2002-07 GENINFO

Coding and Programming - Overview - MINI

MINI CIP

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The acronym CIP stands for **C** oding, **I** ndividualization & **P** rogramming and with the introduction of Progman & CIP 15.0 it has become the sole software tool for coding and programming vehicles.

Initially CIP was developed for use on the BMW E65/E66 and newer models but has since been expanded to include all vehicles produced by the BMW Group. The interface will also be used for all MINI vehicles from start of production (those that utilize an SGC/UNIX programming structure).

The CIP software is capable of reading out the part numbers of all the control modules installed in the vehicle as well as the software levels of the respective modules. The information from the various installed modules is then cross referenced against a "master reference list" to determine if a module(s) needs to be updated.

Once this cross reference process is started it can result in additional issues such as:

- If the software level in a selected module is updated will the hardware of the module still be able to function correctly.
- If the software to be installed is not going to be compatible with the installed hardware then the module will need to be replaced.

Example: *A desktop computer originally built with a Pentium I, 75 Mhz processor using Windows 95 is not able to operate using Windows 2000. In order to operate with Windows 2000 this old desktop computer needs to upgraded with new hardware. However, a desktop computer designed to operate with Windows 2000 can be updated to Windows XP without having to upgrade the hardware of the computer .*

To understand the function of CIP we will first cover some of the fundamental terms and theories behind coding and programming.

FUNDAMENTALS OF CODING AND PROGRAMMING

What is Coding?

It is a process utilized by MINI, which groups system specific operating requirements (Data) together and then assigns a label/code to each of these groups of data. The various groups of data are all pre-loaded into system specific "codable" control modules, along with a basic set of operating instructions (Program).

Types of operating requirements:

- Nominal values of device input signals (0.25V to 2.5V, 5W - 25W,...)
- Type of device input signal (PWM, square wave, analog ...)

- Operational parameters (device activation/deactivation time,...)
- Market specific operations (O2 Sensors, Fuel Type, Emission Control,...)
- Country Specific Regulations (U.S., Canada, Japan, UK, ECE,...)
- Powertrain Configurations (Manual, Auto, Diesel,...)

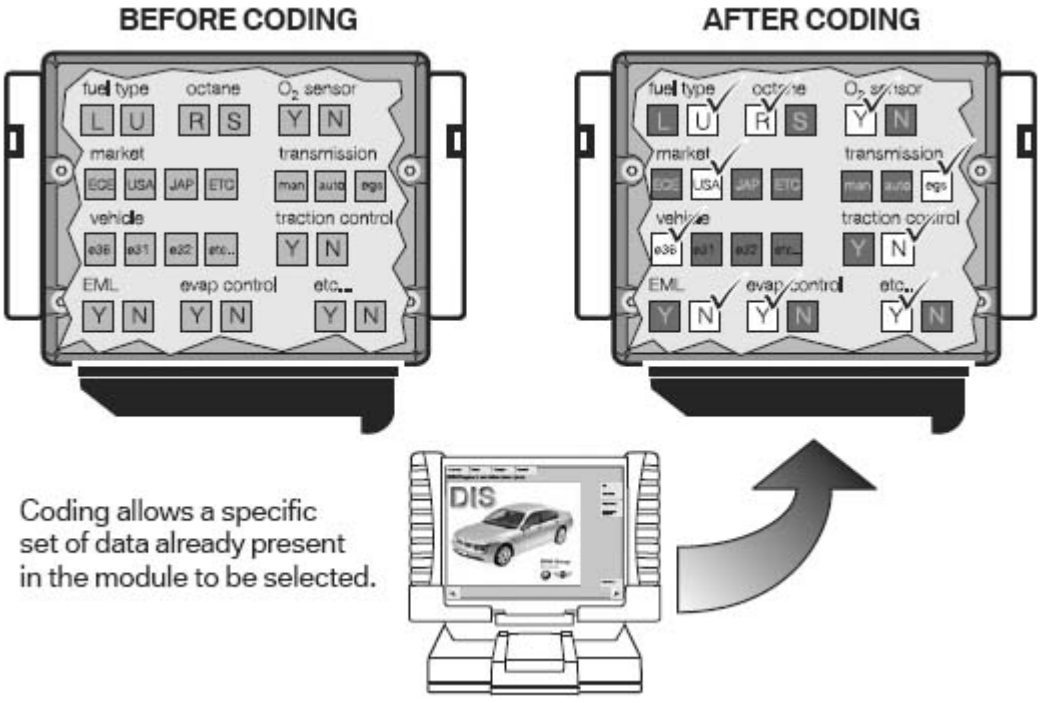

Fig. 1: Labeled Data To Operating Procedure
Courtesy of BMW OF NORTH AMERICA, INC.

The procedure of assigning one specifically labeled group of data to the operating program of a specific control module/component is referred to as "coding".

A "codable" control module has a basic operating program already installed along with several specific variations of operating data. The coding process allows a specific set of operating data to be assigned to the basic operating program of that module/component, with respect to its specific application.

Coding can be performed for some systems/components:

- Selecting customer specific system operational settings from a list of available features (VKM)
- Automatically by selecting a specific coding process available via ZCS Coding or CIP using the DISplus/GT1/SSS.
- By using a coded ground wire to a module.
- Determined at the factory.

NOTE: Codable control modules/components are system specific, which means that

not all control modules are codable.

What is Programming?

It is a process utilized by BMW to load application/system specific operating instructions (Program) into a module/component which already has the systems operating requirements (Data) installed, plus it can be used as a means of updating data and operating instructions previously installed in a control module.

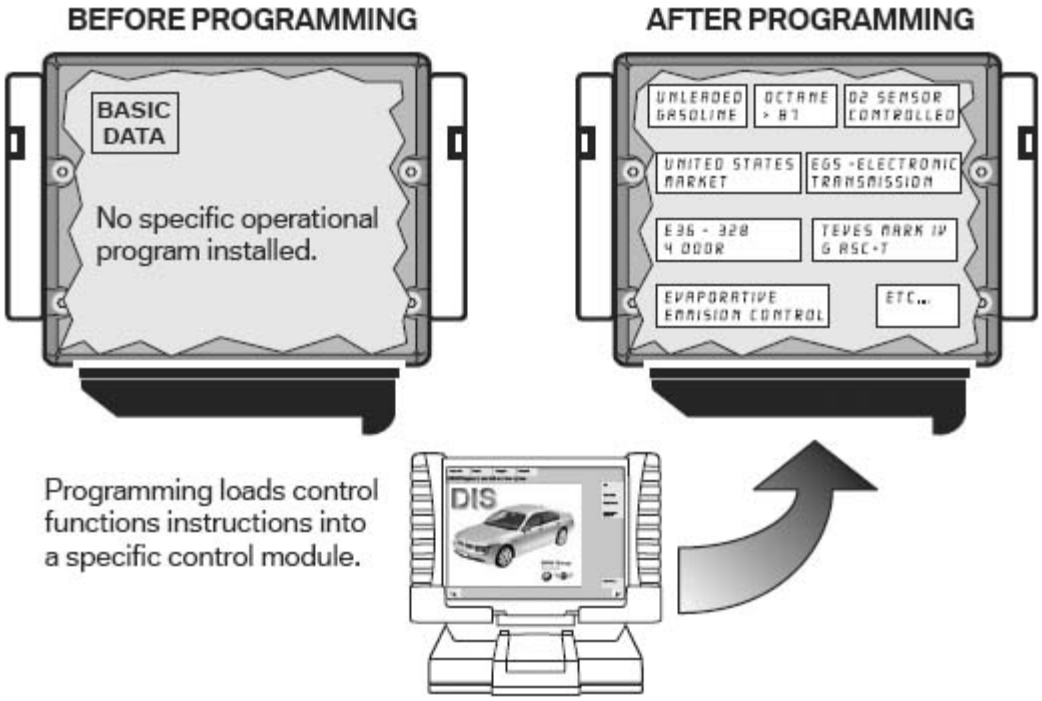

Fig. 2: Updating Data And Operating Instructions Installed In Control Module
Courtesy of BMW OF NORTH AMERICA, INC.

Basic programmable control modules have a pre-defined set of operating data already installed which allows the module to be fairly generic until a specific operational program is installed.

Programming of system control modules is performed using a DISplus/GT1/SSS.

NOTE: Programmable control modules are system specific and not all control modules are programmable using workshop equipment like the DISplus, GT1 or SSS. The ability to program a module is limited to the number of times it has already been programmed and the hardware version of the control module itself.

What is the Purpose of Coding and Programming?

As a global manufacturer, BMW must design a large variety of control modules to meet numerous vehicle requirements pertaining to issues such as:

- Country Specific Regulations (U.S., Canada, Japan, UK, ECE, ...)
- Vehicle Equipment Level (Phone, Navigation, HiFi, IHKA, IHKR, ...)
- Vehicle Powertrain Configurations (Manual, Auto, ...)
- System Specific Operating Requirements (Nominal values, type of input signal, ...)

By using Coding and/or Programming, the large variety of control modules needed can be reduced to a smaller number of model specific hardware variations.

Codable control modules contain:

- A common operating program
- A large number/variety of specific operating data groups

In order to use this type of control module it must first be CODED to ensure that the operating data specific to that vehicle/model application is used by the operating program of the control module.

Programmable control modules contain:

- The required/specific operational data
- No operating program

In order to use this type of control module it must first be PROGRAMMED to ensure that the operating program specific to the vehicle/model application is used.

Prior to the availability of Coding and Programming in the workshop this task could only be performed at the factory.

Initially the factory installed Control Module(s) with a common operating program or data into vehicles and as theses vehicles reached various points in the assembly process the control modules were updated with the required operating data or program specific to the application for that particular vehicle. Since replacement parts always need to be available, parts inventory needed to contain all variations of preprogrammed control modules installed in all varieties of vehicles that were manufactured. This was not a big problem in the early years, when the variety/quantity of models was smaller.

As the number of control modules and the complexity of the various systems installed into vehicles increased, the number of modules that needed to be stored in parts inventory began to increase as well. Eventually this led to the stocking of hundreds of different control modules that were either pre-programmed or pre-coded for a specific application and model, but only differed slightly in the way they were coded or programmed.

Pre-programmed and pre-coded control modules always needed to be available in the event a control module failed once the vehicle left the factory floor, since this was the only place programming & coding procedures could be performed. In order for repairs to be made quickly, dealers were required to maintain a stock of several varieties of control modules, since technicians could only remove the failed module and installed a new preprogrammed or pre-coded module into the vehicle.

