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SERVICE

ADMINISTRATION BULLETIN

Using WDS To Program/Configure Control Modules – Common Issues/Solutions – VID Block – Background Information

MODEL Refer to Text
VIN

Introduction:

Successful replacement & programming of control modules on late model Jaguar cars (beginning with 2002 X-TYPEs, see list below.) can be handled effectively by WDS under normal circumstances.

Over the past 2 years a significant number of concerns regarding control module programming on these vehicles can be traced to how well WDS collects and manipulates the vehicle configuration data known as the vehicle identification block (VID Block). Undesirable results can occur for a variety of reasons.

The objective of this document is to provide the Jaguar technician with supplemental information, that will aim to improve overall results when attempting to replace or reprogram control modules on these vehicles.

This document consists of 2 sections:

Section 1: The WDS Configuration Process (page 2)

The section provides a brief overview of how VID Block Data relates to module programming and replacement, followed by Problem, Cause, and Resolution for each of the most commonly reported module programming issues.

Section 2: Vehicle Architecture (page 9)

This section can be considered optional reading. It contains a more detailed look at Jaguar’s vehicle configuration (VID Block) data, its structure, and how it influences vehicle function, and WDS behavior.

VEHICLE COVERAGE

The following vehicle ranges have a VID block that can be updated, which allows them to be configured using the processes defined in this document:

Model	NAS Model Year	UK Model Year	VIN Range
X-TYPE	2002 On	2001.5 On	C00001 Onwards
XJ Series	2004 On	2003.5 On	G00001 Onwards
XK Range	2003 On	2003 On	A30645 Onwards
S-TYPE	2003 On	2002.5 On	M44998 Onwards

Configuration of control modules on any other models is handled using different processes that are specific to each module.



Section 1: The WDS Configuration Process

The VID Block, is a complex collection of digital data that represents the vehicle configuration, stored in a special re-writeable memory location within the Engine Control Module (ECM). This data is originally programmed to the vehicle on the assembly line when built. It is also an interactive part of many WDS diagnostic and programming functions, and will be read out and manipulated by WDS during most module programming and replacement procedures.

There are many VID Block related issues that can cause a simple module programming or replacement procedure to fail or produce unexpected results.

CONFIGURATION OVERVIEW

WDS provides four different functions for configuring modules/features, these are:

- Configure New Modules
- Configure Existing Modules
- Add/remove Accessories
- Dealer Options

The following details the process involved for the first two of the above.

“CONFIGURE NEW MODULES” OPTION

The ‘Configure New Modules’ option should be used when a new module has been installed to the vehicle as a direct replacement for an existing failed module. Once selected, a list of the modules that can be configured will be displayed. The number of modules displayed will depend on the vehicle and the components/features fitted to the vehicle.

The process for configuring each module varies depending on the vehicle and module selected, it will consist of one or more of the following elements:

- Full or part VIN writes.
- Data download such as variable assisted power steering (VAPS) curves or adaptive damping data.
- Vehicle configuration data (VID block data).
- Flash programming.
- Setup routines such as learn keys, transmitters. PATS ID transfer, alignment, etc.
- Calibration.
- Clearing of configuration flags and/or DTCs.

Note: Many of these processes are managed in background by WDS and are not part of the interactive process on screen.

CONFIGURING NEW CONTROL MODULES OTHER THAN THE ECM

When a new module is installed in the vehicle, it will have either no configuration data stored in memory or it will have default data stored. To enable proper function on the vehicle, the WDS must write a vehicle-specific configuration to the control module. Use of modules with incorrect or no configuration data could result in functionality issues and/or error messages on the instrument cluster. The extent of any issues will depend on the vehicle market and module affected.

VIN verification

Once a module has been installed and then selected from the list of new control modules in the WDS configuration tool, the application will carry out a VIN verification check between the VIN entered manually into the WDS at the start of the session and the VIN stored within the VID block of the ECM. If a mismatch is detected the application will move onto the next control module to verify the VIN until a match has been found. If no match is found, a VIN mismatch message will be displayed to the operator showing the control modules and the VIN that was read from each one.

Control module network address (Node ID)

Once the VIN has been verified, the application will upload the VID block to the WDS. The application will then check that the control module network address (or Node ID) for the control module that was selected from the menu is stored.

