 5 seconds between each test to allow the PCM to reset.

Note that on VR and VS series models the fuel pump is also controlled by the oil pressure switch. If the fuel pump relay is commanded OFF while the engine is running the oil pressure switch will enable the fuel pump to continue running and therefore the engine will continue to run. On VT, VX and VY models if the engine is running and the fuel pump relay is switched off the engine will stop running.

Reset Idle Air Control (IAC)

The Reset Idle Air Control (IAC) motor is used to reset the IAC by setting it to "0 steps" momentarily. This will need to be done after cleaning the throttle body or if the IAC motor is "out of step" with the PCM commands. Once the reset has been initiated it will continue to reset until the test is exited and the ignition cycled off and on again. On MODIS/SOLUS when testing VT/VX/VY models ensure the thumbpad is pressed approximately 5 times in the applicable direction. If the test is not activated re-try pressing the thumbpad.

Reset Fuel Trim Cells

The Reset Fuel Trim Cells is used to reset the PCM's learned long-term fuel correction. For example this may need to be reset if the PCM has been receiving incorrect information from faulty sensors and the engine is running too lean or rich.

Follow the onscreen directions when performing the test. Once the reset has been sent to the PCM the ignition will need to be turned off for 5 seconds and the engine started again before the Cells are set to zero. The long-term fuel trim is indicted by the long-term fuel trim parameters including LT FUEL TRIM(%), LT FUEL-L(%) & LT FUEL-R(%), LT DELTA (%). These readings will return to 0 after the reset. Refer "Data (No Codes)" on SCANNER. Some vehicles have one long term trim reading while others have left and right banks as separate readings.

When testing VT/VX/VY models ensure the thumbpad is pressed approximately 5 times in the applicable direction. If the test is not activated because "Data (No Codes)" is not displaying 0, then perform test again.

Automatic Transmission Functional Tests 3.8L & 5.0L Commodore/Calais/Ute/Statesman/Monaro

Note: During these functional tests the SCANNER on-screen instructions may indicate to scroll thumbwheel up or down. Using the MODIS/SOLUS this is done by pressing the thumbpad up or down. If the on-screen instructions indicate to scroll ½ a turn, do this on the MODIS/SOLUS by pressing the thumbpad approximately 5 times in the applicable direction.

Commodore Powertrain Control Modules (PCM) from VR onwards are capable of bi-directional communications with a scan tool. This allows the scan tool to override the regular PCM controls (under certain conditions) and command actuators to function or resets to be performed.

CAUTION:

**DO NOT RUN THESE TESTS FOR LONGER THAN 2 MINUTES.
DO NOT LEAVE VEHICLE UNATTENDED DURING TESTS.**

Functional tests that control the transmission solenoids are supported on this software for the 3.8L and 5.0L auto trans:

SHIFT SOLENOID A	(VR to VY)
SHIFT SOLENOID B	(VR to VY)
SHIFT SOLENOID A & B	(VR to VY)
TCC SOLENOID	(VR to VY)
TCC PWM SOLENOID	(VT to VY)
PRESS CONTROL SOL (XX to XX)	(VR to VY)

Note that not all vehicles support all tests.

Special Note

Some VR model 3.8L & 5.0L PCM's and some VS 5.0L model PCM's, including Commodore, Calais, Statesman and Ute do not support all of the functional tests. **This is not determined by the SCANNER; the vehicle itself does not support the test.**

Shift Solenoid A, B, A & B Tests

These shift solenoid tests control the ON and OFF command to the shift solenoids. These tests are to be performed with the ignition ON and the engine OFF.

Once the test has been entered the thumbpad or thumbwheel is used to turn the solenoid/s on and off. When testing VT/VX/VY models ensure the thumbpad on MODIS and SOLUS is pressed approximately 5 times in the applicable direction. If the test is not activated re-try pressing the thumbpad.

NOTE: even though the ON of OFF command has been sent to a solenoid it doesn't mean the solenoid has actually switched. Confirm the operation of the solenoid by listening to it or checking with a voltmeter. Note that a solenoid can be switched on and off but it still may be physically blocked preventing oil flow. Ensure the vehicle ignition is switched off for 5 seconds between each test to allow the PCM to reset.

TCC & TCC PWM Solenoid Tests

The Torque Converter Control (TCC) solenoid tests control the ON and OFF command to the TCC and the TCC PWM (Pulse Width Modulation) solenoids. These tests are to be performed with the ignition ON and the engine OFF.

Once the test has been entered the thumbpad or thumbwheel is used to turn the solenoid/s on and off. When testing VT/VX/VY models ensure the thumbpad on MODIS and SOLUS is pressed approximately 5 times in the applicable direction. If the test is not activated re-try pressing the thumbpad.

NOTE: even though the ON of OFF command has been sent to a solenoid it doesn't mean the solenoid has actually switched. Confirm the operation of the solenoid by listening to it or checking with a voltmeter. Note that a solenoid can be switched on and off but it still may be physically blocked preventing oil flow.

Ensure the vehicle ignition is switched off for 5 seconds between each test to allow the PCM to reset.

Pressure Control Solenoid Tests

The Pressure Control Solenoid (PCS) tests control the variable pressure command to the pressure control solenoid. The pressure is varied when the amperage supplied to the solenoid is varied. The higher the amperage the lower the pressure, the lower the amperage the higher the pressure.

CAUTION:

**DO NOT RUN THESE TESTS FOR LONGER THAN 2 MINUTES.
DO NOT LEAVE VEHICLE UNATTENDED DURING TESTS.
APPLY THE BRAKES DURING TESTING TO AVOID VEHICLE
MOVEMENT.**

The tests are separated into lots of two amperage commands. These tests are to be performed with the ignition ON and the engine RUNNING.

Once the test has been entered the thumbpad or thumbwheel is used to vary the amperage between the higher and lower value. When testing VT/VX/VY models ensure the thumbpad on MODIS and SOLUS is pressed approximately 5 times in the applicable direction. If the amperage command does not change try pressing the thumbpad again.

NOTE: The actual amperage commanded and achieved by the transmission can vary by up to 50 mA. Also the PCM on some vehicles will not allow the pressure to go above or below certain values, for example; you may be commanding 0 mAmps from the SCANNER but the commanded and actual amperage on the vehicle will not fall below 150 mAmps. This varies between models and vehicles being tested. A pressure gauge can be installed to the transmission during testing to confirm that the transmission pressure is being controlled by the pressure control solenoid.

Ensure the vehicle ignition is switched off for 5 seconds between each test to allow the PCM to reset.

DTC History

Note: DTC History is only supported by certain vehicles. With vehicles that have this option, it allows the SCANNER to display a history of up to 4 DTC's (Diagnostic Trouble Codes) that may have been stored in the vehicles Engine and Automatic Transmission Powertrain Control Module (PCM). DTC History information is stored when a Diagnostic Trouble Code (DTC) is set in the PCM. DTC (or code) History will display certain information from some engine data parameters that is saved when the code is set. DTC History is the same for Engine and Automatic Transmissions.

DTC HISTORY will display the 4 most recent DTC's set, including any "stalls" that occurred. If a 5th DTC is set the 1st DTC set will be replaced by the 5th DTC, eg it will only display the 4 most recently set DTC's. It can also display "STALL DATA", this is information that is saved at the time the engine stalled. Note that stall data is usually shown as code 99 on the Scanner.

If any stall data is displayed then only a maximum of 3 history codes will be displayed.

When any DTC History information is set the dash mounted check engine light will not be illuminated.

Clearing DTC History

The SCANNER will clear DTC History if the Clear Codes option is present on the Exit Menu. For Example:

```
RESUME  
PRINT SCREEN      > CLEAR ECU CODES  
PRINT FRAME  
ARM MOVIE          [PRESS N FOR MAIN MENU]
```

Do not clear any codes unless the DTC code History has been checked.

Checking the DTC History VR to VT

DTC History is selected as a separate choice once a vehicle has been selected. DTC History will display DTC history for engine and automatic transmission codes. Connect the SCANNER to the vehicle and check the DTC History, follow the ID instructions for connector location and adaptor to use (DL-16 adaptor and S-16 key).

The Main Menu for DTC History is the same as for Engine except there is no DATA option. The DTC History information can be read by the SCANNER or printed out for later reference.

Referring to the typical screen display, note that the 3rd code set is a "Stall" and the 4th code has no code set, it is showing 0 for the code and the parameter readings. Some vehicles may not have any History codes set at all. If some of the parameters show "255" for their value this means that they have reached their maximum measurement, they were most probably set quite a while ago, eg at least 255 ignition cycles ago. Using an average of 2 ignition cycles a day that works out to 125 days ago. An ignition cycle is a key start by the driver, some vehicle's may be started more and some less.

Typical DTC History screen:

CODE HISTORY	
1ST CODE SET _____	41
ENGINE RPM _____	750
IGN CYCLES SINCE SET _____	5
TIME WHEN FIRST SET _____	26:30
2ND CODE SET _____	31
ENGINE RPM _____	2350
IGN CYCLES SINCE SET _____	2
TIME WHEN FIRST SET _____	7:45
3RD CODE SET _____	99
ENGINE RPM _____	350
IGN CYCLES SINCE SET _____	1
TIME WHEN FIRST SET _____	0:35
4TH CODE SET _____	0
ENGINE RPM _____	0
IGN CYCLES SINCE SET _____	0
TIME WHEN FIRST SET _____	0

The DTC definitions are listed in the Diagnostic Trouble Codes manual.

Checking the DTC History (Legacy software only) – 3.8L (non-Supercharged) VX/VY, VU, WHII only

When testing DTC History on VT/VX & VY model Commodores, WHII or WK Statesman or VU/VY Ute the codes are made up of 5 digit DTC numbers. The format of the DTC History is the same as for the VR/VS and VT models except the actual code number is shown as two parameters.

The DTC number will appear on the screen as follows:

1ST CODE SET: P_1	18
ENGINE RPM_____0	COOLANT (°C)____35
TIMES SET_____2	LPG FUEL TYPE__NO
IGN CYCLES SINCE	SET_____10
TIME FROM ENGINE	START_____1:35
2ND CODE SET: P_0	0
ENGINE RPM_____0	COOLANT (°C)____-40
TIMES SET_____0	LPG FUEL TYPE__NO
IGN CYCLES SINCE	SET_____0
TIME FROM ENGINE	START_____0:00
3RD CODE SET: P18	70
ENGINE RPM_____0	COOLANT (°C)____35
TIMES SET_____2	LPG FUEL TYPE__NO
IGN CYCLES SINCE	SET_____10
TIME FROM ENGINE	START_____1:35
4TH CODE: P_0	0
ENGINE RPM_____0	COOLANT (°C)____-40
TIMES SET_____2	LPG FUEL TYPE__NO
IGN CYCLES SINCE	SET_____00
TIME FROM ENGINE	START_____0:00

There is two codes set in the above sample, the first code set is P0118, this is derived from putting together the 2 numbers on the row named "1ST CODE SET". "P0" is shown as "P_" the SCANNER displays the zero as an underscore. So in putting P_1 and 18 together code P0118 is arrived at. Check the rear of this manual for the code description.