As a result of having to maintain a very large inventory of pre-programmed and pre-coded control modules in parts inventory, it was decided to make coding and eventually programming available in BMW workshops.

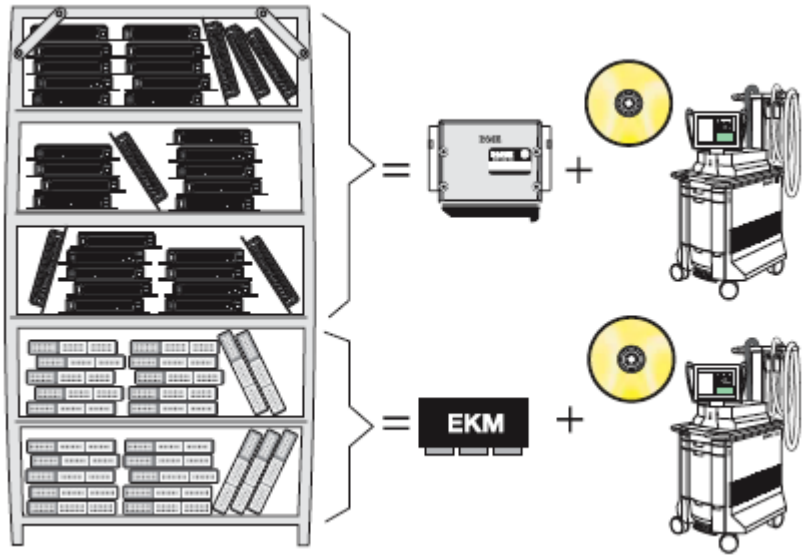

Fig. 3: Special Equipment Features To Control Modules
Courtesy of BMW OF NORTH AMERICA, INC.

The following advantages have occurred since programming and coding can be performed in the workshop:

- Fewer control module hardware versions are needed (only need basic control modules)
- Lower parts and inventory costs
- Able to update software in a control module without having to replace the module (Re-Code/ Re-Program to address service Measures)
- Ability to add special equipment features to existing control modules (DWA, Day Time Running Lights, ...)
- Customization of vehicle operation (Conversions, VKM, A/C, ...)

The means by which coding or programming information is provided to a control module varies and is determined by the vehicle, model year and type of module(s) installed.

BMW currently uses the following methods to perform Coding or Programming:

- Coding Plug
- DME variant Coding
- Coding Code
- Central Coding Key (ZCS) or Vehicle Order (VO)
- EPROM Programming
- Flash Programming
- Vehicle and Key Memory (VKM)

Where is Data Stored in a Control Module?

The control modules used in our vehicles store data/information on one of the following:

- EPROM (Electrically Programmable Read Only Memory)
- EEPROM (Electrically Erasable Programmable Read Only Memory)

in essence these devices are similar to the harddrive of the PC (**P** ersonal **C** omputer) that many of us use daily to store the images and documents/files of information.

EPROM (Electrically Programmable Read Only Memory)

An EPROM is a computer memory chip that can be electrically programmed, however this chip cannot be erased using normal means.

In order to erase data that is stored on the chip it must be removed from the device and exposed to UV lighting for a specific time period. An EPROM has what is commonly called a "window" on the top portion of the chip usually located underneath a protective label, it is this area that must be exposed to UV light of a certain intensity for a specific time period in order to erase the information stored on it.

MINI does not currently utilize EPROMS on current vehicles.

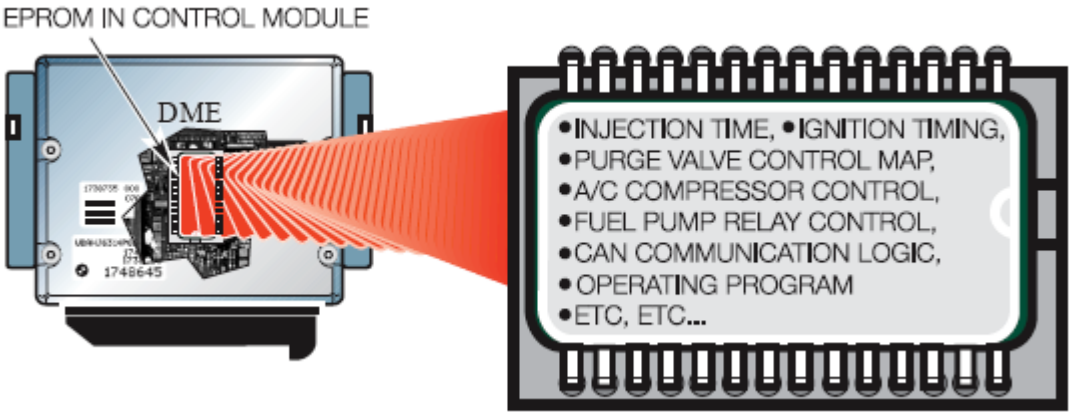

Fig. 4: Data Is Stored On Chip
Courtesy of BMW OF NORTH AMERICA, INC.

EEPROM (Electrically Programmable Read Only Memory)

An EEPROM is a computer memory chip that can be electrically programmed and electrically erased, thereby not requiring the chip to be removed from the module or exposed to light. In general this chip is not easily removable from the device it is installed into (it is usually soldered in its place.

Since the entire process of programming and erasing is done electronically this device is commonly referred to as **"Flash Programmable"** .

During the programming process the following type of information may be loaded into the control module

depending on the specific application or update that needs to be installed:

- Characteristic Maps (Ex. Ignition, Injection, Purge Control, DSC Regulation, ...)
- Control Constants/ Operational Data
- Operational Program
- Control Module Identification Information (Ex. Hardware Number, Program Number, Date of Modification, ...)

At this moment, modules with EEPROMS can only be flash programmed **("flashed")** , can only 14 times total. If the module has to be programmed a 15^{th} time, it has to be replaced.

What is needed to Code and Program?

In order to code or program a vehicle or control in the workshop, specific equipment and special software is required such as a DISplus, GT1 and an SSS which must all be connected to a network and have the must current version of CIP (**C** oding, **I** ndividualization & **P** rogramming) installed. CIP is the software program that contains all the latest data and program information to allow control modules to be updated to the latest level to address customer concerns and implement service solutions.

With the release of CIP 14.0 and the implementation of Progman (see) the DISplus and GT1 will only be capable of performing vehicle diagnosis and activation/initiation of a Coding, Individualization or Programming task through the SSS. A special program management tool (Progman) will only allow the DISplus and GT1 to act as remote terminals to the SSS (regarding Coding, Individualization & Programming), which means that the SSS will be the single supplier of Coding, Individualization and Programming information to a vehicle and its respective control modules.

Review Questions

1. *What happens when a control module is coded?*
2. *What happens when a control module is programmed?*
3. *What advantage is there by allowing workshops/centers to code and/or program control modules?*
4. *What component(s) stores data in a control module?*

VEHICLE CODING INFORMATION

Introduction

As part of an ongoing process to reduce the need for country, model and option specific control modules, MINI utilizes a multi digit vehicle coding structure referred to as a Central Coding Key (ZCS).

The Central Coding Key (ZCS) is a unique 37 digit code that contains specific model, country variation and individual equipment/option information for a vehicle.

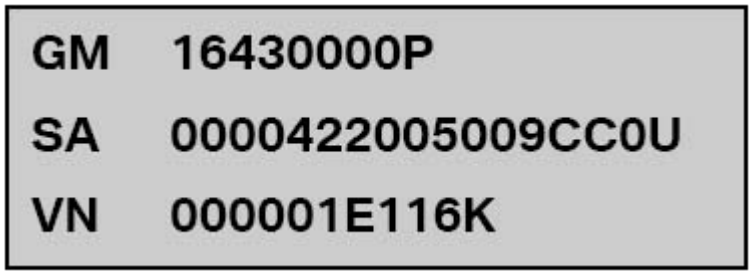

Fig. 5: Vehicle Coding Information Label
Courtesy of BMW OF NORTH AMERICA, INC.

During the manufacturing process of a vehicle, the ZCS code is created to identify the specific vehicle being built and to properly code the control modules installed during the assembly process once the vehicle reaches the end of the line. To ensure that the ZCS code can be retrieved once the vehicle leaves the factory it is stored in two control modules, the cluster and the EWS.

ZCS is often referred to as a "key" since it is able to automatically "unlock" or "activate" specific functions of a new control module or can be used to recode a used control module to be compatible with the specific vehicle it has been installed into. With the introduction of the E31 the ZCS information was used for the first time as a coding key for replacement vehicle control modules, this ensured that the replacement modules would be coded to the required specification of the vehicle.

These codeable modules have no limit as to the number of times that they can be recoded.

ZCS Structure

The 37 digit structure of the ZCS is subdivided into three segments. The segments represent specific information about the vehicle.

Each segment ends with a checksum "digit". A checksum is utilized by the coding software to detect unacceptable/erroneous manually entered coding information.

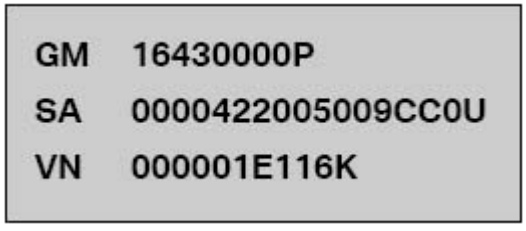

Fig. 6: ZCS Structure Lable
Courtesy of BMW OF NORTH AMERICA, INC.

The information/digits of the ZCS code reflects the options installed in the vehicle and should never be changed manually unless it is necessary for special recoding functions such as:

- Canadian market vehicle being moved to the US

- Retrofit installation of an accessory system (ie. alarm or satellite radio)

For extreme cases; If a modification needs to be made to the ZCS structure and there is no information available in a service bulletin then the Technical Hotline should be contacted for assistance by submitting a PUMA case, requesting a modified ZCS code.

Each portion of the ZCS provides specific information regarding that vehicle:

GM (Grundmerkmale) - Identifies the "Basic Features" of the vehicle and contains 9 digits that are used to describe:

- Vehicle type (R50, R52, R53 ...)
- Specific body style of the vehicle (Convertible, Coupe ...)
- Country specific coding identification (US, UK, ECE ...)
- Unique equipment that affects the basics of the vehicle (with sunroof, without sunroof, wheel size ...)
- Basic language variant (English, Spanish, German ...)