If the Node ID is stored, the application will assume that valid data is also programmed into the VID block and will proceed to extract it from the uploaded VID block before downloading the same data to the new control module.

Note: WDS cannot check to confirm the data in the VID block is correct, it assumes that if the Node ID is valid, then so is the associated data, ***therefore, if the data in the VID block is incorrect then the new control module will also be incorrect.***

Depending on which control module is selected, the application will also run any of the elements listed in this section that are supported by the particular control module selected, to ensure that the new control module is fully operational and configured.

If Node IDs are not found in the VID block for the control module selected, the application will present the message:

'The vehicle identification block does not appear to have the restoration data for this module.'

Note: In this instance it is essential that the data displayed during the vehicle identification process at the start of the WDS session is checked and corrected, as this data will be used to identify many of the configuration options. This is particularly important if additional features have been added to the vehicle using the add/remove accessory function, as these changes are not covered in the VCATS data.

Following this message WDS will present a list of options to select in order to configure the new control module. These options will be based on the configuration options available for the particular control module selected.

POTENTIAL PROBLEMS AND RESOLUTIONS

Issue 1:

Problem: Features, that previously operated correctly, no longer function.

Cause a: The VID block stored in the ECM is corrupted or incorrect for a specific control module. When a new control module is installed, the corrupted data is copied into the new control module causing the control module to be configured incorrectly. This will result in features, that previously operated correctly, not functioning.

Cause b: A new control module was installed, but before it was programmed, the 'Configure New ECM' option was run.

Cause c: A new ECM and another control module were installed in a vehicle; the ECM was programmed first causing the default data from the other control module to be programmed into the VID block.

Resolution 1:

Reinstall the old control module (if communications can be established) and then select 'Program the ECM as New', using the 'Configure New Modules' option. This will copy the original data into the relevant section of the VID block. Following this, reinstall the new control module and program it from the 'New Module' menu that will then copy the valid data from the VID block into the new control module.

Note: When installing two new control modules, if one is the ECM, **always** configure the other control module first. WDS will detect that no data is available in the VID block and allow manual selection of the configuration options to program the control module. Once this has been carried out, the new ECM can be configured.

Resolution 2:

If resolution 1 fails, the VID block will have to be rebuilt. To do this, the VID block will need to be read using the 'Vehicle Identification Block Read' application available via the special applications menu on WDS. The data should be saved to a floppy disc and sent back via email to Technical Helpline for editing.

Expected turnaround time for VID block editing is 2 business days. Please recognize that this is the most direct resolution to this issue.

The corrected data can then be loaded back onto the WDS and programmed back to the ECM. Only when this is complete should the new control module be programmed using the 'Configure new modules' option.

Issue 2:

Problem: A new instrument cluster was installed, now the speedometer displays either incorrect or maximum m.p.h. and logs miles on the odometer.

Cause: The tire compensation is corrupted or not programmed in the VID block. Installing the instrument cluster causes the corrupt data to be copied into it.

Resolution:

The correct tire compensation can be programmed into the VID and instrument cluster by selecting the correct tire size from the 'Add Accessories' menu. On the 2003 model year S-TYPE instrument cluster the odometer value will return to its original mileage if no road speed has been detected.

Note: A revision to the software introduced on JTP 759/19 and all subsequent CDs stops this error occurring, as the WDS no longer uses the data from the VID block to program the tire compensation values.

Issue 3:

Problem: Programming of a control module fails part way through leaving it in an unprogrammed condition. (This is often seen with a 12-56 error on WDS indicating a communications time-out.)

Cause: Most failures are generally caused by the vehicle battery voltage being low, faulty WDS communications leads or poor connections at the vehicle's J1962 data link connector (DLC).

Resolution:

Make sure vehicle battery is fully charged.

Make sure that PTU is left on base station.

Make sure that the pins or diagnostic cable is not damaged.

Make sure that the vehicle's DLC is not damaged

Switch the WDS off and then back on, then start a new session and rerun the 'Configure New Modules' application to complete the programming task.

Note: It is not necessary to reload the WDS system software.

Note: If a control module configuration process fails, do **not** configure the ECM until the problem has been resolved, since this will lead to the problems identified in issue 1.