The data listed directly underneath this code is the value of these parameters when the code was initially set, the engine RPM was 0, the coolant temp was 35°C, it has been set 2 times, the vehicle was on petrol (not LPG if fitted) at the time, it was set 10 ignition cycles ago and the engine had been running for 1 minute and 35 seconds when the code was initially set.

The 2nd code set is displayed in the "3rd CODE SET" line. The codes can appear in any of the 4 positions, if a code set is shown as zeros then there is no code set in that position. Looking at the 3RD CODE SET line the code is "P18" and "70", this becomes code P1870.

When no code is set then "P_0 and 0 are displayed on the code line, also the COOLANT (°C) will display -40 (this is a default value from the PCM).

Clearing DTC History

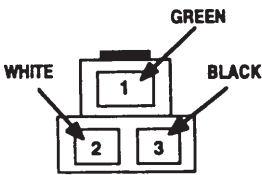
On some vehicles the History Codes can be cleared by using the Clear ECU Codes option on the DTC History datalist exit menu.

Warning: Clearing the DTC History may also clear any current Engine and Automatic Transmission codes.

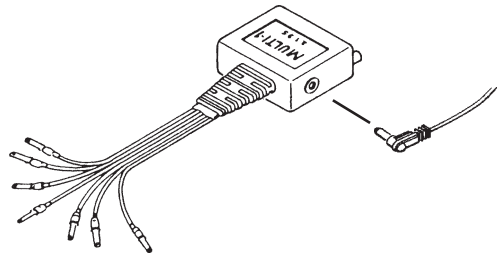
Auto Code Read

For Auto Code Read vehicles the SCANNER will read and display any fault present codes on the screen.

Rodeo & Jackaroo – Multi-1 hookup



(Use multi-1 and white terminal converters.)



Apollo Auto Trans

Important: For these vehicles ensure the “O/D OFF” switch is not engaged and the “O/D OFF” lamp is not illuminated.

Manual Code Read

Note: On some Manual Code systems the SCANNER may display on-screen instructions.

How To Get Codes

The HOW TO GET CODES function is available from the CODE FUNCTIONS MENU. Simply move the cursor to this function and press **Y** to select it. This function provides specific vehicle information for activating and reading the ECU trouble codes. For example:

```
FIND SQUARE CHECK CONNECTOR IN R-SIDE OF  
ENGINE COMPARTMENT. JUMPER PINS E1 TO T.  
KEY ON, ENGINE OFF. ENGINE LAMP FLASHES  
CODES. CODE TYPE 09 (TENS/ONES).
```

Refer to “Reading Different Code Types” for connector and code lamp location drawings and for descriptions of the various code types.

Reading Different Code Types

Depending on the vehicle type, the scanner may be connected to the vehicle ECU for automatic code reading, or you may have to read codes visually by observing a flashing lamp or flashing LED's. You can use MANUAL CODE ENTRY when the AUTO CODE READ function is not available or when you prefer to enter a code manually. SCANNER connection instructions for *automatic* code reading are displayed on the screen at the end of the vehicle identification sequence. This section provides code gathering instructions and descriptions of the various code types found during *manual* code entry.

Different types of code pulse patterns are used by different carmakers. The code type used depends on the vehicle. When a vehicle has indicator lamps or LED's that flash trouble codes, the SCANNER gives you the code type used for the vehicle you are testing. The following pages of this manual describe in detail the code types that can be read visually.

Code Type 05 — Piazza

Code type 05 flashes a 2-digit (tens/ones) CHECK ENGINE warning lamp code, figure 3-9. Code 12 is always displayed first to indicate proper operation of the self-diagnosis system.

You can read code type 05 visually on Piazza models by connecting two test leads together, figure 3-11. Then, with the key on and engine off, observe the flashing lamp on the dash.

The lamp flashes each digit as 0.4-second pulses, with 1.2 seconds between each digit. If more than one code is present, the lamp will remain off for 3.2 seconds and then indicate the next code. Each code (including code 12) is flashed three times, before proceeding to the next code. This cycle repeats until the system is reset.

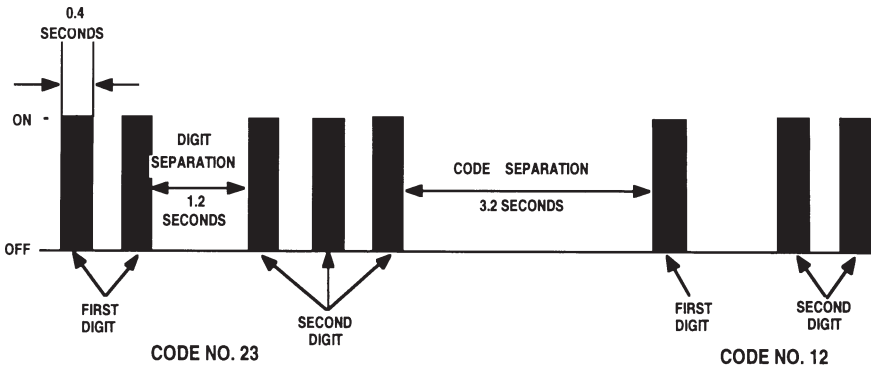


Figure 3-9

Used on:

CODE TYPE 05

Piazza

Pattern:

10's and 1's

Read codes on:

CHECK ENGINE lamp

Start codes by:

Piazza — Connect two test leads together and turn ignition on.

When done:

Turn ignition off, disconnect connectors, clear codes

Code 12 always appears first. Each code repeats three times, including code 12. Code display cycle repeats as long as system is in diagnostic state.

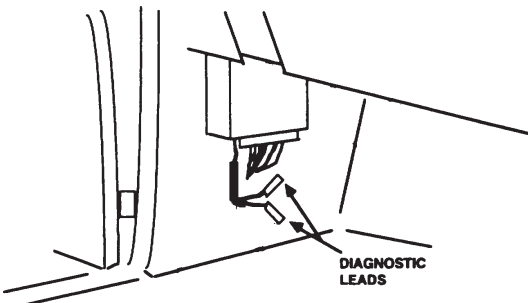
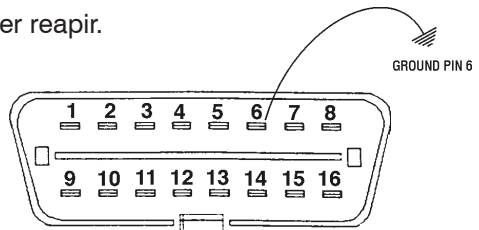


Figure 3-11.
Connect two test leads together to flash codes on Piazza models.

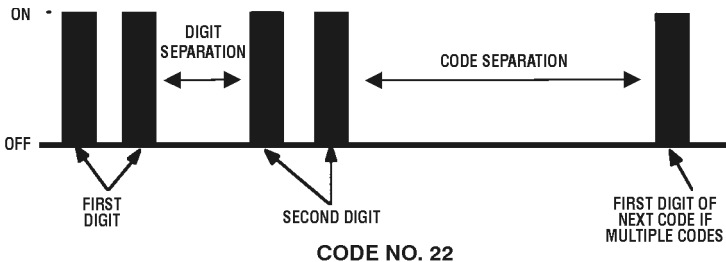
SB Barina 1.6L X16XE 1996-2000 Engine Codes Manual Procedure

This model engine codes can be accessed manually by carrying out the following procedure and counting the check engine light flashes in the instrument cluster.

- Ensure ignition is switched OFF.
- Ground data link connector (DLC) terminals 6 as per below diagram.
- Switch ignition ON.
- Trouble codes will be displayed in groups of flashes as displayed below.
- Count check engine light flashes and record trouble codes and refer to below table.
- To clear trouble codes after repair.



16-pin connector



SB Barina 1.6L X16XE 1996-2000 Engine Trouble Code List

13	O2 SENSOR OPEN CKT	35	IDLE SPEED CONTROL FAULT
14	COOLANT SENSOR VOLTS LO	41	EST LINE COIL 2+3 VOLTS HIGH
15	COOLANT SENSOR VOLTS HI	42	EST LINE COIL 1+4 VOLTS HIGH
16	KNOCK SENSOR OPEN CKT	44	O2 SENSOR LEAN MIXTURE
17	FUEL INJ CKT (S)	45	O2 SENSOR RICH MIXTURE
18	KNOCK FILTER MODULE	49	BATTERY VOLTS HIGH
19	INCORRECT RPM SIGNAL	51	ECU FAULT
21	TPS VOLTS HIGH	55	ECU FAULT
22	TPS VOLTS LOW	63	EST LINE COIL 2+3 VOLTS LOW
24	NO VEHICLE SPEED SIGNAL	64	EST LINE COIL 1+4 VOLTS LOW
29	FUEL PUMP RELAY VOLTS LOW	75	TORQUE CONTROL VOLTS LOW
32	FUEL PUMP RELAY VOLTS HIGH	76	CONTINUOUS TORQUE CONTROL
33	MAP SENSOR VOLTS HIGH	92	HALL SENSOR CKT
34	MAP SENSOR VOLTS LOW	93	QUAD DRIVER MODULE (QDM)

Code Types 07 — Commodore VL

The control systems that output code type 7 are placed in the diagnostic, code-display, mode by activating a rotary switch on the ECU. The ECU will then flash the codes on the two LED's, figure 3-13. These cars flash the first digit on the red LED (10's digit). The second digit flashes on the green LED (1's digit). For example: RED—RED—pause—GREEN—GREEN—GREEN indicates code 23.

To read Nissan codes manually, you must follow the appropriate diagnostic procedure. Failure to follow the procedure may result in misreading codes or inaccurate diagnosis. The Nissan control systems are placed in the diagnostic, code-display, mode as explained in the following sections.

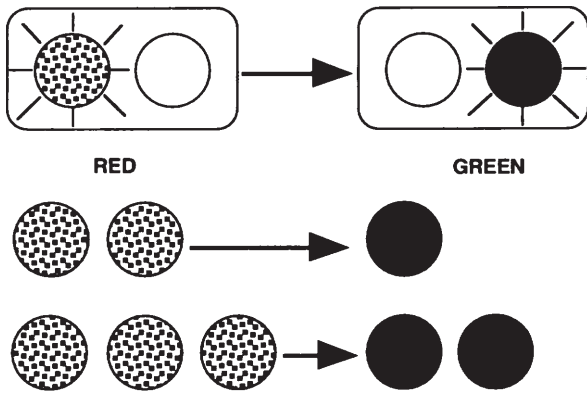


Figure 3-13

Used on:

Pattern:

Read codes on:

Start codes by:

When done:

CODE TYPE 07

Commodore VL

10's and 1's

Red (10's) and green (1's) LED's on ECU

Follow appropriate diagnostic code reading procedure

Turn ignition off, turn diagnostic switch counterclockwise, clear codes

Code 44 or 55 is pass code (system OK) for cars with A/C. Code 31 may be pass code for cars without A/C.