SA (Sonderausstattungs) - Identifies the "Special Equipment" of the vehicle and contains 17 digits that describe what features/functions are installed in the vehicle, such as:

- Power Windows or Manual windows
- Power Door Locks or Manual Door Locks
- Power Sunroof or Manual Sunroof
- Power Convertible Top or Manual Convertible Top
- Satellite Pre-wire

The SA segment is configured to provide a total of 64 possible number combinations (option groups) for all series vehicles worldwide. The information is modified whenever a new component/accessory is added to the vehicle via a retrofit coding procedure.

VN (Versionsnummer) - Identifies the "Version Number" of the vehicle and contains 11 digits that are used to describe:

- Series specific coding data that are not reflected in the GM or SA segments. This includes, model year dependent data, software and hardware versions of the control modules installed, coding instructions, etc.

The VN is displayed as 40 possible combinations of digits. A deliberate change in the VN will result in erroneous coding data being used when recoding a module or coding a replacement module which will affect the proper operation of a control module(s) coded with an incorrect VIN.

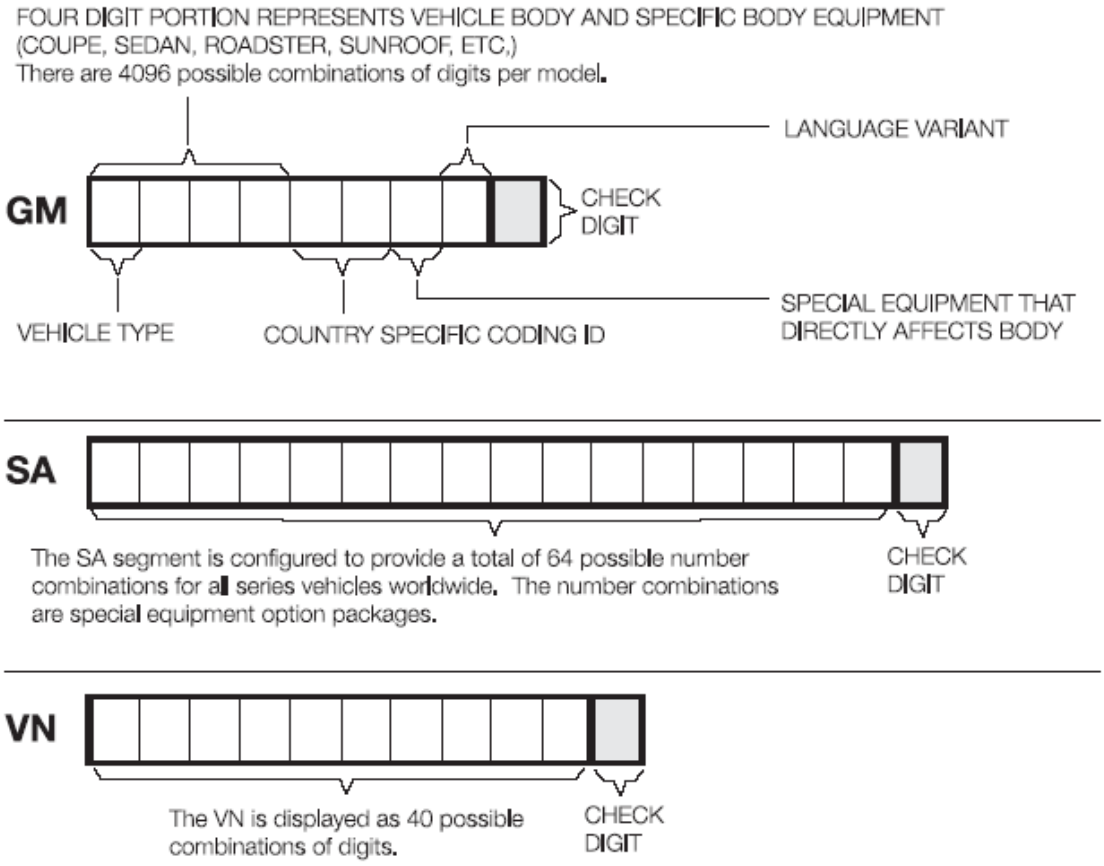

Fig. 7: VN Number
Courtesy of BMW OF NORTH AMERICA, INC.

ZCS Stored Location in Vehicle

The ZCS is stored in the vehicle to simplify the coding procedures when a module needs to be recoded or a replacement module needs to be coded. The ZCS information is stored in the cluster and the EWS.

The procedure to code control modules that utilize the ZCS information can be performed via the DISplus/GT1 or SSS using Progman with CIP 15.0 or higher and accessing the "Codierung ZCS/FA" function. Always reference service bulletins for information regarding the latest coding version and any possible software errors.

When coding a ZCS codable control module the coding program in CIP automatically searches the stored location, based on the VIN, and codes the selected module according to the information provided in the ZCS code.

The ZCS information is stored in two locations, referred to as redundant data storage, this insures that the information is always available in the event the primary device storing the data fails.

NOTE: If the module primarily storing the ZCS code fails, the coding software will automatically use the information stored in the "back up" module.

ZCS Identification / Display

The ZCS information for a specific vehicle can be obtained by:

- Accessing the control module(s) that electronically stores the information, using the DISplus/GT1 or SSS
- Contacting technical hotline

CONTROL MODULES FLASH (EEPROM) PROGRAMMING

An EEPROM is an E lectrically E rasable P rogrammable R ead O nly M emory chip that is soldered onto the circuit board of a control module. This signifies that programs & data stored on the chip can be electrically erased and replaced with new/revised programs or data.

In order to erase the data on the chip a short duration low level voltage/charge is applied to a pin on the EEPROM and the stored data is erased, hence the name "Flash". Once the data is erased new data is loaded.

By using a this technology, control modules have the ability to be updated a total of 13 times before they need to be replaced.

Theoretically an EEPROM can be erased and reprogrammed more than 13 times, MINI set the number to 13, since a point will be reached where the update being installed may no longer be compatible with the hardware of the installed module which could result in erroneous operation. If the program is not compatible with the hardware version of the module, the program used to determine the correct update for the module will indicate that the module will need to be replaced before the update can be performed.

The reference to Flash programming is a result of the technology used to erase the EEPROM prior to installing a new program and or data.

The utilization of EEPROMs started with Engine Management Systems and has expanded into other control modules.

Determination Process for DME EEPROM

The CIP program is used to determine the correct replacement part numbers (Control Module or software update) to be installed.

For modules that utilize EEPROMs/Flash programming the determination process is done automatically as part of determining a measures plan.

CIP (CODING, INDIVIDUALIZATION, AND PROGRAMMING)

A demonstration on how to code and program are found in the following pages.

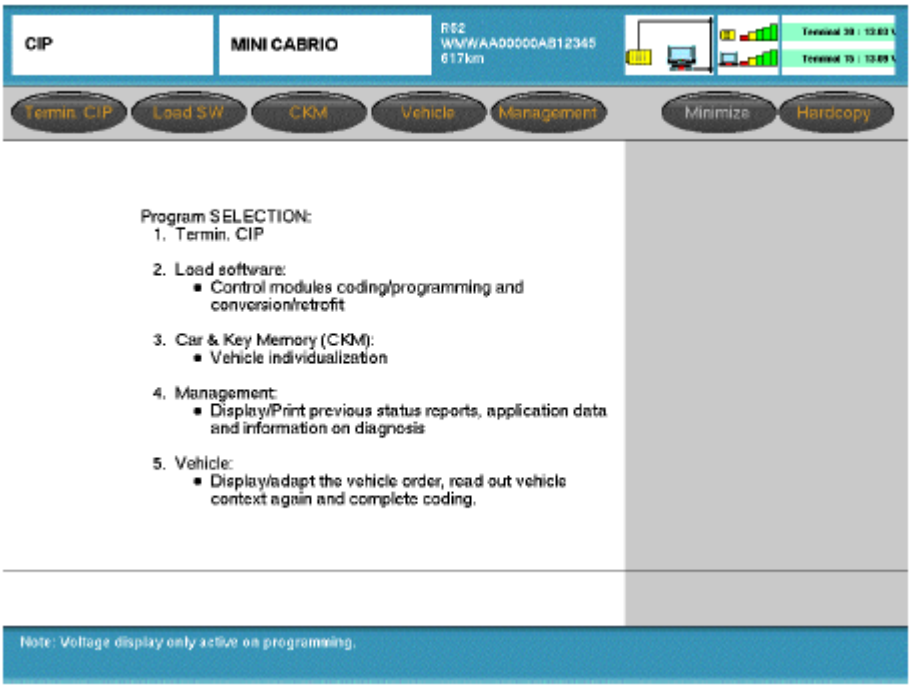

Fig. 8: Display Screen - CIP Functions
Courtesy of BMW OF NORTH AMERICA, INC.

Selection of CIP functions/options:

Termin. CIP - End the CIP program and return to Progman home screen

Load SW - Load software function to be selected if:

- Control module has been replaced
- Retrofit process is to be carried out
- Vehicle software is to be updated
- Coding/programming of one or more module(s) is performed

CKM - Vehicle Memory allows various driver selectable features (such as drive way locking, central locking/unlocking, daytime running lights etc.) to be coded to the vehicle.

Management - Provides the ability to:

- Display the current version of CIP installed
- Print previously performed Service Measure Reports
- Run a test on the software currently installed on system (SSS)

Vehicle - Allows access to:

- Vehicle Order
- Initialization
- Service Functions
- Complete vehicle coding

The following pages describe how to utilize CIP with Progman to perform various tasks in the workshop. Please be advised that all the screenshots and procedures are up to date as of this books publication. Although changes in the software are the only constant, there are no major changes perceived in the near future and the fundamentals will remain the same.

The table of contents can be used to find specific procedures on tasks.

Accessing Stored ZCS Information (w/ Progman v. 14 & 15)

Fig. 9: Display Screen - New Session
Courtesy of BMW OF NORTH AMERICA, INC.

From the Progman startup window, select **New session** .

Establish a connection to the interface connected to the vehicle and select **Continue** .