CONFIGURING NEW ECM

When an ECM is replaced, the configuration process is different from the other control modules. Data cannot be extracted from the VID block and downloaded to the new control module, since the VID block in the new module is not programmed.

Once the ECM has been selected and the VIN verification has been carried out, the WDS application will flash program the control module with the latest available calibration file from the WDS database. When the flash programming has been completed successfully, the next stage is to transfer the ECM's unique Passive Anti Theft System Identification (PATS ID) to the other control modules on the vehicle that require it. The control modules that store the PATS ID vary from vehicle to vehicle.

After flash programming and PATS ID transfer have been completed, the next stage is to generate VID block data. This includes the configuration data for the ECM and the mirror data for all the configurable control modules that are also stored in the VID block.

It is essential that the data displayed during the vehicle identification process at the start of the WDS session is checked and corrected, as this data will be used to identify which control modules the WDS needs to extract data from to rebuild the VID block.

The ECM's own configuration is constructed from data extracted from the VCATS code stored in the WDS database, for the VIN entered at the start of the session, and from operator questions. The 17 character VIN that forms part of the VID block is copied from the instrument cluster. Once this part of the VID block has been rebuilt the application will interrogate all control modules that store a mirrored copy of their configuration data in the VID block and construct the remaining part of the VID block before downloading it to the new ECM.

The final stage is to clear any DTCs logged, the whole programming and configuration process for the ECM will then be complete.

POTENTIAL PROBLEMS AND RESOLUTIONS

Issue 1:

WDS fails part way through the process, leaving the vehicle in a condition where it will not start.

Cause: Most failures are generally caused by the vehicle battery voltage being low, faulty WDS communications leads or poor connections at the vehicle's J1962 data link connector (DLC).

Resolution:

Make sure vehicle battery is fully charged.

Make sure that PTU is left on base station.

Make sure that the pins or diagnostic cable is not damaged.
Make sure that the vehicle's DLC is not damaged
Rerun the 'Configure New ECM' process a second time.

CONFIGURE EXISTING CONTROL MODULES

Configuring existing control modules consists of flash programming the latest available calibrations into an existing control module. Only the ECM and TCM are currently supported, although further control modules will be included on future vehicles.

Programming an existing control module does not affect a control modules configuration, as this is located in a protected area of memory, neither will PATS ID be erased or immobilization initializations need to be run.

Note: It is vital that when programming an existing control module the vehicle configuration confirmation screen displays the correct configuration for the vehicle VIN that has been entered at the start of the session. E.g., Engine size, engine type, market, speed control type, transmission, etc.

POTENTIAL PROBLEMS AND RESOLUTIONS

Issue 1:

The control module fails to successfully configure.

Cause: Most failures are generally caused by the vehicle battery voltage being low, faulty WDS communications leads or poor connections at the vehicle's J1962 data link connector (DLC).

Resolution:

Make sure vehicle battery is fully charged.

Make sure that PTU is left on base station.

Make sure that the pins or diagnostic cable is not damaged.

Make sure that the vehicle's DLC is not damaged

It is possible to retry a number of times although most control modules will need to go through a rectification procedure. The rectification procedure will again differ depending on the vehicle and control module but will also differ slightly to the normal procedure in that battery resets or relay disconnects may have to be carried out. If a failure does occur during the normal download procedure and a retry is attempted WDS will automatically detect whether or not the rectification procedure is needed or not.

Note: When resetting battery, disconnect both battery leads and touch them together to fully discharge all control module capacitors.

BEST PRACTICES

- When installing two new control modules, if one is the ECM, **always** configure the other control module first. WDS will detect that no data is available in the VID block and allow manual selection of the configuration options to program the module. Once this has been carried out, the ECM can be configured.

- If a control module configuration process fails, do **not** configure the ECM until the problem has been resolved, since this will lead to the problems identified in issue 1 (page 4).

- Most configuration failures are generally caused by the vehicle battery voltage being low, faulty WDS communications leads or poor connections at the vehicle's J1962 data link connector (DLC).
 - Make sure vehicle battery is fully charged.
 - Make sure that PTU is left on base station.
 - Make sure that the pins or diagnostic cable are not damaged.
 - Make sure that the vehicle's DLC is not damaged

- It is vital when programming an existing control module, that the vehicle configuration confirmation screen displays the correct configuration for the VIN that was entered at the start of the session.
E.g., Engine size, engine type, market, speed control type, transmission, etc.