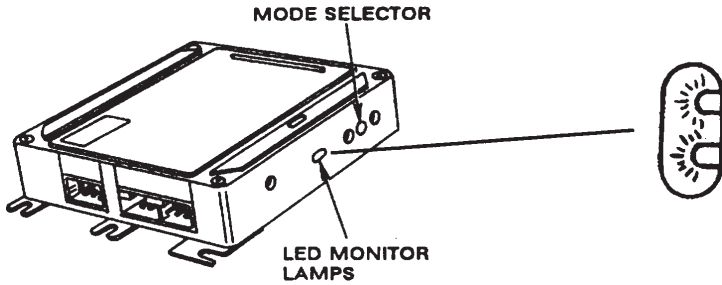


Figure 3-15. Two mode and five mode systems that output code type 7a are placed in the diagnostic mode by activating a switch on the ECU.

Diagnostic Code Reading — Two Mode System, Code Type 7

These cars do not have a connector for scanner hookup. To display codes on the flashing LED or lamp, the ECU must be in the diagnostic mode. Perform diagnostic code reading for these models as follows:

1. Locate the ECU below the glove box on the passenger side toe board.
2. Turn the ignition on; do not start the engine. Verify that the LED and the CHECK ENGINE lamp light briefly for a bulb check. If either does not light, follow carmaker diagnostic procedures to correct the problem before proceeding farther.
3. Turn the diagnostic selector switch on the ECU fully *clockwise*.
4. Wait at least two seconds.
5. Turn the diagnostic selector switch on the ECU fully *counterclockwise*.
6. Count the long-and-short flashes of the LED or the CHECK ENGINE lamp. For example: LONG—LONG—LONG—pause—SHORT—SHORT indicates code 32. Any codes present will flash one time each.
7. Write down any codes present.
8. Clear codes by turning the diagnostic selector switch on the ECU fully *clockwise*. Wait two seconds then repeat steps 5 and 6 to verify that no more codes are present.
9. Turn the ignition off.

Code Type 09 — Apollo JK and JL, and Nova LF

See 'Apollo Transmission' for manually gathering transmission codes.

To manually gather engine codes from these vehicles, you install a bridge between two terminals in a diagnostic connector and observe a flashing lamp on the dash, figure 3-17. Type 09 flashes a 2-digit (tens/ones) CHECK ENGINE lamp code, figure 3-18. The lamp flashes each digit as 0.5-second pulses, with 1.5 seconds between digits. If more than one code is present, the light will remain off for 2.5 seconds and then indicate the next code. After all codes have been displayed, there is a 4.5-second pause and the sequence is repeated. Continuous flashing indicates that the system is normal, and no trouble codes are present.

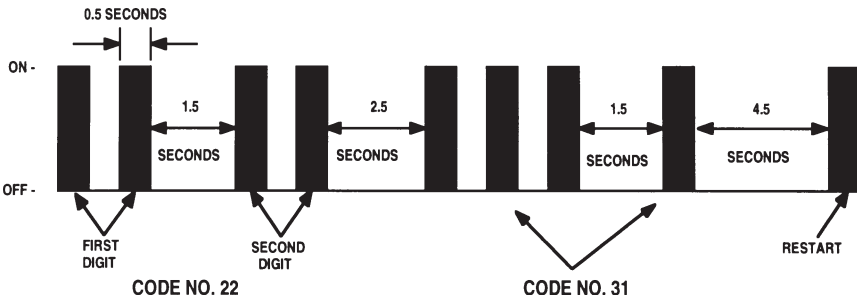


Figure 3-18

CODE TYPE 09

Used on:

Apollo JK & JL and Nova

Pattern:

10's and 1's

Read codes on:

CHECK ENGINE lamp

Start codes by:

Install bridge between two terminals in a diagnostic connector and turn ignition on

When done:

Turn ignition off, remove bridge, clear codes

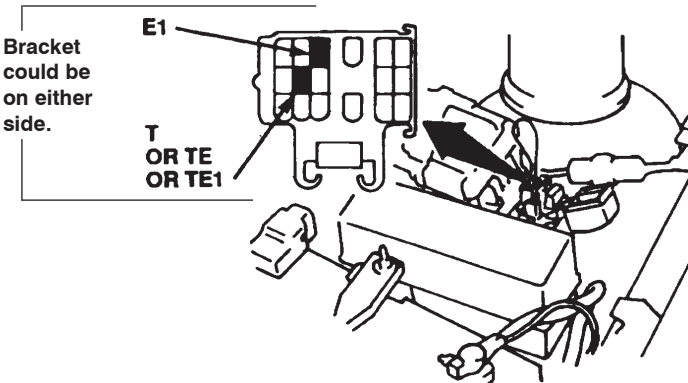


Figure 3-17. Apollo JK and JL and Nova diagnostic connectors for visual code reading.

Using the Codes & Data Menu Tests for Eng & A/T : 5.7L & Rodeo etc and Holden VZ Eng & A/Trans 2006 CAN models

Codes Submenu Selection

The SCANNER displays a CODES submenu from the CODES & DATA MENU that includes the following selections:

- Engine/Trans Trouble Code Information – VZ/WL 3.6L CAN vehicles
- History Codes
- Freeze Frame (5.7L only)
- MIL, SVS, or Message Requested
- Last Test Failed
- Test Failed Since Code Cleared
- Failed This Ignition
- DTC Status (5.7L only)

ENGINE/TRANS TROUBLE CODE INFORMATION

This selection allows you to view current DTC's stored in control module.

HISTORY CODES – VZ/WL 3.6L Series CAN vehicles

HISTORY CODES (inc current) – Except VZ/WL 3.6L CAN vehicles

The HISTORY selection allows you to view history (and current DTC's except VZ/WL CAN) stored in control module memory since the last time DTC's were cleared. When you press Y to enter this mode, the SCANNER displays a screen similar to the following:

```

                                CODE LIST
** CODES & DATA. OK TO DRIVE. **
P0122 TP SENSOR OR APP SENSOR 1 CKT SHRT
*** END OF LIST ***

```

If there are no codes, the SCANNER displays:

```

                                CODE LIST
** CODES & DATA. OK TO DRIVE. **
                                (NO CODES PRESENT)
*** END OF LIST ***

```

FREEZE FRAME (5.7L only)

The FREEZE FRAME selection allows you to view the Freeze Frame and Failure Records associated with a particular diagnostic trouble code (DTC). Freeze Frame and Failure Records include stored values of selected data parameters at the time a DTC sets. When you press **Y** to enter this mode, the SCANNER displays a list of any set DTC's:

```
CHOOSE A FAILURE RECORD OR FREEZE FRAME:
> P1406 (FREEZE FRAME)
  P1406
  P1577
  P1376
```

A DTC followed by “(FREEZE FRAME)” indicates an emissions-related DTC that meets OBD-II (see OBD-II and EOBD Vehicle Communication Manual for details) freeze frame requirements. A DTC *not* followed by “(FREEZE FRAME)” indicates either a non-emissions related DTC, or an emissions-related DTC that has not yet met the OBD-II defined freeze frame requirements.

Select a Freeze Frame or Failure Record, and the SCANNER briefly displays:

```
PLEASE WAIT WHILE THE CORRESPONDING
FREEZE FRAME/FAILURE RECORD DATA
IS LOADED . . .
```

Then the SCANNER displays:

```
FREEZE FRAME/FAILURE RECORD DATA
** CODES & DATA. OK TO DRIVE. **
P0201 CYLINDER 1 - INJECTOR CKT PROBLEM
ENGINE LOAD (%) _____0    COOLANT (°C) _____100
```

MIL SVS OR MESSAGE REQUESTED

The MIL SVS or MESSAGE REQUESTED selection allows you to view DTC's that are currently turning on the MIL or SVS lamp, or displaying a message on the Message Console. Selecting CLEAR CODES from the Exit Menu clears the DTC's from this selection. When you press **Y** to enter this mode, the SCANNER displays a screen similar to the following (if DTC's are stored):

```
                CODE LIST
** CODES & DATA. OK TO DRIVE. **
P0122 TP SENSOR OR APP SENSOR 1 CKT SHRT
*** END OF LIST ***
```

If no DTC's are stored, the SCANNER displays:

```
                CODE LIST
** CODES & DATA. OK TO DRIVE. **
                (NO CODES PRESENT)
*** END OF LIST ***
```

FAILED THIS IGNITION

The FAILED THIS IGNITION selection allows you to view DTC's that set during the current ignition cycle. Selecting CLEAR CODES from the Exit Menu clears the DTC's from this selection. When you press **Y** to enter this mode, the SCANNER displays a screen similar to the following (if DTC's are stored):

```
                CODE LIST
** CODES & DATA. OK TO DRIVE. **
P0122 TP SENSOR OR APP SENSOR 1 CKT SHRT
*** END OF LIST ***
```

If not DTC's are stored, the SCANNER displays:

```
                CODE LIST
** CODES & DATA. OK TO DRIVE. **
                (NO CODES PRESENT)
*** END OF LIST ***
```

DTC STATUS (5.7L only)

The DTC STATUS selection allows you to quickly check on the status of the OBD-II (see OBD-II and EOBD Vehicle Communication Manual for details) test(s) associated with a particular diagnostic trouble code (DTC). You can also use this selection to check DTC test status and verify your DTC-related repairs. Use the DTC listing at the end of this supplement as reference.

When you press **Y** to enter this mode, the SCANNER first displays a screen prompting you to enter the DTC:

```
DTC STATUS
SCROLL IN DESIRED TROUBLE CODE TO TEST
*** P0000 ***
```

Move the thumbpad or thumbwheel up or down to select the correct number; press **Y** to move the cursor to the next digit to the right. If you enter a DTC not supported by the vehicle, a screen appears like the following:

```
DTC STATUS
SCROLL IN DESIRED TROUBLE CODE TO TEST
*** P1976 ***
THIS VEHICLE DOES NOT SUPPORT THIS DTC!!
```

If you enter a DTC supported by the vehicle, the SCANNER displays a screen like the following:

```
P0201 CYLINDER 1 - INJECTION CKT PROBLEM
THIS IGNITION CYCLE ____ RAN & FAILED
LAST TEST ____ FAILED SINCE CLEAR ____ NOT RUN
HISTORY ____ YES MIL OR SVS REQ ____ YES
```

The first line displays the DTC definition. The next three lines include five information fields:

- **THIS IGNITION CYCLE** – Indicates the OBD-II test status related to the selected DTC. The SCANNER can display four possible results: RAN & FAILED, RAN & PASSED, NOT RUN, and RAN & INT (INT = Intermittent). RAN & INT means the test was inconclusive and must be repeated.
- **LAST TEST** – Indicates the results of the last DTC-related test(s). The SCANNER can display PASSED or FAILED.
- **SINCE CLEAR** – Indicates the test status since the DTC was last cleared. The SCANNER can display PASSED, FAILED, or NOT RUN.
- **HISTORY** – Indicates whether the PCM has stored a history code. The SCANNER can display YES or NO. Typically, if this reads YES, a FREEZE FRAME or FAILURE RECORD will be available for that DTC.
- **MIL OR SVS REQ** – Indicates the PCM command status to the Malfunction Indicator Lamp or Service Vehicle Soon Request lamp the last time the DTC set. The SCANNER can display YES or NO. YES means the PCM commanded the lamp ON.