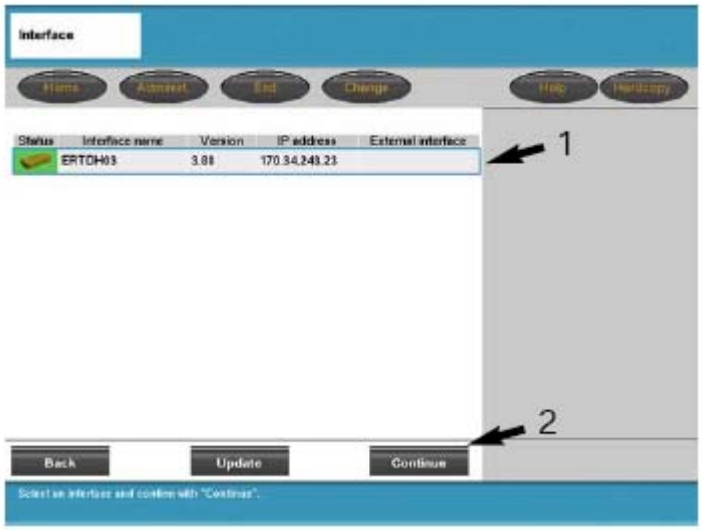

Fig. 10: Display Screen - Continue
Courtesy of BMW OF NORTH AMERICA, INC.

To perform the procedure from CIP the Model series must be selected.

Select the **MINI** .

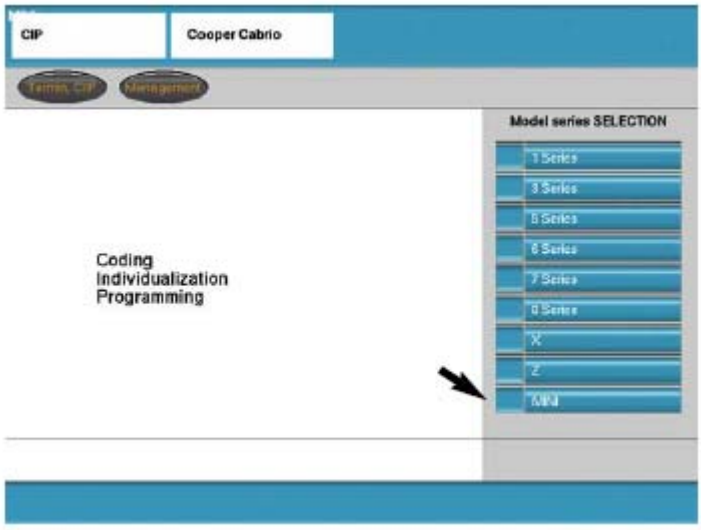

Fig. 11: Display Screen - MINI
Courtesy of BMW OF NORTH AMERICA, INC.

Select **CodierungZCS/FA** .

Advance screen to the right two times to enter the vehicle series selection screen.

Fig. 12: Display Screen - CodierungZCS/FA
Courtesy of BMW OF NORTH AMERICA, INC.

Select vehicle series.

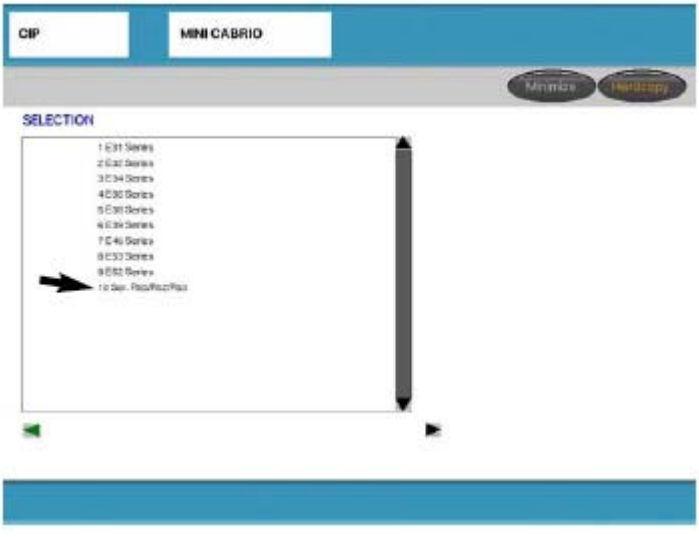

Fig. 13: Display Screen - Vehicle Series
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Display coding code and code for printout** .

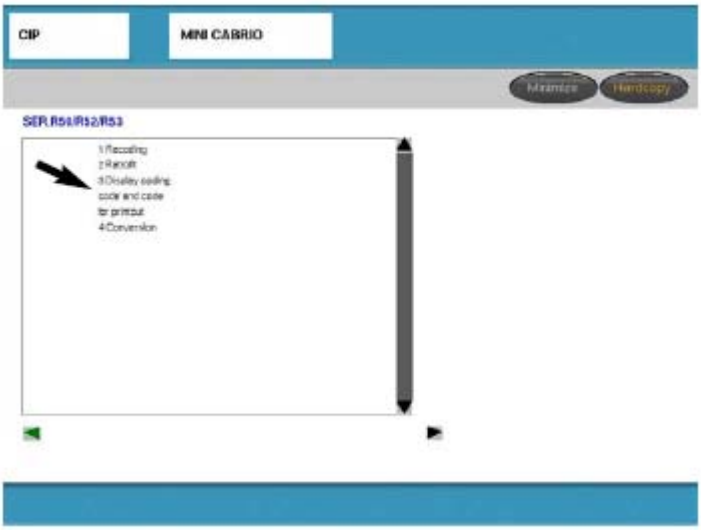

Fig. 14: Display Screen - Coding Code And Code For Printout
Courtesy of BMW OF NORTH AMERICA, INC.

ZCS Information for vehicle is displayed along with the stored location.

Fig. 15: Display Screen - ZCS Information For Vehicle Is Displayed Along With Stored Location
Courtesy of BMW OF NORTH AMERICA, INC.

ZCS Codable Control Modules (w/ Progman v. 14 & 15)

Control modules located in a vehicle that are ZCS codable are listed/identified by the "Codierung ZCS/FA" function contained in CIP.

To perform the procedure from CIP the Model series must be selected.

Select the **MINI** .

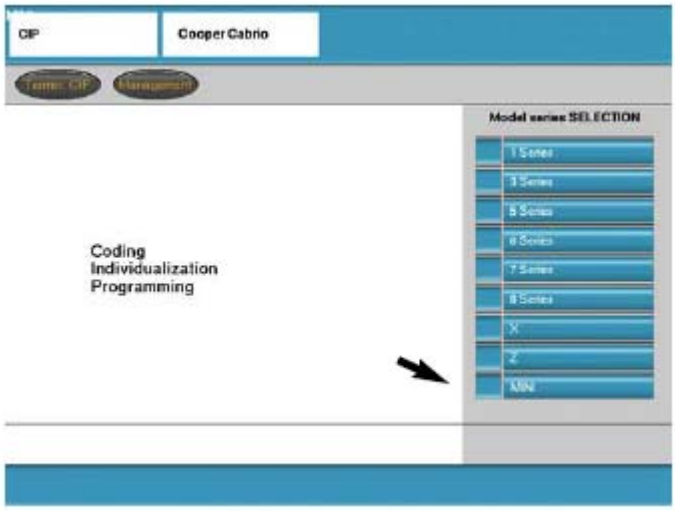

Fig. 16: Display Screen - MINI
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Codierung ZCS/FA** .

Fig. 17: Display Screen - Codierung ZCS/FA
Courtesy of BMW OF NORTH AMERICA, INC.

Select vehicle series.

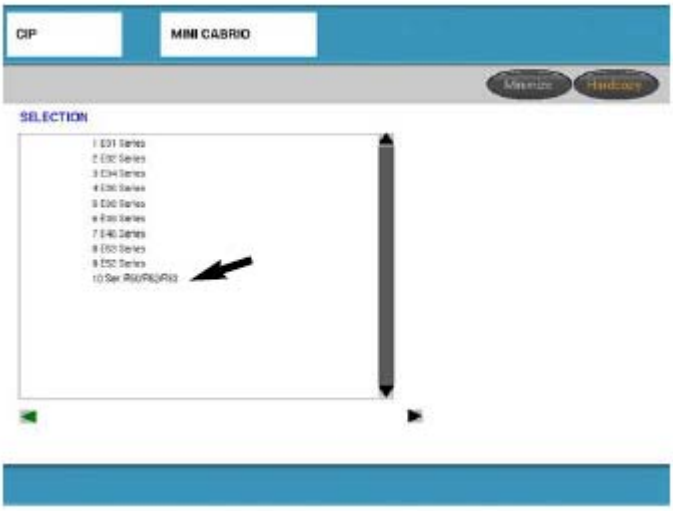

Fig. 18: Display Screen - Vehicle Series
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Recoding** .

Then advance screen to the right.

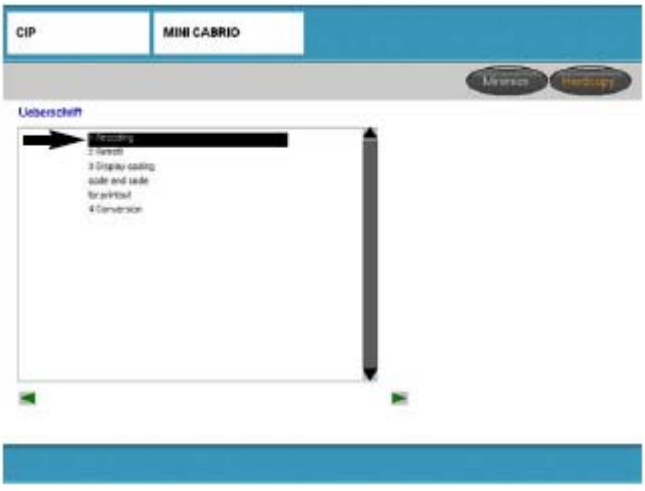

Fig. 19: Display Screen - Recoding
Courtesy of BMW OF NORTH AMERICA, INC.

The window now displays a list of control modules that are ZCS codable.

Fig. 20: Display Screen - Window
Courtesy of BMW OF NORTH AMERICA, INC.

ZCS Coding a Module (w/ Progman v. 14 & 15)

To ZCS code a control unit, follow the instructions for ZCS Codable Control Modules (w/ Progman v.14 & 15) to get to the list of ZCS codable control modules. Then select the module to be coded and follow on screen instructions.

Accessing Stored ZCS Information (w/ Progman v. 16 & higher)

From the Progman startup window, select **New session** .

Fig. 21: Display Screen - New Session
Courtesy of BMW OF NORTH AMERICA, INC.

Establish a connection to the interface connected to the vehicle and select **Continue** .