- When resetting battery, disconnect both battery leads and touch them together to fully discharge all control module capacitors.

Note: This document provides general guidelines. Always refer to Technical Bulletins and EPQR FAQs for the latest information on any issues regarding specific control modules.

Section 2: Vehicle Architecture

All of the vehicles listed on page 1 have multiple configurable modules including the ECM, TCM, and various other body/chassis control modules. In all cases the central module (for configuration) is the ECM. While each configurable module stores its own configuration data, this data is also mirrored in the ECM's vehicle identification (VID) block. The mirrored data is not used during normal vehicle operation; however, it is used by WDS during the module configuration process. The structure of the VID block is identified below.

THE VID BLOCK STRUCTURE

The VID block is only stored in the vehicle's ECM and is initially programmed into the module during production. It contains 256 bytes of data vital to the ECM's own functionality as well as being needed when programming new modules.

Each VID block is partitioned into 5 separate areas: VIN, ECM configuration, Mirror Data, VCATS code, and Checksum.

Area 1: VIN

The first 20 bytes (0 – 19) contain the vehicle's VIN. Illustrations 1 and 2 show a sample VID block extracted from an X-TYPE using the 'Vehicle Identification Block Read' application available via the 'Special Applications' menu of the 'Vehicle Configuration' tab. Illustration 1 displays the data in hexadecimal format (HEX), while Illustration 2

VID BLOCK FOR X-TYPE C12061 IN HEX WITH VIN HIGHLIGHTED

X-Type 01.5 / Complete vehicle

Denso VID Block Contents

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	0	0	53	41	4A	41	45	35	31	53	58	32	59	43	31
16	32	30	36	31	5A	0	0	0	5	80	80	50	0	0	0	0
32	0	0	0	0	15	71	7	80	31	D4	0	0	C2	6D	45	2F
48	23	0	98	0	0	0	0	0	0	0	0	0	0	0	0	0
64	80	80	52	52	52	52	0	0	0	0	3	2	0	0	0	0
80	80	0	80	0	8	4	0	0	0	13	43	3	30	93	1C	0
96	A	A	1E	F8	7F	F1	72	7	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	EA	EA	EA	EA
128	EA	EA	EA	EA	EA	EA	1F	40	0	0	0	6C	CD	0	0	0
144	1	13	42	CD	1	13	1	9A	1	14	1	4D	6	40	1	39
160	C	80	1	4	13	88	0	E8	1C	20	0	CC	2F	76	0	86
176	42	CC	0	40	42	CD	0	0	E9	0	0	0	0	0	0	41
192	45	35	31	53	58	32	59	32	36	43	30	37	46	42	42	44
208	41	41	42	41	42	41	41	41	42	41	45	45	41	41	41	42
224	41	42	41	41	42	43	42	42	41	44	42	41	41	41	41	41
240	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	C7

VIN

ILLUSTRATION 1:

shows the same data converted to ASCII by pressing the ASC button on the WDS screen. This shows the 17-digit VIN (highlighted in yellow) in a readable format. Bytes 0-2 are padded with 0 to make the 20 bytes.

VID BLOCK FOR X-TYPE C12061 IN ASCII WITH VIN HIGHLIGHTED

START OF VIN

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	<?>	<?>	<?>	S	A	J	A	E	5	1	S	X	2	Y	C	1
16	2	0	6	1	Z	<?>	<?>	<?>	<?>	<?>	<?>	P	<?>	<?>	<?>	<?>
32	<?>	<?>	<?>	<?>	<?>	q	<?>	<?>	1	<?>	<?>	<?>	<?>	m	E	/
48	#	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>
64	<?>	<?>	R	R	R	R	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>
80	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	C	<?>	0	<?>	<?>	<?>
96	<?>	<?>	<?>	<?>	□	<?>	r	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>
112	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>
128	<?>	<?>	<?>	<?>	<?>	<?>	@	<?>	<?>	<?>	I	<?>	<?>	<?>	<?>	<?>
144	<?>	<?>	B	<?>	<?>	<?>	<?>	<?>	<?>	<?>	M	<?>	@	<?>	<?>	9
160	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	/	v	<?>	<?>
176	B	<?>	<?>	@	B	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	A
192	E	5	1	S	X	2	Y	2	6	C	0	7	F	B	B	D
208	A	A	B	A	B	A	A	A	B	A	E	E	A	A	A	B
224	A	B	A	A	B	C	B	B	A	D	B	A	A	A	A	A
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<?>