Functional Tests for Eng & A/T : 5.7L & Rodeo etc and Holden VZ Eng & A/Trans 2006 CAN models

Note: During these functional tests the SCANNER on-screen instructions may indicate to scroll thumbwheel up or down. Using the MODIS/SOLUS this is done by pressing the thumbpad up or down. If the on-screen instructions indicate to scroll ½ a turn, do this on the MODIS/SOLUS by pressing the thumbpad approximately 5 times in the applicable direction.

On certain models, GM have interactive bi-directional functional tests. Because there are many of these tests, it is not practical to describe them all. However, they can be grouped into general test categories:

- Valve and solenoid ON/OFF tests
- Gauge, lamp, and relay ON/OFF tests
- Transmission shift tests
- Torque converter tests
- Injector tests
- Engine operating mode tests (loop status and cruise mode)
- Spark, EGR, and timing tests
- Adaptive memory resets

Functional Test Selection

Select FUNCTIONAL TESTS from the Main Menu and the SCANNER displays the Functional Test menu:

```
SELECT TEST MODE. PRESS Y TO CONTINUE.  
> CALIBRATION P/N  
VIN  
CANISTER PURSE DUTY CYCLE (%)
```

As you scroll through the Functional Tests menu, the cursor moves to the bottom line and stays there. Other test selections will move into position on the bottom line and then move up the screen with continued scrolling.

WARNING: Do not enter any functional test while driving a vehicle on a road test, unless the specific test requires you to do so. PCM changes to ignition timing, fuel delivery, and other engine, transmission, and suspension functions may affect engine operation and vehicle control.

After finishing a test press **N** to return to the FUNCTIONAL TEST menu.

Functional Test Operation

Functional test operation will vary, depending on the test. There are four general types of functional test operation:

- **Informational Tests** – These are read-only types of tests. For instance, when you select VIN from FUNCTIONAL TESTS, the SCANNER displays the VIN number.
- **Toggle Tests** – These tests toggle a component, such as a solenoid, relay, or switch, between two states. The words ON/OFF, OPEN/CLSD, or ENAB/DISA may be used to name the component states.
- **Variable Control Tests** – These tests command a certain value for a system or component. For instance, the DELTA SPARK RETARD(°) functional test allows you to vary spark timing in one-degree increments up to 10 degrees. The EGR(%) functional test allows you to vary the duty cycle of the EGR value from 0 to 100 percent.
- **Reset Tests** – These tests reset values stored in the PCM. For example, you can reset fuel trim values.

Toggle tests, variable control tests, and reset tests look very similar on the SCANNER display. For example, the fuel pump relay (on/off) functional test screen looks similar to the following:

```
FUEL PUMP RELAY (ON/OFF)
> ON   OFF   CHANGE DATA   PRESS N TO EXIT
  RPM _____ 850   TPS (V) _____ 1.25
  TPS (%) _____ 23   ADAPT SHIFT CNT _____ OFF
```

The first line of a functional test screen displays the test name. The second line lets you activate the test and select the data parameters you want to view. Toggle tests will have two test activation fields (ON/OFF, OPEN/CLSD, or ENAB/DISA), while variable control and reset tests will only have one (TEST). In addition, test navigation instructions are included on the second line (e.g. PRESS N TO EXIT, PRESS N TO TEST). The last two lines display the data parameters. Use the thumbpad to move the cursor from the test activation field(s) to the change data field. Before beginning a functional test you should select the data parameters you want to view. (See the Australian Data Parameter manual.)

Variable Control Tests – When you select TEST from a variable control test screen, the test activation field on the second line will change to a scrollable number. For example, the EGR (%) functional test screen looks similar to:

```
EGR (%)
>TEST    CHANGE DATA          PRESS N TO EXIT
RPM_____850          TPS (V)_____0.85
TPS (%) _____10    TPS NORM (%) _____10
```

Select TEST and the display changes to:

```
EGR (%) _____0
_____0          PRESS N TO EXIT
RPM_____850    TPS (V)_____0.85
TPS (%) _____10    TPS NORM (%) _____10
```

During a variable control test, you use the thumbpad or thumbwheel to increase or decrease the variable control value. In the above example, you scroll to instantaneously change the EGR valve opening by varying its duty cycle. The duty cycle you are commanding appears in the upper right corner of the screen. In this case, the SCANNER changes the duty cycle in increments of 10 percent.

NOTE: Some variable control tests require you to press **Y** each time you change the variable value (i.e. COMMAND GEAR).

After finishing a test press **N** to return to the FUNCTIONAL TEST menu.

Data Parameter Selection

Before beginning a functional test you should select the data parameters you want to view. Most functional tests allow you to view data parameters during the test. Select CHANGE DATA from a functional test screen and the last two lines of the display change similar to the following:

```
FUEL PUMP RELAY (ON/OFF)
ON   OFF   CHANGE DATA   PRESS N TO EXIT
> DATA LIST 1          DATA LIST 2
  DATA LIST 3          DATA LIST 4
```

Use the thumbpad or thumbwheel to move the cursor from one data list selection to another. Press **Y** to select the desired data list. The SCANNER will pause momentarily and then display the first two lines of the new data list.

While the SCANNER is in this mode, you can scroll through the selected list until the desired parameters are displayed. Press Y to exit the scrollable data list and return to the functional test. The parameters available and the data lists you select from will vary, depending on the vehicle. You can change data parameter selections during a test.

EGR Control

Since a proper functioning EGR system is crucial to preventing a vehicle from emitting high levels of NO_x, the EGR CONTROL test is described in detail here. This test is a bidirectional functional test available on some 1996 and later engines. In this test mode, the SCANNER commands the PCM to cycle the EGR valve open and closed at fixed intervals. This provides a functional test of EGR system operation.

Two versions of the EGR CONTROL test are available on vehicles with the necessary PCM communication capabilities. The tests vary slightly for each of the following two kinds of EGR valves:

- Integrated electronic EGR valve
- Digital EGR valve

Some engines that use these valves do not have PCM's with the communication functions required to perform the functional test. The EGR CONTROL test selection appears on the FUNCTIONAL TESTS menu only for those vehicles with the necessary capability.

The SCANNER displays the standard CODES & DATA data list during the EGR CONTROL tests, with slight differences explained in the following paragraphs.

Integrated Electronic EGR Valve – The integrated electronic EGR valve has a single built-in solenoid, which the PCM controls to open and close a vacuum vent for the valve. Press **Y** to select the EGR CONTROL test, and the SCANNER will display:

```
EGR SOLENOID SHOULD CYCLE. IF ENGINE IS
RUNNING, IDLE WILL BE SET TO 1500 RPM.
PRESS Y TO ENTER TEST. THEN PRESS
N TO EXIT.
```

Press **Y**, and the SCANNER displays a data list similar to CODES & DATA:

```
OFF      RPM      850 02 (mV)      689      INT      128
          ** EGR TEST. DO NOT DRIVE! **
.....
.....
```

The EGR valve will cycle on and off at regular intervals. As the valve cycles, the words OFF and ON will alternate in the upper left corner of the display. When the display indicates ON, the integral solenoid on the valve should be energized to close the vacuum vent, and the EGR valve should be open. Engine speed should drop as the valve opens.

Scroll to view the entire data list and check engine operation as desired. Press **N** to exit and return to the FUNCTIONAL TESTS menu.

Digital EGR Valve – The digital EGR valve has three solenoids that open and close different sized orifices in the valve. This EGR CONTROL test allows each solenoid to be controlled independently. Press **Y** to select the EGR CONTROL test, and the SCANNER will display:

```
EGR SOLENOID SHOULD CYCLE. IF ENGINE IS
RUNNING, IDLE WILL BE SET TO 1500 RPM.
PRESS Y TO ENTER TEST. THEN PRESS Y
FOR NEXT SOLENOID. PRESS N TO EXIT.
```

Press **Y**, and the Scanner displays a data list similar to CODES & DATA:

```
OFF   RPM   850 02 (mV) 689   INT   128
      ** EGR TEST. DO NOT DRIVE! **
.....
.....
```

When you enter the test, solenoid 1 will cycle on and off at regular intervals. As the solenoid opens, the word OFF in the upper left corner of the display will change to ON1. When the display indicates ON, the solenoid should be energized to open the first valve orifice. Engine speed should drop as the valve opens.

Press **Y** to test the second solenoid. The words in the top left of the display will alternate from OFF to ON2 as the PCM cycles the solenoid. Engine speed should drop as the valve opens.

Press **Y** to test the third solenoid. The words in the top left of the display now will alternate from OFF to ON3 as the solenoid cycles. Engine speed again should drop as the valve opens. Engine speed may drop enough when solenoid 3 opens to stall the engine.

Scroll while testing any solenoid to view the entire data list and check engine operation as desired. You can continue to press **Y** and cycle through all three solenoids as many times as necessary. Press **N** at any time to exit and return to the FUNCTIONAL TESTS menu.

SCANNER Communication During Functional Testing

If a functional test is your first selection from the MAIN MENU after connecting the Scanner to the vehicle or if communication stops because of a particular mode request (such as ROAD TEST – NO C&D), the SCANNER must establish communication with the PCM. If it has difficulty communicating, the following message will appear:

```
WAITING FOR MODULE TO COMMUNICATE WITH  
SCANNER. CONNECT ALDL CONNECTOR.  
TURN KEY ON.
```

If the Scanner has already established communication with the PCM, the message will not appear.

If communication is interrupted during testing, but power remains connected, the Scanner displays this message:

```
NO COMMUNICATION. IS KEY ON? IS DLC  
CONNECTED? WAIT 15 SECONDS. PRESS N TO  
REENTER VEHICLE IDENTIFICATION, OR  
SEE REFERENCE MANUAL "APPENDIX A".
```

This could happen, for example, if the diagnostic link connector (DLC) is loosened or the ignition is turned off. This message stays on the screen until communication is established, or until **N** is pressed. When communication is established, the SCANNER will go to the selected function.

If the identification is correct, disconnect the SCANNER and check the vehicle connector for damaged terminals or open wiring. The inability of the SCANNER to communicate with the vehicle also may indicate a basic PCM failure.

If communication is established, but it does not match what the SCANNER is looking for, the SCANNER displays:

```
COMMUNICATION MISMATCH.  
PRESS N TO REENTER VEHICLE ID,  
OR PRES Y TO CONTINUE.
```

This typically occurs if the vehicle is improperly identified, or if the selected module has the wrong PROM installed.

Clear Codes for Engine and Auto Trans

Clear codes is available on most Live Data Holden engines, it is accessed from the CODES & DATA or CODES ONLY exit menu.

Please Note: VN & VP Commodores, Statesman VQ, Ute VG, Camira & Astra engines do not support electronic clear codes from a scan tool, remove battery power to clear codes.

For Auto Code Read and Manual Code Read vehicles clear code instructions are detailed in the CODE FUNCTIONS menu.