Fig. 22: Display Screen - Continue
Courtesy of BMW OF NORTH AMERICA, INC.

To perform the procedure from CIP the Model series must be selected.

Select the **MINI** .

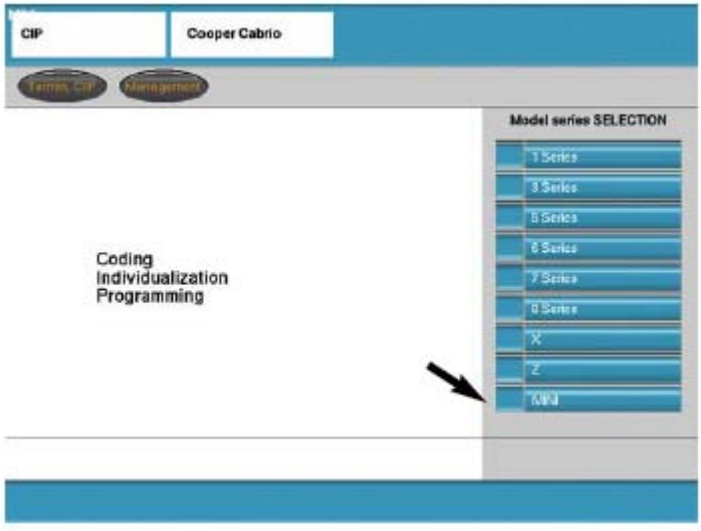

Fig. 23: Display Screen - MINI
Courtesy of BMW OF NORTH AMERICA, INC.

From the top menu bar, select **Vehicle** .

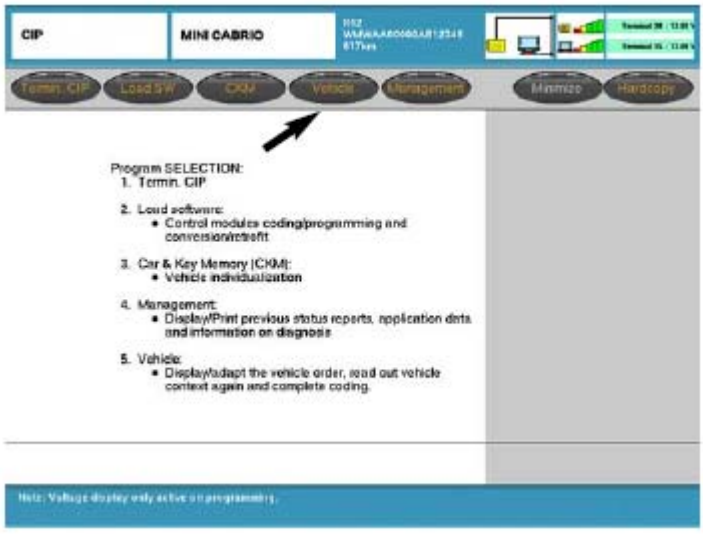

Fig. 24: Display Screen - Vehicle
Courtesy of BMW OF NORTH AMERICA, INC.

The CIP software now looks at the modules installed in the vehicle for:

- Part number of the control unit.
- Software number of the installed control unit.

Fig. 25: Display Screen - CIP Software
Courtesy of BMW OF NORTH AMERICA, INC.

To display the vehicle's ZCS code, select **ZCS Coding/Variant Code** .

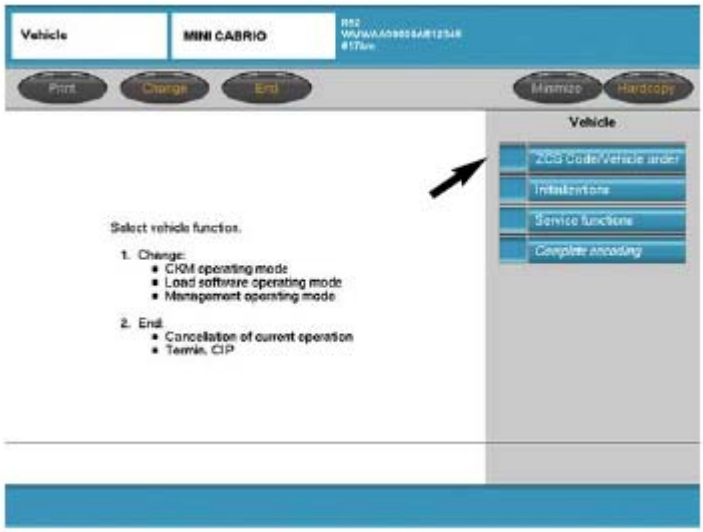

Fig. 26: Display Screen - ZCS Coding/Variant Code
Courtesy of BMW OF NORTH AMERICA, INC.

ZCS Coding All Modules (w/ Progman v. 16 & higher)

From the Progman startup window, select **New session** .

Fig. 27: Display Screen - New Session
Courtesy of BMW OF NORTH AMERICA, INC.

Establish a connection to the interface connected to the vehicle and select **Continue** .

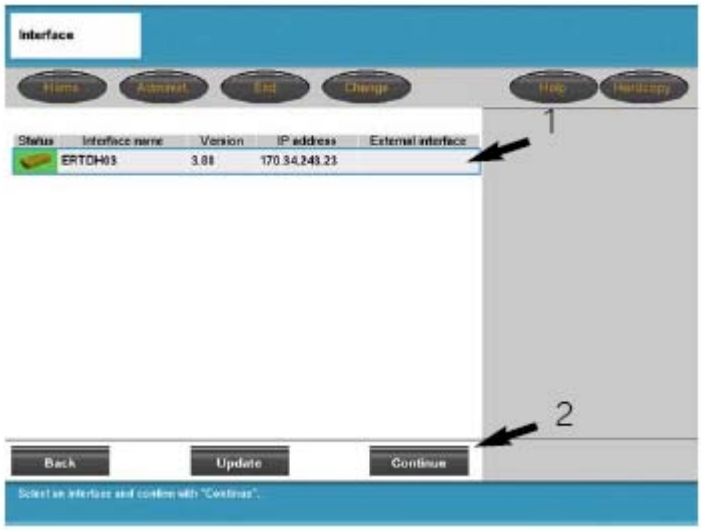

Fig. 28: Display Screen - Continue
Courtesy of BMW OF NORTH AMERICA, INC.

To perform the procedure from CIP the Model series must be selected.

Select the **MINI** .

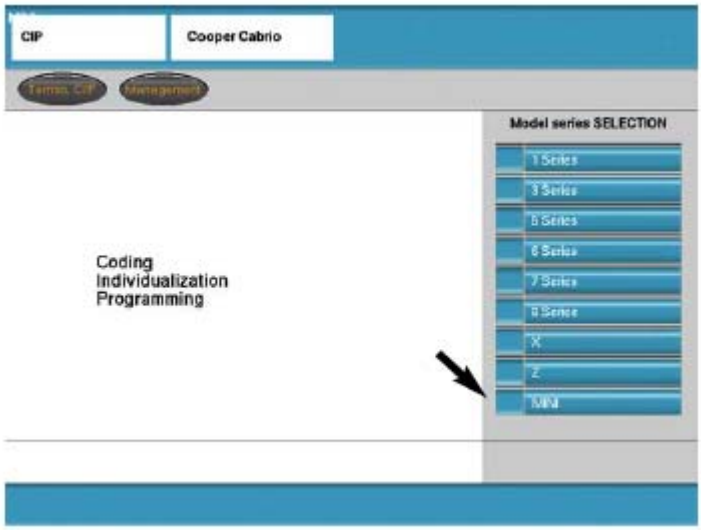

Fig. 29: Display Screen - MINI
Courtesy of BMW OF NORTH AMERICA, INC.

From the top menu bar, select **Vehicle** .

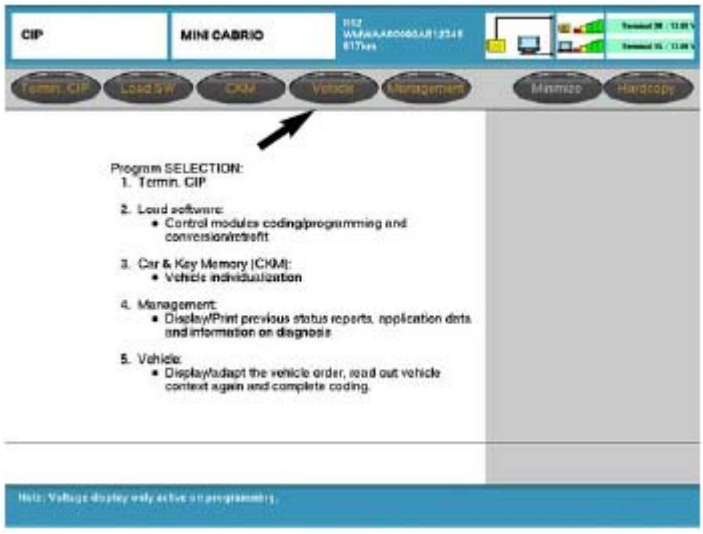

Fig. 30: Display Screen - Vehicle
Courtesy of BMW OF NORTH AMERICA, INC.

The CIP software now looks at the modules installed in the vehicle for:

- Part number of the control unit.
- Software number of the installed control unit.

Fig. 31: Display Screen - Control Modules
Courtesy of BMW OF NORTH AMERICA, INC.

To code all the modules fitted in the vehicle, select ***Complete encoding*** .

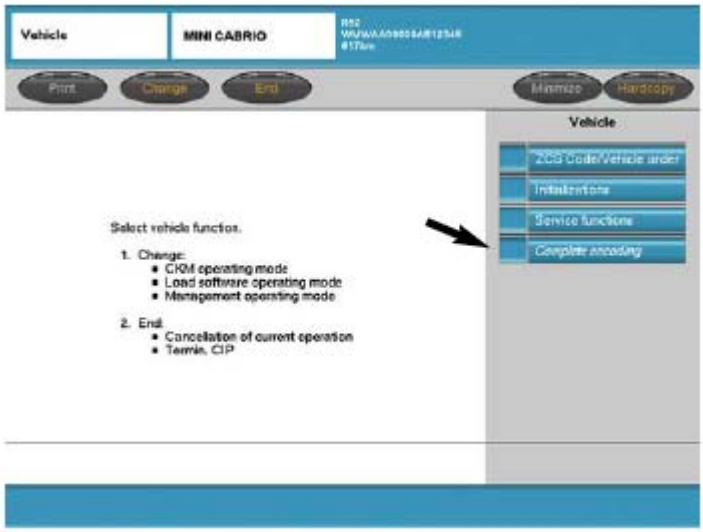

Fig. 32: Display Screen - Complete Encoding
Courtesy of BMW OF NORTH AMERICA, INC.