ILLUSTRATION 2

Area 2: ECM Configuration

Bytes 20 – 63 contain data used for the ECM's own configuration purposes. The data in this area is only stored in the ECM and is the only part of the VID block data that affects normal vehicle operation. All other data in the VID block is only used as a back up to support configuration of other control modules.

Area 3: Mirror Data

Bytes 64 – 190 contain mirrored data from most of the other configurable modules that are installed in the vehicle. The definition of this data changes depending on the vehicle model.

The mirrored data itself is split into 2 parts for each module. The first part is a 1-byte Node Identification (Node ID); this is the module network address that is used when communicating with the module. The second part is a 5-byte data block containing the mirrored data. To mirror the data of a module 1 or more sets of the above can be required.

Illustration 3 shows the same VID block detailed above with the second block of data and Node ID for the GECM highlighted (bytes 184 –189).

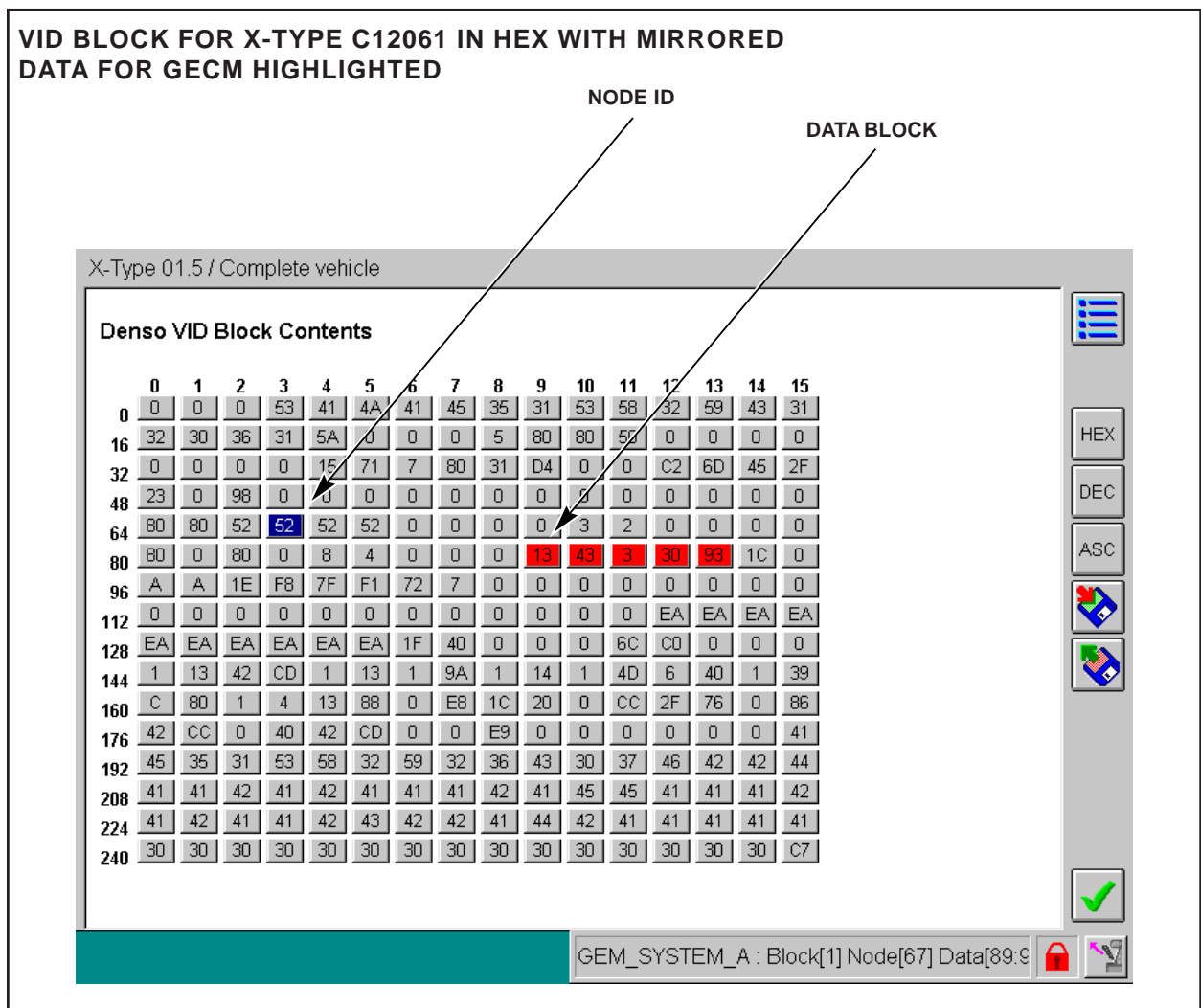


ILLUSTRATION 3

Area 4: VCATS Code

Bytes 191-254 contain a 64-byte vehicle configuration and test system (VCATS) bar code definition that is unique to each vehicle (Illustration 4).

The VCATS code is initially used during production to program and configure a vehicle. It is also used by WDS to define which features are installed in a vehicle when programming or configuring a vehicle or module in the service environment.