ABS (Anti-lock Brake System) and Traction Control (ABS/ETC)

Warning:

Diagnosis and repair of the ABS system should be carried out by qualified personnel using appropriate workshop manuals and using the precautions detailed by the manufacturer of the vehicle.

The SCANNER has ABS tests for selected vehicles as per coverage listing.

These vehicles have live data for the ABS and can communicate with the SCANNER to transmit fault codes and live data.

The Traction Control is part of the ABS system, when entering the identification the SCANNER will ask if the vehicle is fitted with traction control.

Testing the ABS and TC system

The ABS and TC is selected from the “ANTI-LOCK BRAKES” menu. Accessing the ABS and TC codes and data is through the 16-pin diagnostic connector using the DL -16 adaptor. Always follow the on-screen instructions.

Important Note

It is normal for the ABS and TRAC dash lamps to be illuminated while the SCANNER is communicating with the ABS and TC system. When these lamps are illuminated it indicates the ABS and TC will not be operative although normal braking will still occur. Some vehicles may indicate an “ABS fault” has occurred, but this is only because the scan tool is communicating with the vehicle’s ABS system. After completing ABS diagnosis and disconnection of the scan tool, this “fault” will disappear once ignition is cycled.

Codes Only

Some vehicles may have CODES ONLY for ABS. The CODES ONLY option will display only codes. The codes are displayed with several items of data that is recorded when the code is set, this code information is referred to as DTC History. These extra items of data can assist in fault finding the ABS system. The extra items of data appear after the particular code.

An example of a Codes Only screen without any codes set:

```
ABS CODES & DATA
*** RECEIVING VEHICLE DATA ***
(NO CODES PRESENT)
```

An example of a Codes Only screen with two codes set:

```
ABS CODES & DATA
*** RECEIVING VEHICLE DATA ***
(SCROLL FOR ABS CODES)
27 LF WHEEL SPEED SENSOR CONTINUITY
CONDITONS AT TIME OF ABOVE FAULT CODE:
BRAKE SW      OFF      STRTS SINCE CODE      1
ABS STATE     OFF      VEH SPEED (KPH)      22
23 RF WHEEL SPEED SENSOR CONTINUITY
CONDITIONS AT TIME OF ABOVE FAULT CODE:
BRAKE SW      ON       STRTS SINCE CODE      8
ABS STATE     OFF      VEH SPEED (KPH)      69
```

Codes And Data

The ABS Main Menu has “CODES & DATA” as the test option.

Please note: it is normal for the ABS and TRAC dash lamps to be illuminated while the SCANNER is communicating with the ABS and TC system. When these lamps are illuminated it indicates the ABS and TC will not be operative although normal braking will still occur.

The CODES & DATA option displays Data and Codes. The codes are displayed with several items of data that is recorded when the code is set, this code information is referred to as DTC History. These extra items of data can assist in fault finding the ABS system. The extra items of data appear **after** the particular code and all code information is displayed **after** the data list.

An example of a Codes & Data list without any codes set:

```

          ABS CODES & DATA
*** RECEIVING VEHICLE DATA ***
(NO CODES PRESENT)
ECU ID ___XXXXXX   BRAKE SWITCH _____ OFF
LF WHEEL(KPH) ___0   RF WHEEL (KPH) _____ 0
LR WHEEL(KPH) ___0   RR WHEEL (KPH) _____ 0
PUMP _____ OFF   VALVE RELAY _____ OPEN

```

An example of a Codes & Data list with two codes set:

```

          ABS CODES & DATA
*** RECEIVING VEHICLE DATA ***
(SCROLL FOR ABS CODES)
ECU ID ___XXXXXX   BRAKE SWITCH _____ OFF
LF WHEEL(KPH) ___0   RF WHEEL (KPH) _____ 0
LR WHEEL(KPH) ___0   RR WHEEL (KPH) _____ 0
PUMP _____ OFF   VALVE RELAY _____ OPEN
27 LF WHEEL SPEED SENSOR CONTINUITY
CONDITIONS AT TIME OF ABOVE FAULT CODE:
BRAKE SW _____ OFF   STRTS SINCE CODE _1
ABS STATE _____ OFF   VEH SPEED(KPH) __22
23 RF WHEEL SPEED SENSOR CONTINUITY
CONDITIONS AT TIME OF ABOVE FAULT CODE:
BRAKE SW _____ ON   STRTS SINCE CODE _8
ABS STATE _____ OFF   VEH SPEED(KPH) __69

```

The information relevant to a particular code is displayed **below** the code description.

Some vehicles can only display 2 or 3 codes at a time even though there may be more faults present. Repair any current faults, clear the codes and recheck for codes after road testing.

ABS Clear Codes

Clear codes is available on the exit menu from ABS Codes Only or Codes & Data. This will clear any current and history codes from the vehicle ECU. **The ignition may have to be cycled off and on to reset the ABS module and extinguish the ABS and TRAC lights.**

Clear Codes for VT, WH models onwards

When using the clear codes function it may be necessary to make several attempts to clear the codes successfully, this is due to the type of communication protocol these models use between the SCANNER and the vehicle. It is not a fault with the SCANNER.

SRS AIRBAG

– READ ALL OF THIS SECTION BEFORE CONNECTING SCANNER TO VEHICLE

Warning #1: Before operating the SCANNER on airbag systems you need to be a competent airbag technician.

Warning #2: Diagnosis and repair of the SRS Airbag system should be carried out by qualified personnel using appropriate manufacturer’s workshop manuals and using the precautions detailed by the manufacturer of the vehicle.

Warning #3: Do not operate the SCANNER when it is mounted on the steering wheel or dashboard **AND for personal safety keep expansion area of all airbags clear.**

Warning #4: Read all of this SRS section before operating the diagnostic equipment.

Warning #5: Do not connect the SCANNER to a vehicle unless the vehicle is specifically supported by the SCANNER. Ensure correct identification of the vehicle matches vehicle listed on the SCANNER before the SCANNER is connected to the vehicle. This may result in damage to either test equipment or vehicle components.

CAUTION: Do not leave scan tool connected for longer than 2 minutes. Always terminate communications by pressing N twice to exit the system. Then exit out through “OTHER SYSTEMS”. ***If SRS Airbag lamp is ON then wait for it to extinguish then turn key off and disconnect SCANNER.***

If you are unsure of any aspect of SRS airbag repair procedures seek further professional advice from a “qualified source”.

Refer to rear cover for application vehicle listing. Seatbelt pretensioners when fitted are included within the SRS airbag system.

SRS Clear Codes – Clearing (resetting) the Airbag Light

Clear codes is available on the exit menu from Airbag Codes & Data or History Codes to clear codes from the SRS ECU memory. **(Also refer “No Communication” in this section.)**

VR Commodore, Calais, Ute and Statesman Only

VR Commodore models, including Calais and Statesman, have two code options from the SRS Main Menu and no data option.

Code Types

The two code options are “CODE HISTORY” and “CODES ONLY”. Codes Only displays current or hard fault codes and Code History displays codes that are not current and have been set and stored previously in the SRS ECU memory. History Codes can only be erased by the use of a scan tool like the SCANNER, current codes are erased automatically when the fault is rectified.

Testing the SRS

When checking for SRS Airbag codes always check for current codes first by selecting “CODES ONLY”. If there are no current codes present the SRS ECU will not transmit any to the SCANNER and the screen will display a message like this:

```
NO CODES PRESENT OR VEHICLE IS NOT  
FITTED WITH AIRBAG MODULE.  
SEE REFERENCE MANUAL FOR MORE  
INFORMATION ON THIS SYSTEM.
```

Double check the vehicle is fitted with an Airbag system, the Airbag module is present and the Airbag fuse is not blown. If these are all OK then proceed to check history codes by selecting “CODE HISTORY”. If no History Codes are present than the same message as above will be displayed on the screen.

VR SRS Clear Codes

Current code can only be cleared (reset) by repairing the fault that is causing the code to be displayed. Once the current fault is repaired that fault code will become a History code and can then be cleared (reset) using the Clear Codes option on the Code History exit menu. Several seconds after the code is cleared the screen display should change to:

```
NO CODES PRESENT OR VEHICLE IS NOT  
FITTED WITH AIRBAG MODULE.  
SEE REFERENCE MANUAL FOR MORE  
INFORMATION ON THIS SYSTEM.
```

There are no more codes present and the SRS Airbag system should be functional again.

VS Commodore, Calais, Ute and Statesman Only

These models have the CODES & DATA option that displays the codes and data as per the engine and other systems.

VS SRS Clear Codes

Clear codes (reset) is available on the Codes & Data exit menu. It may be necessary to cycle the ignition OFF and ON to extinguish the SRS lamp or stop SCANNER communicating with the airbag system.

Commodore/Calais VT series onwards Ute VU series onwards, Statesman WH series onwards

The SCANNER support varies between models with some models having the options of reading of current codes, history codes and frozen codes, clearing of rectified codes and the display of data parameters.

NOTE: It has been noted that some VT model vehicles have been fitted with VX type ECU's, so if a VT Commodore SRS will not communicate, ID the airbag as the equivalent VX Commodore system. (ID as year 2000 VX etc.)

The SRS TEST MENU is set up as below:

```
MAIN MENU—AIRBAG          OTHER SYSTEMS
>TEST MENU
CUSTOM SETUP
```

When Test Menu is selected the Scanner will then display another menu similar to the following example. Note: Menu selections do vary between models.

```
TEST MENU
>CODES ONLY          DATA (NO CODES)*
HISTORY DTC         FROZEN DTC*
```

Note: Also refer “No Communication” on page 65 and page 66 for more information.

CODES ONLY

This selection will display any CURRENT codes transmitted by the vehicle.

Current Codes are active during the current ignition cycle, the fault is present at the time the SCANNER is reading the code.

All codes are displayed with the codes number and description.

These codes clear when the fault is no longer present.

NOTE: When a code is transmitted by the vehicle to the SCANNER the code will indicate there may be a problem either in the indicated sensor/actuator or in the WIRING for that sensor/actuator.

CAUTION: Always check history codes as well as current codes only.

DATA (NO CODES)

This selection displays SRS Airbag data that is transmitted to the SCANNER by the vehicle. For descriptions and explanations of the various parameters see the Australian Data Parameter manual.

History DTC

This selection will display any HISTORY codes transmitted by the vehicle.

History Codes are set during the current ignition cycle but remain in the SRS ECU until they are cleared by a scan tool. The code may have been set recently or not been cleared from a previous fault. **Some History codes will light the SRS lamp until they are cleared.**

All codes are displayed with the codes number and description.

NOTE: When a code is transmitted by the vehicle to the SCANNER the code will indicate there may be a problem either in the indicated sensor/actuator or in the WIRING for that sensor/actuator.

Frozen DTC

Frozen codes indicate that the code was set *during* the current ignition cycle and the fault indicted is active during this ignition cycle. For the frozen code to be set the fault must be present for more than 10 seconds. An ignition cycle is from when the key is turned to the ON or ignition position until it is turned back to the OFF position. There must be a time of at least 10 seconds between the key turning off and on again to separate ignition cycles.

SRS Clear Codes

Clear codes (reset) is available on the exit menu from SRS History DTC. This will clear any current and history codes from the vehicle SRS ECU after the fault has been rectified.