A warning window appears to confirm selection.

Select **Continue** .

Fig. 33: Display Screen - Continue
Courtesy of BMW OF NORTH AMERICA, INC.

To start complete vehicle encoding, select **Yes** .

Fig. 34: Display Screen - Yes
Courtesy of BMW OF NORTH AMERICA, INC.

Manual Input of ZCS Data (w/ Progman v. 14 & 15)

From Progman establish a connection to the interface connected to the vehicle and access CIP.

To perform the procedure from CIP the Model series must be selected.

Then select the body.

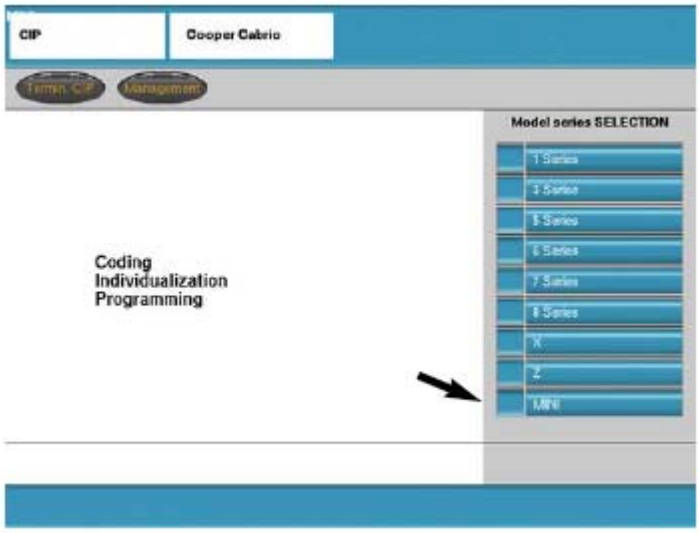

Fig. 35: Display Screen - Model Series Selected
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Codierung ZCS/FA** .

Then advance screen to the right two times to enter the vehicle series selection screen.

Fig. 36: Display Screen - Codierung ZCS/FA
Courtesy of BMW OF NORTH AMERICA, INC.

The version ID page is displayed.

Make sure it is the most up-to-date version of the software for the encoding procedure.

Press the right arrow.

Fig. 37: Display Screen - Right Arrow
Courtesy of BMW OF NORTH AMERICA, INC.

Select vehicle series (i.e "E36 Series").

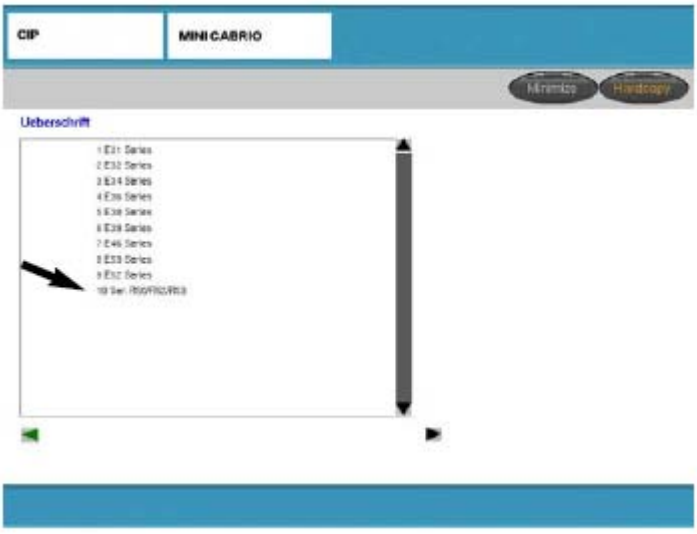

Fig. 38: Display Screen - Vehicle Series
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Recoding** .

Then advance screen to the right.

Fig. 39: Display Screen - Recoding
Courtesy of BMW OF NORTH AMERICA, INC.

Displays control modules that are ZCS codable.

Select **KOMBI** .

Fig. 40: Display Screen - KOMBI
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Yes** to recode KOMBI.

Fig. 41: Display Screen - Yes To Recode KOMBI
Courtesy of BMW OF NORTH AMERICA, INC.

Follow the instructions given on screen.

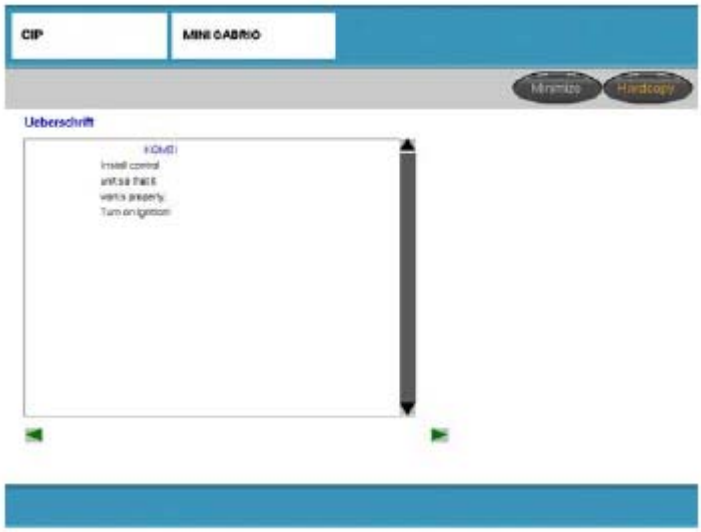

Fig. 42: Display Screen - Instructions
Courtesy of BMW OF NORTH AMERICA, INC.

Chassis number of vehicle is displayed.

Select "Yes" to accept VIN.

Select "No" if VIN needs to be changed.

When installing a new module the last 7 digits of the VIN will need to be entered.

Fig. 43: Display Screen - Vehicle Chassis Number
Courtesy of BMW OF NORTH AMERICA, INC.

Follow the instructions given on screen.

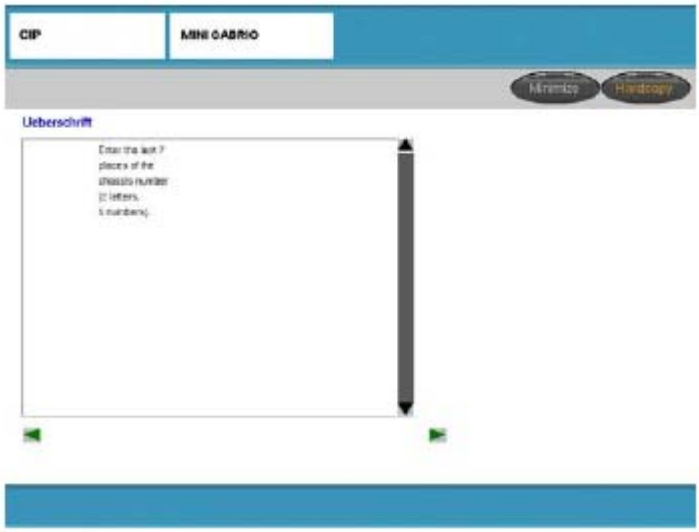

Fig. 44: Display Screen - Instructions
Courtesy of BMW OF NORTH AMERICA, INC.

Chassis number of vehicle is displayed, enter VIN using touch screen pad or the keyboard on an SSS.

Select "Yes" to accept VIN.

Select "No" if VIN needs to be changed/corrected.

When installing a new module the last 7 digits of the VIN will need to be entered.

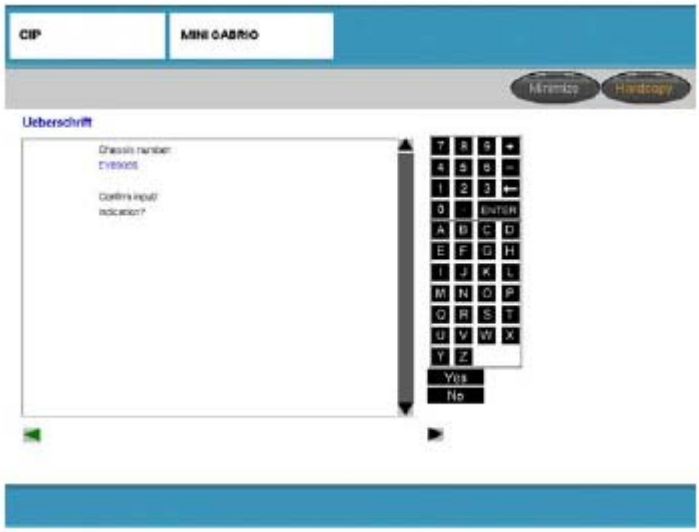

Fig. 45: Display Screen - Vehicle Chassis Number
Courtesy of BMW OF NORTH AMERICA, INC.

Current ZCS code is displayed.

Select "Yes" to accept current code.

Select "No to change the ZCS data.

When installing a new module the ZCS code of the vehicle will need to be entered. The information can be obtained from:

- ZCS print out of old module before removal.
- ZCS label located in vehicle.

Fig. 46: Display Screen - ZCS Code
Courtesy of BMW OF NORTH AMERICA, INC.

If the ZCS code must be changed follow the instruction given on screen and enter the required information exactly as indicated on the ZCS label or printout of ZCS code before removal of module.

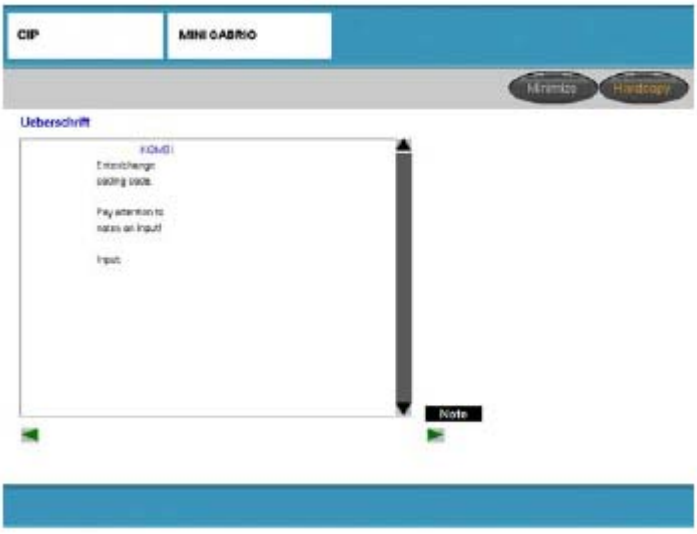

Fig. 47: Display Screen - Instruction
Courtesy of BMW OF NORTH AMERICA, INC.