VID BLOCK FOR X-TYPE VIN C12061 IN ASCII WITH VCATS DATA HIGHLIGHTED

X-Type 01.5 / Complete vehicle

Denso VID Block Contents

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	<?>	<?>	<?>	S	A	J	A	E	5	1	S	X	2	Y	C	1
16	2	0	6	1	Z	<?>	<?>	<?>	<?>	<?>	<?>	P	<?>	<?>	<?>	<?>
32	<?>	<?>	<?>	<?>	<?>	q	<?>	<?>	1	<?>	<?>	<?>	<?>	m	E	/
48	#	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>
64	<?>	<?>	R	R	R	R	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>
80	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	C	<?>	0	<?>	<?>	<?>
96	<?>	<?>	<?>	<?>	0	<?>	r	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>
112	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>
128	<?>	<?>	<?>	<?>	<?>	<?>	@	<?>	<?>	<?>	<?>	I	<?>	<?>	<?>	<?>
144	<?>	<?>	B	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	M	<?>	@	<?>	9
160	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	/	v	<?>	<?>
176	B	<?>	<?>	@	B	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	<?>	A
192	E	5	1	S	X	2	Y	2	6	C	0	7	F	B	E	D
208	A	A	B	A	B	A	A	A	B	A	E	E	A	A	A	B
224	A	B	A	A	B	C	B	B	A	D	B	A	A	A	A	A
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<?>

VCATS Code

64 BYTE VCATS CODE

ILLUSTRATION 4

The VCATS code for each individual vehicle is not only programmed into the VID block but is also stored on the WDS CDs. As well as being displayed using the 'Vehicle Identification Block Read' application, the VCATS code is written to the session log file (Illustration 5).