Important Note: When using the clear codes function it may be necessary to make several attempts to clear the codes successfully, this is due to the type of communication protocol these models use between the SCANNER and the vehicle. It is not a fault with the SCANNER.

Astra TR/TS, Barina SB/XC, Combo SB/XC & Vectra JR/JS

Codes, Data and Clear Codes are supported for each SRS system.

When the SCANNER is communicating with these systems the SRS Airbag warning lamp on the dash will illuminate, this is normal and will extinguish when communications have ceased.

Note for Astra TS Airbags:

There are three different airbag systems different systems fitted to the TS model Astra:

SAB6	1998 – 2000
SAB6m	2000 – 2002
SAB8x	2002 - 2003

The systems are listed on the SCANNER by their names in the “split” years 2000 and 2002.

No easily identifiable external difference can be seen between the systems so you may need to try each type on the SCANNER. To establish which system it is.

Note that SAB6 and SAB6m systems will communicate as each other with the only difference being an incorrectly reading Battery Voltage.

The SAB6 will read battery voltage at approximately half of what it should be if the SAB6 system is used on a SAB6m. Conversely the SAB6m will show approximately double the battery voltage if used on a SAB6 system.

SAB6m system and SAB8x systems will not communicate with each other.

Note that no damage will occur to the systems by attempting communication with the incorrect system.

If there is no communication with any system then check the airbag system further for faults and consult Appendix B for no communication tips.

Note for Vectra Airbags

In 1997 and 1998 there are two systems different systems fitted to the Vectra. The systems are listed on the SCANNER as “AIRBAG TYPE 1” and “AIRBAG TYPE 2”. These two systems cannot be easily distinguished between so each type may need to be tried on the vehicle to establish which system it is. Type 1 will not communicate as type 2 and vice versa.

Note that no damage will occur to the system by attempting communication with the incorrect system.

If there is no communication with either system then check the airbag system further for faults and consult Appendix B for no communication tips.

Note for Barina SB Airbags

In 1998 and 1999 there are two systems different systems fitted to the Barina. The systems are listed on the SCANNER as “AIRBAG-S” and “AIRBAG SAB6”. These two systems cannot be easily distinguished between so each type may need to be tried on the vehicle to establish which system it is. Airbag-S will not communicate as Airbag SAB6 and vice versa.

Note that no damage will occur to the system by attempting communication with the incorrect system.

If there is no communication with either system then check the airbag system further for faults and consult Appendix B for no communication tips.

No Communication

Warning #1: Before operating the SCANNER on airbag systems you need to be a competent airbag technician.

- 1. Ensure the correct airbag ID has been entered, for example: “Drivers airbag only” or “with side airbags” questions are answered correctly.**
- 2. It has been noted that some VT model vehicles have been fitted with VX type ECU’s, so if a VT SRS will not communicate, ID the airbag as the equivalent VX Commodore system. (ID as year 2000 VX etc.)**

3. It has also been noted that used vehicles have been fitted with totally different airbag computers than original fitment for that vehicle hence,
4. Ensure vehicle being tested has the correct SRS ECU installed for that particular vehicle and airbag configuration. (If “no communication” or the SRS dash light cannot be turned off, refer back to the appropriate manufacturer’s Workshop Manuals.)
5. Always “EXIT” the SCANNER correctly ie: When finished diagnosing
 1. End communication by exiting through ‘OTHER SYSTEMS’ on SRS-MAIN menu.
 2. Turn vehicle key off.
 3. Disconnect SCANNER from vehicle.(This will allow correct “closing of communication” between the SCANNER and the vehicle.)
ie: Do NOT pull the SCANNER communication cable away from the vehicle without following the above.
6. If message “No Communication – Wait 15 seconds (no more than 30 seconds) then Press “N” ” is displayed, “N” must be pressed within the next 15 seconds (ie: within 30 seconds of the message appearing).

Exiting/Finishing Diagnosing

Always “EXIT” the SCANNER correctly ie: When finished diagnosing

1. End communication by exiting through ‘OTHER SYSTEMS’ on SRS-MAIN menu.
2. Turn key off.
3. Disconnect SCANNER from vehicle.

(This will allow correct “closing of communication” between the SCANNER and the vehicle.)

ie: Do NOT pull the SCANNER communication cable away from the vehicle without following the above.

Instruments

From the VT series model, Holdens introduced electronic instrument panels that have diagnostic functions. The SCANNER supports Codes, Data, Clear Codes and Functional Tests for some of these systems. Refer to back pages for coverage listing.

Codes Only

This option displays current and history codes that are set in the Instrument cluster.

Some codes may indicate that there is a code (or DTC) set in another vehicle system, it will not indicate what the code is, only that a code is set in the system specified. If this is the case then the other system needs to be checked for codes by entering the other system into the SCANNER to check for the specific codes set in that system. Sometimes there may be a code set for a system the vehicle being tested is not fitted with, for example a ECC (Electronic Climate Control) code may be set and the vehicle may only have a manual type air conditioner. Disregard these codes if the system is not fitted.

Any History Codes displayed will be under a heading onscreen titled as "HC Historical Codes Follow:".

History codes are codes that have been set previously and are not currently causing a fault.

Clear Codes: Clear Codes may take several attempts to clear any codes present.

NOTE: When clear codes is selected and codes are cleared the Instrument panel will "reset" itself, the needles may jump, the LCD segments may all light up and the warning lights may all come on momentarily. This is normal operation and indicates that codes and the panel have been reset.

Data (No Codes)

Instrument Panel data only is displayed when this option is selected. Be aware that not all parameters displayed may be applicable to the vehicle being tested. For example the vehicle may not be fitted with Cruise Control so any parameters indicating Cruise Control items are disregarded, or it may not be fitted with LPG so any LPG associated items may be disregarded. Check the parameter definitions if you are unsure about a particular parameter.

Instrument Functional Tests

The SCANNER supports functional tests for some vehicles. There are various tests available under this menu option. The tests available for each vehicle is dependent on what tests that vehicle supports. **Not every vehicle supports every Functional Test.**

The SCANNER provides on-screen instructions on how to perform the tests. Some tests are performed with the ignition on and some with the engine off. Follow the on-screen prompts to perform the tests available for the vehicle being tested.

The SCANNER can only request the controller to send ON/OFF commands to the instrument panel.

Note: During these functional tests the SCANNER on-screen instructions may indicate to scroll thumbwheel up or down. Using the MODIS/SOLUS this is done by pressing the thumbpad up or down. If the on-screen instructions indicate to scroll $\frac{1}{2}$ a turn, do this on the MODIS/SOLUS by pressing the thumbpad approximately 5 times in the applicable direction.

CAUTION:

**DO NOT RUN THESE TESTS FOR LONGER THAN 2 MINUTES.
DO NOT LEAVE VEHICLE UNATTENDED DURING TESTS.**

ECC (Electronic Climate Control)

Codes Only

This option displays fault codes that are set in the ECC (Electronic Climate Control).

Clear Codes: Clear Codes may take several attempts to clear any codes present.

Data (No Codes)

ECC data is displayed when this option is selected. The data will change if different climate control settings are chosen, if the fan settings change or vent positions changed.

Switch Data

This option displays the ON or OFF state of the ECC switches mounted on the dash. Switches will need to be held down for several seconds to change the parameter reading on the SCANNER.

BCM & TDM (Body Control Module) & (Theft Deterrent Module)

All Commodores (from VR 1994 onwards) have a body computer that controls certain electrical systems on the vehicle, this is called a Body Control Module or BCM. VR Commodores also have a TDM or Theft Deterrent Module that control the theft deterrent system.

The systems the BCM controls can include the windscreen wipers, dome lamp, central locking, theft deterrent and more.

The BCM can display data showing the state of switches for the systems it controls as well as various items like battery voltage and vehicle speed. Some Higher specification Calais and Statesman models have more parameters that are displayed on their data lists than lower specification Commodore models, because they have more systems that are controlled by the BCM.

BCM data is useful when trying to isolate a problem with a vehicle system, it can help determine whether a fault is in the switch or elsewhere in the system.

The BCM systems are different between each model series (eg: VR, VS, VT etc.) and different between Commodore, Calais & Statesman models.

Testing the BCM

The SCANNER supports live codes and data for the BCM & TDM systems. The SCANNER is connected to the vehicles 16 pin diagnostic connector using the DL-16 adaptor with key S-16. Always follow the on-screen instructions.

VR Series – important information

Commodore/Calais VR, Statesman VR, and Ute VR have **BCM** and **TDM** modules.

On **Calais** and **Statesman** vehicles the Hi series BCM can be made by one of two manufacturers, Yazaki and Bosch. To determine which BCM is fitted, lower the RH dash fuse panel and look up at the BCM which is to the right of the steering column behind the instrument cluster. The BCM will be labelled as Yazaki or Bosch.

The SCANNER supports Yazaki BCM only and all TDM on these vehicles.

All **Commodore** and **Ute's** use the Yazaki made BCM only. Calais and Statesman will have either Yazaki or Bosch BCMs.

On these vehicles the Scanner menu will display as shown:

```

MAIN MENU—BODY          OTHER SYSTEMS
>TEST MENU
CUSTOM SETUP

```

When TEST MENU is selected the following sub menu will be displayed:

```

TEST MENU
DATA (NO CODES)
TDM INFO

```

DATA (NO CODES)

- is applicable ONLY to Yazaki* made BCM's.

(*See important Information heading above.)

Data (No Codes) displays data only for Yazaki BCM's. Yazaki BCM's do not give out codes. See the Australian Data Parameter manual for parameter descriptions.

TDM INFO

- is applicable to all VR series vehicles.

This is applicable to all VR models regardless of BCM type. It displays both codes and data for the TDM system. Some of this information is similar to the (Yazaki) BCM Data Only selection. See the Australian Data Parameter manual for parameter descriptions.

Clear Codes is available for TDM INFO.

Commodore/Calais VS, VT, VX, Statesman VS, WH & Ute VS, VU Series

The SCANNER supports Codes & Data and clear codes on these series vehicles.

The main menu will appear like this:

```

MAIN MENU—BODY
>CODES & DATA
CUSTOM SETUP

```

BCM Identification VT & VX

There are several parameters that are used to identify the BCM including BCM LEVEL, BCM TYPE & IDENTIFIER. It has been noted that these parameters on some vehicles will require the engine to be running to show valid information. Invalid information may be displayed as ??? on the screen.

BCM Clear Codes

Clear codes is available on the exit menu from ABS Codes & Data. This will clear any current and history codes from the BCM. A clicking noise may be heard from the BCM during code clearing, this is normal operation.

Clear Codes for VT, VTII, VX, VXII,, VU, VUII, WH & WHII models

When using the clear codes function it may be necessary to make several attempts to clear the codes successfully, this is due to the type of communication protocol these models use between the SCANNER and the vehicle. It is not a fault with the SCANNER.

Clear Codes for VY series onwards

When using the clear codes function it may be necessary to make several attempts to clear the codes successfully, this is due to the type of communication protocol these models use between the SCANNER and the vehicle. It is not a fault with the SCANNER.