Confirm or enter new GM information.

Fig. 48: Display Screen - GM Information
Courtesy of BMW OF NORTH AMERICA, INC.

Confirm or enter new SA information.

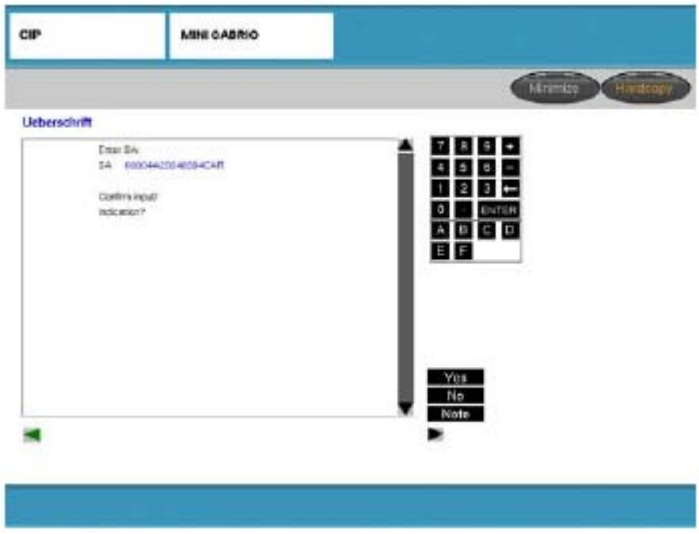

Fig. 49: Display Screen - SA Information
Courtesy of BMW OF NORTH AMERICA, INC.

By selecting "EWS adjustm." or "CAS Calibration" the rolling code tables can be initialized.

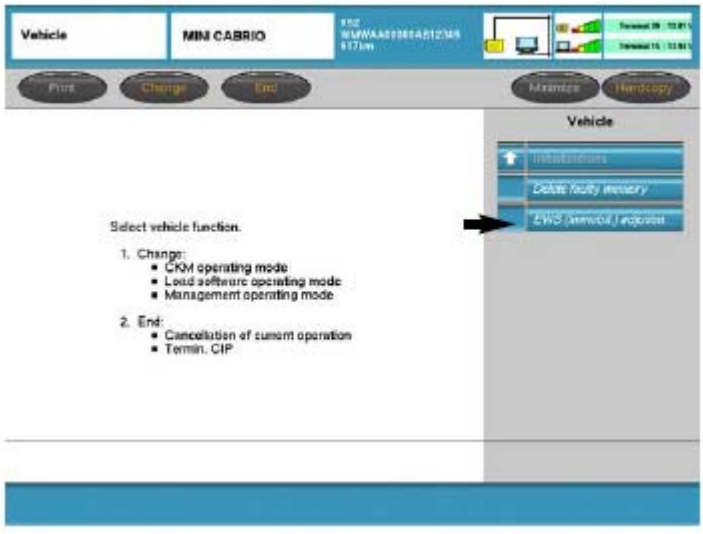

Fig. 50: Display Screen - Vehicle Function
Courtesy of BMW OF NORTH AMERICA, INC.

By selecting "Yes" the calibration/initialization of the rolling code tables in the DME and CAS or EWS modules will be carried out.

Fig. 51: Display Screen - EWS Calibration
Courtesy of BMW OF NORTH AMERICA, INC.

Vehicle - Service Function

The "Service function" feature provides access to various calibration functions.

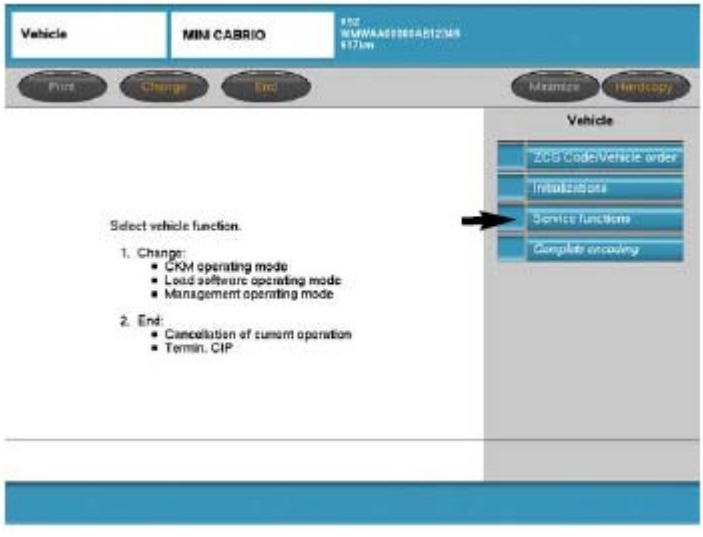

Fig. 52: Display Screen - Service Function
Courtesy of BMW OF NORTH AMERICA, INC.

Selecting "LWS" will provide the ability to calibrate the steering angle sensor.

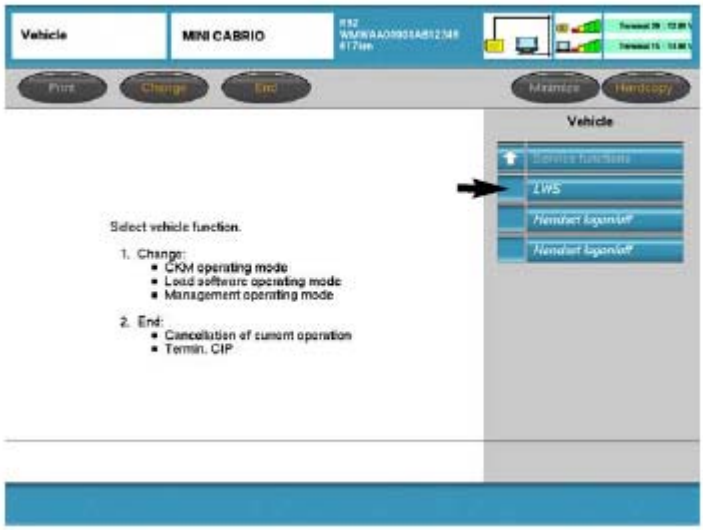

Fig. 53: Display Screen - LWS
Courtesy of BMW OF NORTH AMERICA, INC.

By selecting "Continue" the process to calibrate the steering angle sensor will be carried out.

Fig. 54: Display Screen - Continue
Courtesy of BMW OF NORTH AMERICA, INC.

Additional Coding Functions

Retrofit

The retrofit function allows options or accessory equipment to be added after the vehicle is manufactured.

By selecting to install a new option/accessory from the list of available retrofits for the specific vehicle, the ZCS information will be updated to reflect the addition of the new option or accessory that was installed. Updating of

the ZCS information will ensure that the new component is recognized and able to communicate with the other modules in the vehicle.

Conversion

The conversion function allows specific features of certain control modules/systems to be modified, similar to the way Individualization(Vehicle & Key Memory) is used on newer models to "customize" a vehicle.

CKM - Vehicle Memory (w/ Progman v. 16 & higher)

The CKM feature contained in CIP provides the ability to "customize" certain vehicle functions to meet the specific preferences of the customer. It is important to note that the functions/features that can be "customized" will vary depending on model, equipment level and vehicle software level.

Upon selecting "CKM" a check of the current vehicle and key settings is made and displayed. A printout should be collected before and after the customization is performed.

Upon selecting CKM, a check of the current vehicle settings is made.

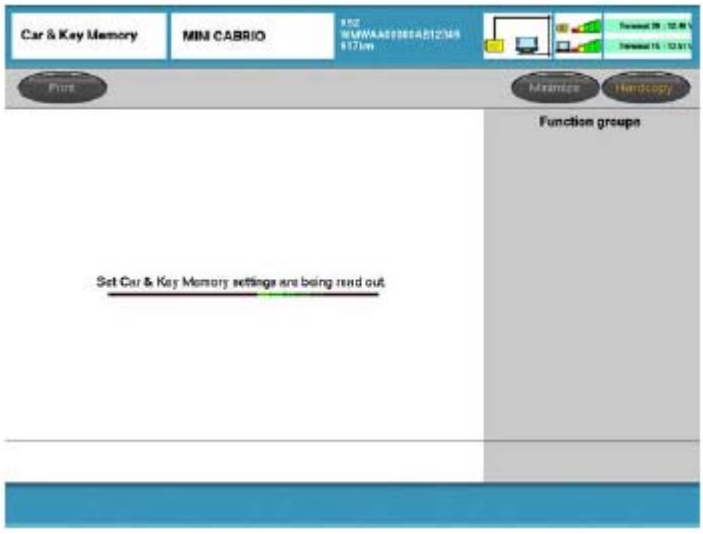

Fig. 55: Display Screen - CKM
Courtesy of BMW OF NORTH AMERICA, INC.

Once the check is complete the current setting are displayed and can be printed out.

Fig. 56: Display Screen - Complete Current Setting
Courtesy of BMW OF NORTH AMERICA, INC.

Changes to the current settings can be made by selecting the preferred function.

All selections can be made at once.

Fig. 57: Display Screen - Preferred Function
Courtesy of BMW OF NORTH AMERICA, INC.

Once all selections have been made, select **Encode car** .

Fig. 58: Display Screen - Encode Car
Courtesy of BMW OF NORTH AMERICA, INC.

To save setting select **Save** .

Fig. 59: Display Screen - Save
Courtesy of BMW OF NORTH AMERICA, INC.

A status bar shows up during the coding procedure.