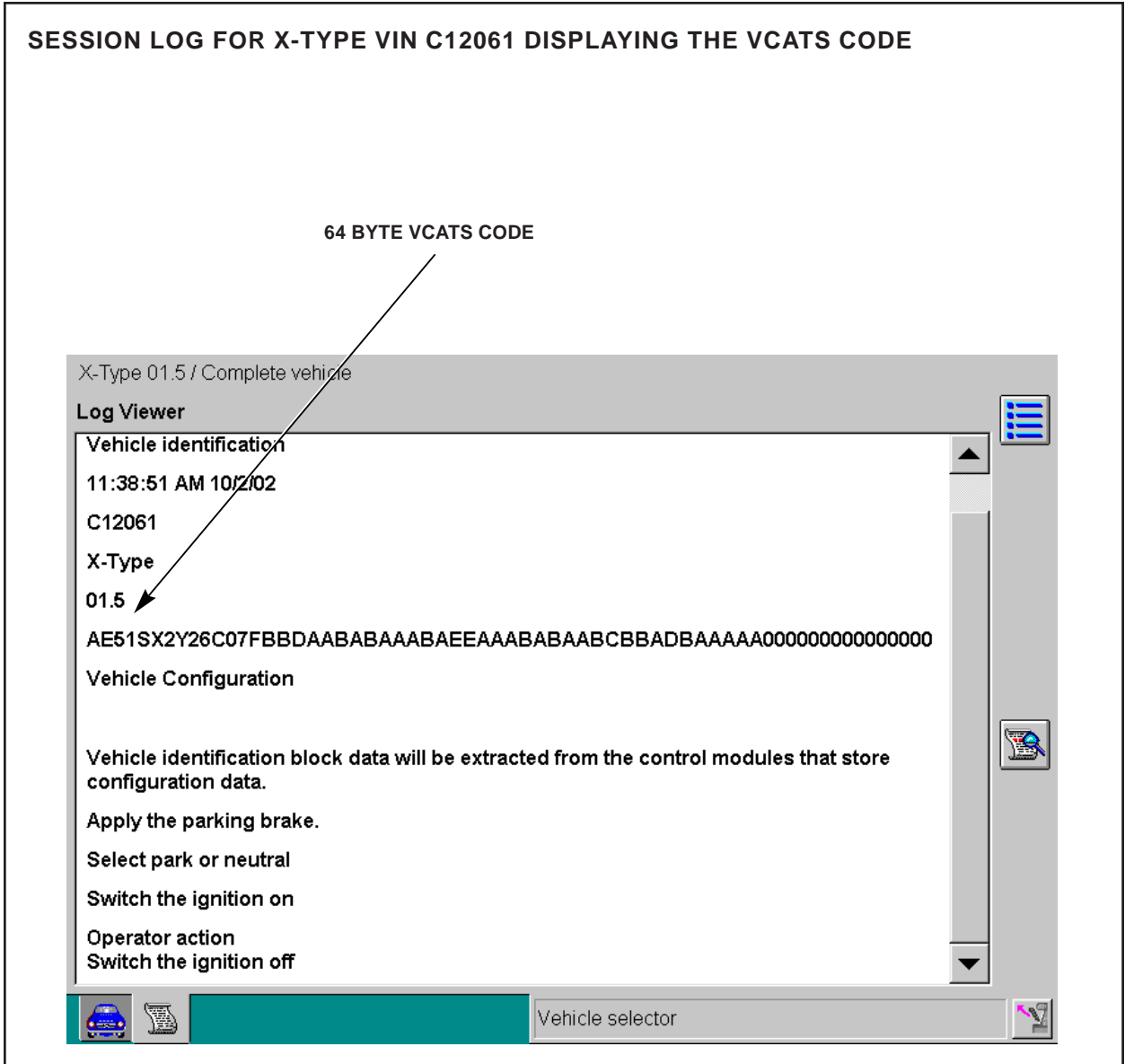


ILLUSTRATION 5

When a VIN is entered into WDS at the start of a session, the operator is asked if they would like to read the configuration from the vehicle and given the option of 'YES' or 'NO'. If 'YES' is selected the VCATS code will be read from bytes 191-254 in the VID block and if 'NO' is selected the VCATS code will be read from the CD, either way the code should be exactly the same. Once WDS has loaded the VCATS code from either the VID block or from the CD, relevant data is extracted and displayed in a screen titled 'Vehicle configuration confirmation' (Illustration 6).