Note: Communication between the SCANNER and the vehicle may drop to NO COMMUNICATION during this process. Select YES for same ID and re-enter system to re-check codes.

BCM Radio Pin Number

For late model Commodore, Calais, Statesman and Ute vehicles the radio's fitted to the vehicles have a security code that must be entered to enable the radio to work. This only needs to be entered if power to the radio has been interrupted. The number is supplied to the owner of the vehicle on a card but is also able to be accessed from the BCM information. Select RADIO CODE from the BCM submenu to display the radio pin number or for VY and VZ models refer to Key Code and BCM Linking Instructions.

ATTENTION: If the radio for the vehicle has been changed from the radio fitted at production of the vehicle the number in the BCM may not be correct for the radio currently fitted.

Note: Some security information including radio PIN can be changed in the BCM section.

The software is able to display the radio pin number for the following vehicles:

- VS Commodore, Calais, Statesman & Ute
- VT Commodore & Calais
- VX Commodore & Calais
- WH Statesman
- VU Ute
- V2 Monaro (up to 2002)
- VY & VZ (can be viewed in Key Code and BCM Linking Software section)

IMPORTANT: To display the Radio Pin Number the vehicle theft deterrent system must be disarmed. This is done by ensuring the ignition is switched ON with a valid key (NOT the spare key without a keypad).

A damaged key or damaged slip ring around the ignition key may cause an incorrect pin number or no pin number to be displayed.

NOTE: For Legacy software only

For VS Calais & Statesman the radio pin number is a 6-digit figure, for technical reasons the number is shown as two numbers on screen. These two numbers need to be ADDED together to form the radio pin number. For example the SCANNER may display:

Example 1

*** RECEIVING VEHICLE DATA ***
(SCROLL FOR MORE)
RADIO PIN ___1234 ADD THIS ___262144

To form the 6 digit radio pin number add the two numbers together
1234 plus 262144 = 263378

or

Example 2

*** RECEIVING VEHICLE DATA ***
(SCROLL FOR MORE)
RADIO PIN ___2156 ADD THIS ___524166

To form the 6 digit radio pin number add the two numbers together
2156 plus 524166 = 526322

Important: Follow the vehicle owner’s manual for instructions on how to input this code into the radio.

CAUTION: if you have entered the number several times and the radio is still not functioning and you have the followed the procedures correctly then you may have the incorrect number for the radio fitted to the vehicle. Remember the radio may have been changed from the unit originally fitted to the vehicle.

VT Commodore Note

VT model Commodores manufactured around May 1999 have a change in the BCM Radio Pin number. If the SCANNER does not communicate with before 5/1999 re-ID the vehicle as after 5/1999 and vice versa. If there is still no communication see above notes or the no communication tips in Appendix B.

BCM Functional and Actuator Tests

The SCANNER supports functional tests for some vehicles. There are various tests available under this menu option. The tests available for each vehicle is dependent on what tests that vehicle supports. **Not every vehicle supports every Functional Test.**

The SCANNER provides on-screen instructions on how to perform the tests. Some tests are performed with the ignition on and some with the engine off. Follow the on-screen prompts to perform the tests available for the vehicle being tested.

During testing you may need to monitor the selected actuator/solenoid with a meter or by listening for actuator/solenoid activation. The controller does not monitor the selected actuator/solenoid. A completed test does not mean the actuator/solenoid was activated. The SCANNER can only request the controller to send ON/OFF commands to the actuator/solenoid.

Note: During these functional tests the SCANNER on-screen instructions may indicate to scroll thumbwheel up or down. Using the MODIS/SOLUS this is done by pressing the thumbpad up or down. If the on-screen instructions indicate to scroll $\frac{1}{2}$ a turn, do this on the MODIS/SOLUS by pressing the thumbpad approximately 5 times in the applicable direction.

CAUTION:

**DO NOT RUN THESE TESTS FOR LONGER THAN 2 MINUTES.
DO NOT LEAVE VEHICLE UNATTENDED DURING TESTS.**

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Part 3 – Key Coding and BCM Linking

(Not applicable to Ethos)

**Please refer to separate Key Code/BCM Linking Instructions
for more information.**

**These are located on the Operator's CD or in paper form
supplied in each diagnostic kit.**

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Appendix B — Vehicle Does Not Communicate With SCANNER

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If a control system fails to communicate with the SCANNER, a problem may exist with the wiring or other circuit parts on the car; or the vehicle identification to the SCANNER may be incorrect. The vehicle's failure to communicate can be an important symptom for diagnosing a driveability problem.

NOTE: Also check vehicle specific information in Part 2.

General Checks

Check the following points first:

1. **Vehicle identification** — Check the vehicle identification entered. The control modules do not all transmit the same amount of data at the same speed. Nor do they all transmit the same information in the same order. Additionally, the SCANNER must address, or “question,” some modules to establish communication. All of these points mean that the SCANNER must know *exactly* what year and model module it is connected to. If the SCANNER thinks it is receiving data from one car and it is connected to another (through incorrect identification), it will either not communicate at all or display some data readings that are clearly incorrect. Always enter a new vehicle identification when testing a new vehicle, even if two vehicles are exactly the same model with the same engine.
2. **Connections** — See "Check SCANNER Connection and Operation" for information on cables and connections.
3. **Loss of power to a control module** — The modules receive battery voltage through one or more fuses or fusible links in the wiring harness. Use a wiring diagram to check module connections for battery voltage and ground. If a module fuse or fusible link is open, the module cannot communicate with the SCANNER.
4. **Ignition off when connecting SCANNER** — Be sure the ignition is *off* when connecting and disconnecting the SCANNER. If the ignition is on when the SCANNER is connected or disconnected, SCANNER memory may be disrupted. Erase and reenter vehicle identification if this occurs.
5. Turn ignition on after connecting to vehicle and then press **Y** for next screen.
6. Always follow the on-screen instructions.
7. Ensure you are using the correct adaptor and correct key if applicable.
8. Check the SCANNER reference manuals for any applicable details.
9. Ensure you are connected to the correct vehicle connector.
10. Check the SCANNER cable for broken wires and adaptors for misaligned pins.
11. Check the vehicle connector for broken wires and for misaligned pins.

12. Vehicles with Mazda Electronic Control Systems (MECS), including Ford Laser etc, as well as certain Kia vehicles do not transmit any codes when no faults are detected. (The screen will not change when checking for codes.)
13. Low vehicle battery voltage may cause incorrect test results.
14. The vehicle ECU may be faulty, **check by disconnecting a known sensor and running a test.**
15. Check for voltage/grounds at vehicle diagnostic connector.
16. ID as a vehicle 1 or 2 years either side of the build date – it has been known of a vehicle having an ECU system of 5 years before the build date.

No Codes are Displayed

Most data stream vehicles transmit trouble codes along with their data. Therefore, if the data is displayed, an absence of trouble codes *does not* indicate a communication problem. Some vehicles transmit trouble codes separately from the data stream.

Some vehicles with AUTO CODE READ capability transmit a "pass code," **others do not**. Therefore, the absence of trouble codes may or may not indicate that there is a communication problem. However, if the car you are testing will not start, or has a driveability symptom, and no codes are present, there probably is a communication problem.

You can diagnose a communication problem on *some* AUTO CODE READ cars by attempting to manually gather codes. However, many AUTO CODE READ cars do not provide manual code gathering as an option.

You can also try inducing a trouble code. Unfortunately, there is no common way to do this. The method will vary, depending on the vehicle make and model year. Generally, you can induce a code by disconnecting a resistive-type sensor, such as a TPS or coolant temperature sensor. However, the best method is to use your experience based on what you have seen on similar cars in the past.

IF NO CODES DISPLAYED AND YOU WISH TO VERIFY THAT THE VEHICLE IS OK PULL A KNOWN SENSOR, RUN TEST AND KNOWN CODE SHOULD APPEAR – REPLACE SENSOR AND CLEAR CODES.

Engine Will Not Start and ECU Will Not Communicate With Ignition On

If the engine does not start and the PCM will not communicate with the ignition on, follow the instructions in the section titled "Check the CHECK ENGINE Lamp" to see if the vehicle will display codes on the instrument panel lamp. Also make these basic tests:

- **Battery** — Check the battery state of charge and cranking capacity. The MODIS is self-powered, therefore the SCANNER module on the MODIS may appear to operate normally even if the battery does not have enough power to crank the engine or operate the vehicle computer.
- **ECU supply voltage** — Check a wiring diagram for the location of the ECU fuses or fusible links and test for an open circuit.
- **ECU ground** — Use a wiring diagram to identify the location of the ground connection. An open ground can keep a fuel-injected engine from starting. A high-resistance, or "dirty," ground can cause overall poor operation.

An open ground or battery voltage (B+) circuit on a fuel-injected engine will remove power from the PCM and keep the engine from starting. A carbureted engine may start and run even if the power circuit to the PCM is open. It probably will run very poorly, however, because it will be running without feedback fuel control or spark advance control.

Engine Runs But Will Not Communicate

The way in which the engine runs can be a clue to the cause of a test problem. If the engine seems to run normally but the PCM will not communicate with the SCANNER, the cause may be a wiring problem to the diagnostic connector that does not affect the rest of the system. If the engine runs poorly, the cause may be a poor system ground or a voltage problem that affects the PCM or the entire system.

Refer to the sections, "Check the CHECK ENGINE Lamp" and "Check the diagnostic Connector" for troubleshooting instructions.

Check SCANNER Connection and Operation

Begin troubleshooting the test or communication problem by determining if the SCANNER is working normally. If the SCANNER works properly on other vehicles, particularly same-model vehicles, the problem is probably in the vehicle, not the SCANNER. If the readings are unsteady, the SCANNER may be at fault or there may be a power problem on the vehicle.

If the SCANNER intermittently resets or goes blank, a wire may be opening intermittently in one of the cables or in the adapter. Use an ohmmeter to check continuity of the SCANNER data cable from pin to pin between the D-shaped connectors at either end of the cable.

Check the CHECK ENGINE Lamp

Many cars and trucks with PCM diagnostic capabilities have a CHECK ENGINE lamp on the instrument panel. On some vehicles, the lamp is labeled simply ENGINE, or has a symbol to indicate the PCM. Regardless of the label, they all can be referred to as the CHECK ENGINE lamp.

The CHECK ENGINE lamp can be an important device for checking the PCM's ability to transmit to the SCANNER. If the SCANNER cannot communicate with the vehicle, disconnect the SCANNER and see if the PCM will flash trouble codes on the CHECK ENGINE lamp. This applies only to some vehicles.

Turn the ignition on and verify that the CHECK ENGINE lamp lights with the ignition on and the engine off. If it does not, troubleshoot and repair the problem before going farther. It could be as simple as a burned out lamp bulb or a blown fuse. Refer to the carmaker's shop manual for the CHECK ENGINE lamp troubleshooting procedure on the specific vehicle you are testing. Common causes of CHECK ENGINE lamp circuit problems include:

- A blown circuit fuse (GAUGES or other lamp fuse)
- A burned-out lamp bulb
- A wiring or connector problem
- A defective lamp driver
- A diagnostic connector problem

Special Cases

Some vehicle systems transmit data at a slow baud rate. These vehicles can appear to have communication problems when actually, they simply transmit data at a very slow speed.

The baud rate determines how fast the SCANNER responds to the PCM and how fast the data readings change on the screen. It also affects the time that it takes to record a movie. Readings from these vehicles can take up to seven seconds to change. This display speed, or “data update rate” depends on the ECU; it is *not* controlled by the SCANNER.

NOTE: Also check vehicle specific information in Part 2.

Special Cases — Specific Vehicles

The vehicles listed in the following sections are specific models that may have problems communicating with the SCANNER.

Apollo JM/JP 2.2L & 3.0L using MODIS

Note that side power must be supplied to Toyota-2 adaptor for data to be displayed with engine running.

These vehicles can transmit ECU operating data to the SCANNER. This test mode appears on the MAIN MENU as the selection DATA (NO CODES). These Toyota systems do not transmit trouble codes in this mode. Codes must be read separately by using the CODE FUNCTIONS selection on the MAIN MENU.

To place these cars in a test mode where the ECU is more sensitive to trouble codes, select DATA (NO CODES) from the MAIN MENU **without** turning the ignition to RUN. Then exit from DATA (NO CODES) and select AUTO CODE READ. The ECU will now transmit codes for potential faults sooner than it will transmit them in the normal driving mode. The ECU will stay in this test mode until the ignition is turned off.

Nova LF/LG 1.6L & 1.8L using MODIS

Note that side power must be supplied to Toyota-1 adaptor for data to be displayed with engine running.

Other Holden Models

These vehicles can display a NO COMMUNICATION message when there is a communication problem. If the SCANNER displays the message, NO COMMUNICATION, it means that the SCANNER and the control module simply cannot communicate with each other for some reason. Some common problems that may prevent a vehicle from performing a test or communicating with the SCANNER are listed below. If the CHECK ENGINE lamp passes the bulb check, put the ECU into the "field service" mode by turning the ignition on and then installing a bridge from pin B to pin A in the 12-pin ALDL connector. Bridge pin 1 to pin 2 on the 6-pin ALDL connector, bridge 5 and 6 on the 16-pin ALDL connector, figure B-1.

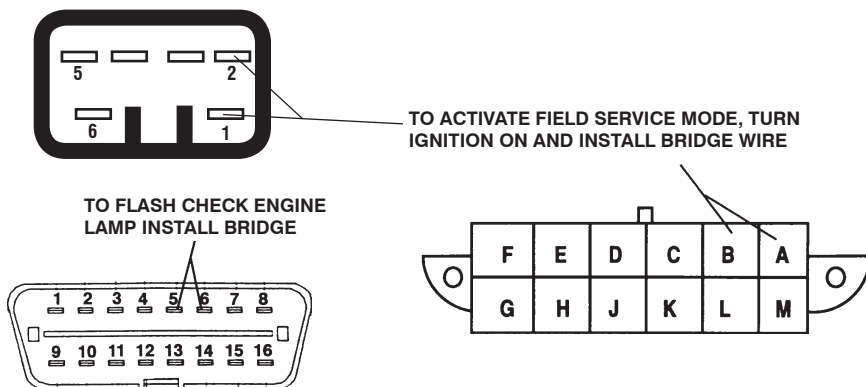
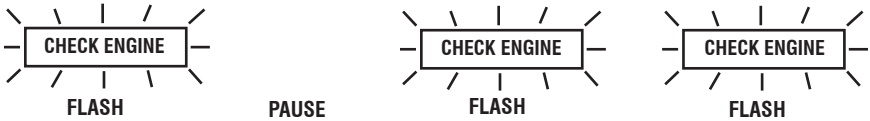


Figure B-1. Bridge these pins to flash codes on the CHECK ENGINE lamp.

The CHECK ENGINE lamp should flash code 12 three times. It then should flash any other codes present in ECU memory, or it should flash code 12 again. Code 12 appears on the CHECK ENGINE lamp as:



Several different symptoms and problems may occur at this point:

1. If the CHECK ENGINE lamp lights for a bulb check but stays out and does not flash any codes, check the continuity of pins A and B in the ALDL connector (1 and 2 on the 6-pin connector) 5 and 6 on the 16-pin connector. See "Check the ALDL Connector" for voltage readings on the ALDL pins.
2. If the CHECK ENGINE lamp flashes rapidly with no code pattern check the ECU. Verify that a PROM is installed. Refer to the manufacturer's troubleshooting procedure for the specific vehicle you are testing.
3. If the CHECK ENGINE lamp lights steadily and does not flash at all with ALDL pins A and B bridged, refer to the manufacturer's troubleshooting chart for this symptom on the specific vehicle.
4. Watch for a code 51 or other 50-series code that indicates a PROM or ECU problem. Code 51 means a PROM failure or a missing PROM. Many carbureted engines do not transmit a code 51 on the data stream; and if the PROM is missing, the ECU for these systems will not communicate with a SCANNER. Some ECU's will, however, flash code 51 on the CHECK ENGINE lamp in this case.

The following paragraphs list common symptoms that often accompany a NO COMMUNICATION message. References to other sections in this appendix are also listed. You may need a wiring diagram for the specific vehicle and troubleshooting procedures for some of the following checks.

If the CHECK ENGINE lamp does not flash code 12, or if it does but the SCANNER will not receive data, the next step is to check the ALDL connector. Figure B-2 shows the 6-pin, 12-pin and the 16-pin ALDL connectors. Note that pin identification on the 6-pin connectors is not the same as pin identification on the 12-pin or 16-pin connector. Use a digital voltmeter to check the ALDL connector, as follows:

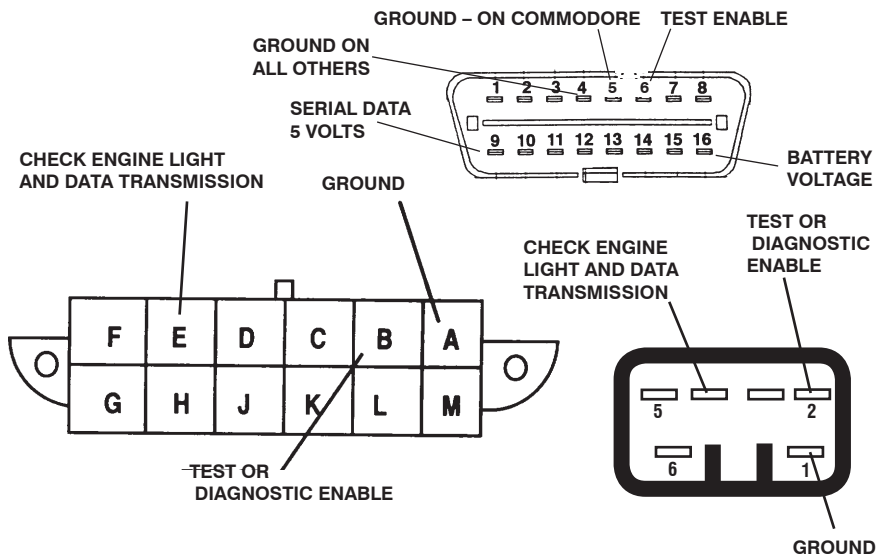


Figure B-2. Check voltage and continuity on the specified pins if the ECU/PCM does not communicate.

1. Check ground continuity. Connect the voltmeter positive (+) lead to ALDL **pin A** (pin 1 on the 6-pin connector). Connect the negative (-) lead to the battery negative terminal. Do not connect to a body or chassis ground; go directly to the battery ground *terminal*. With the ignition on, voltage drop across the ground terminal should be 0.1 volt or less. An open or high resistance ground can keep the ECU from entering the diagnostic mode.

To test for an open ground at ALDL pin A (or 1), turn the ignition on and then bridge pin B to pin A in the 12-pin ALDL connector. Bridge pin 1 to pin 2 on the 6-pin ALDL connector. Connect the voltmeter positive lead to the jumper and the negative lead to a known good ground (battery ground terminal if possible), figure B-3. The meter should read 50 millivolts (0.050V) or less for a good ground. If the reading is higher, high resistance exists in the ALDL ground connection. If the voltmeter reads 5 volts, the ALDL ground connection for pin A (or 1) is open.

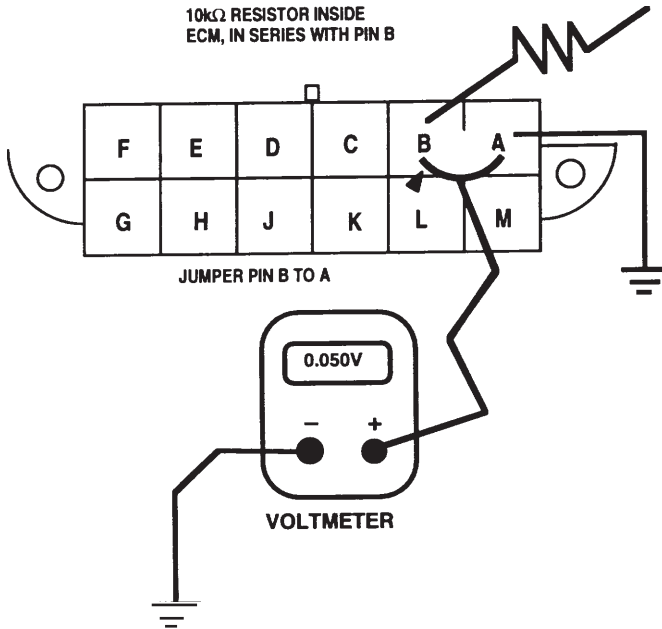


Figure B-3. Test ground continuity for the ALDL connector.

2. Check voltage on the test terminal, **pin B** (pin 2 on the 6-pin connector). Connect the voltmeter positive lead to ALDL pin B (or 2) and the negative lead to the ALDL ground pin or a known good ground. With the ignition on, voltage on pin B (or 2) should be 5 volts. If the circuit to pin B is open, a 160-baud ECU cannot be switched into the diagnostic mode.
3. Check voltage on **pin 4** of the 6-pin connector (CHECK ENGINE lamp). Connect the voltmeter positive lead to ALDL pin 4 and the negative lead to the ground pin or a known good ground. With the ignition on, voltage on pin 4 should be less than 1 volt (approximately 0.7 to 0.8 volt) when the lamp is on with the ignition on and the engine off. The meter reading should rise to battery voltage when the lamp goes off with the engine running. If the circuit to pin 4 is open, the ECU cannot transmit data to the SCANNER.

4. Check voltage on **pin E** of the 12-pin connector. Connect the voltmeter positive lead to pin E and the negative lead to pin A or a known good ground. With the ignition on, voltage should be 5 volts or fluctuating between 3.5 and 5.0 volts. If the circuit is open, the ECU cannot transmit data to the SCANNER.

Most communication problems can be found and corrected by checking the points listed above. In a few cases, though, communication failure may be due to ECU failure. In all cases, check and verify all of the circuits and parts involved in data communication before condemning the ECU.

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