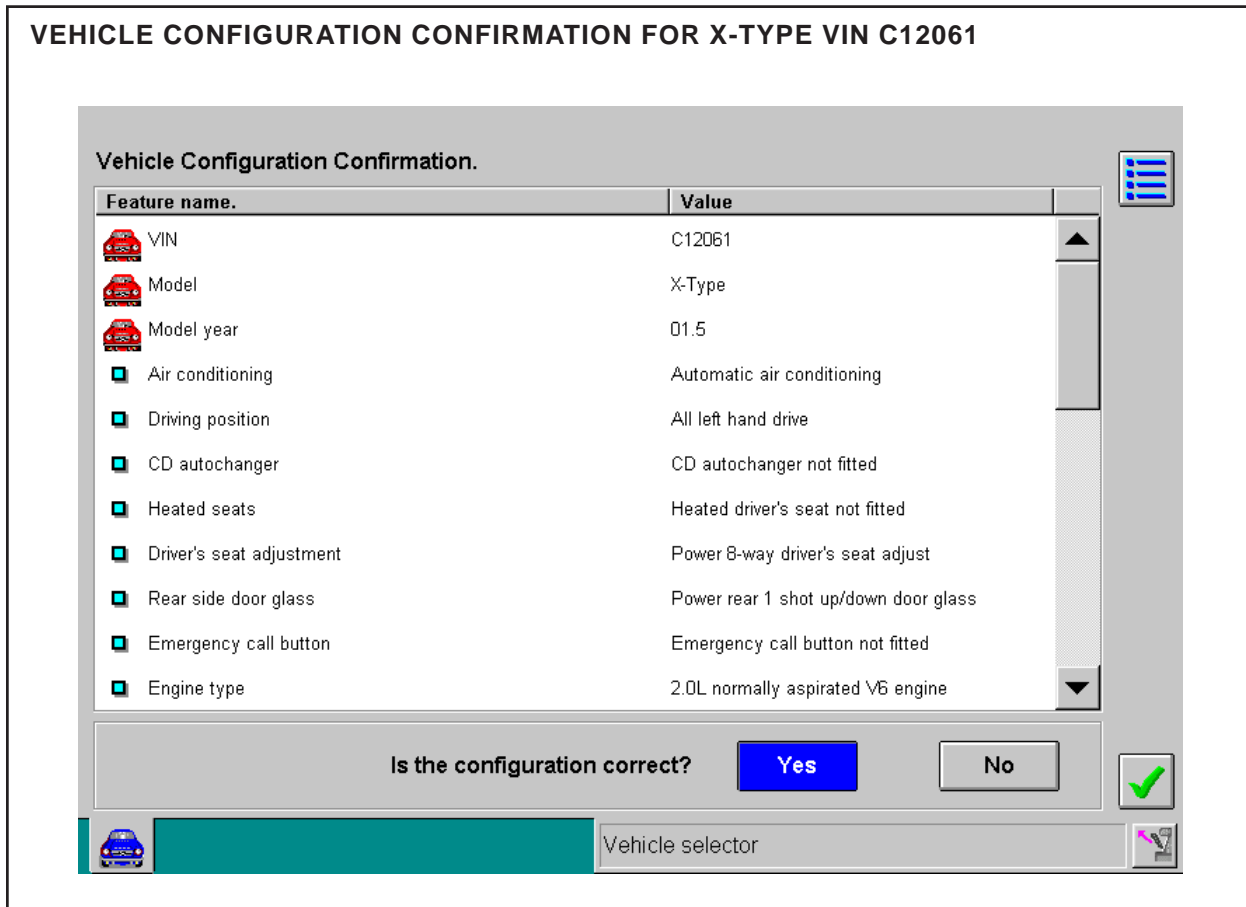


ILLUSTRATION 6

This data represents the 'as built condition' of the vehicle and will not identify any changes made by the dealer using the 'Add and remove accessories' option. E.g., if the VIN is entered for a vehicle that has had a CD changer installed, the 'configuration confirmation screen' will still show it as not installed. In this instance 'No' should be selected and the data changed to indicate that a CD changer is installed. This change only affects the data on WDS for the current session, the vehicle's VCATS code is not updated.

Note: The VCATS code is vital to the Programming and Configuration tool on WDS as certain data is used to program calibration files into a module or when VID block data isn't available to rebuild a module's configuration data, e.g., programming a new ECM.

If no VCATS data is available (i.e. the VID block contains no VCATS data or up to date data is not available on the WDS database) then a minimal configuration screen will be provided on WDS. This supplies vehicle type, VIN and model year only. Under these circumstances the WDS system will provide pop up questions to determine any additional data required.

Area 5: Checksum

The last byte of the VID block contains the VID checksum of all 256 bytes. If the checksum does not match the data the ECM will ignore all configuration data in the first 64 bytes and will resort to default data that was programmed during the ECMs manufacture. This may cause problems with malfunction indicator lamps coming on depending on the market.

The checksum only confirms that the data value is correct for the VID block it does not confirm that the data is valid for the vehicle.

Note: The last 192 bytes (excluding checksum byte 256) do not have any effect on the functionality of any modules on the vehicle even if the data is corrupt or not programmed. The data is merely a copy of the data that has been programmed into the various configurable modules. It only has an effect if the WDS has used the data to program another module.