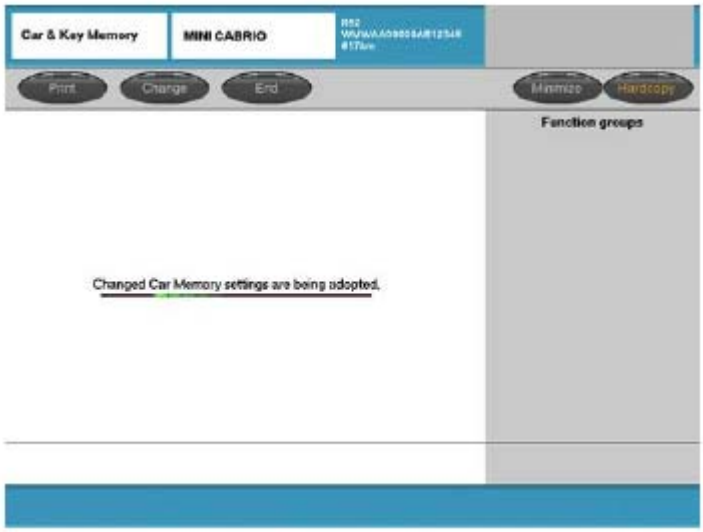

Fig. 60: Display Screen - Coding Procedure
Courtesy of BMW OF NORTH AMERICA, INC.

Once complete, a final diagnosis report will be displayed.

Select **Finish** .

Fig. 61: Display Screen - Finish
Courtesy of BMW OF NORTH AMERICA, INC.

Newly change CKM settings are being read out.

Fig. 62: Display Screen - CKM Settings
Courtesy of BMW OF NORTH AMERICA, INC.

CIP displays a window with the changes made to vehicle memory reflected.

End and terminate CIP.

Fig. 63: Display Screen - CIP Window
Courtesy of BMW OF NORTH AMERICA, INC.

Confirm or enter new VN information.

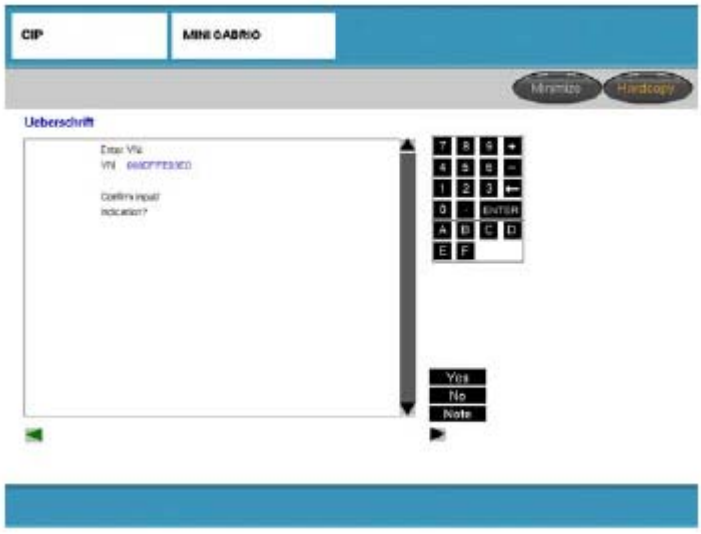

Fig. 64: Display Screen - VN Information
Courtesy of BMW OF NORTH AMERICA, INC.

Confirm or correct ZCS information.

Fig. 65: Display Screen - ZCS Information
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Yes** to begin the coding process for the installed/selected module.

Upon completion of the coding process print out a copy of the ZCS information displayed and attach it to the repair order to be maintained with vehicle file.

Switch ignition off for 10 seconds, then check for proper system operation.

Fig. 66: Display Screen - Yes To Coding Process
Courtesy of BMW OF NORTH AMERICA, INC.

Programming a Control Module (w/ Progman v. 16 & higher)

From the Progman startup window, select **New session** .

Fig. 67: Display Screen - New Session
Courtesy of BMW OF NORTH AMERICA, INC.

Establish a connection to the interface connected to the vehicle and select **Continue** .

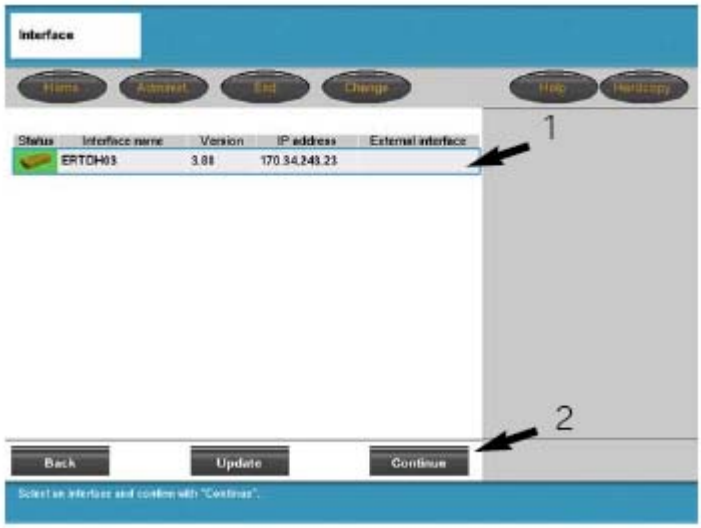

Fig. 68: Display Screen - Continue
Courtesy of BMW OF NORTH AMERICA, INC.

To perform the procedure from CIP the Model series must be selected.

Select the **MINI** .

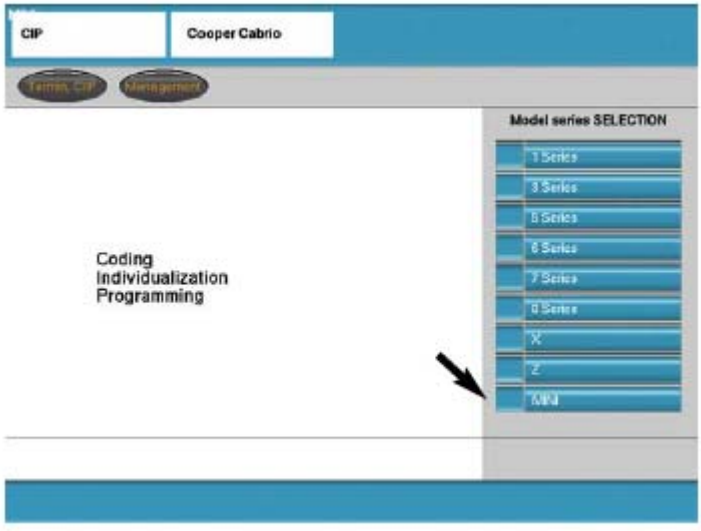

Fig. 69: Display Screen - MINI
Courtesy of BMW OF NORTH AMERICA, INC.

From the top menu bar, select **Load SW** .

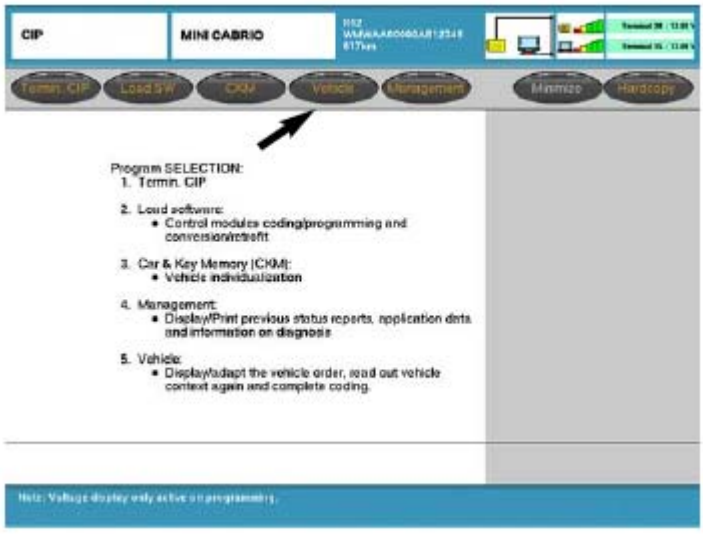

Fig. 70: Display Screen - Menu Bar
Courtesy of BMW OF NORTH AMERICA, INC.

The CIP software now looks at the modules installed in the vehicle for:

- Part number of the control unit.
- Software number of the installed control unit.

Fig. 71: Display Screen - CIP Software
Courtesy of BMW OF NORTH AMERICA, INC.

Answer "Yes" if:

- A previously installed control module has been replaced.

Answer **"No"** if:

- No control module(s) has been replaced but an update on one or more modules needs to be performed.
- A retrofit needs to be performed on the vehicle even if a module had to be installed as part of the installation process.

Fig. 72: Display Screen - No
Courtesy of BMW OF NORTH AMERICA, INC.

The CIP software now looks at the modules installed in the vehicle for:

- Part number of the control unit.
- Software number of the installed control unit.

Fig. 73: Display Screen - CIP Software Looks

Courtesy of BMW OF NORTH AMERICA, INC.

The CIP software now looks at the modules installed in the vehicle for:

- Part number of the control unit.
- Software number of the installed control unit.

Fig. 74: Display Screen - CIP Software Looks
Courtesy of BMW OF NORTH AMERICA, INC.

Select the module that needs to be programmed.

OR

Select "Retrofits" if an accessory function/feature is to be added or deleted.

Example: ***DME/EMS2000***

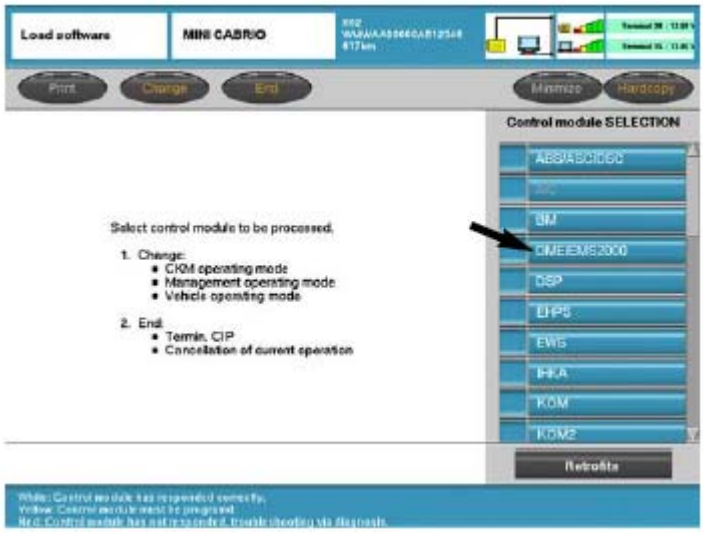

Fig. 75: Display Screen - DME/EMS2000
Courtesy of BMW OF NORTH AMERICA, INC.

Programming is selected if:

- Checking for availability of updated software for selected control module.
- It is known that updated software is available for the selected control module.

Replacement is selected if:

EWS is selected if:

- Alignment of EWS & DME must be performed.

Example: ***Programming***

Fig. 76: Display Screen - Programming
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Update software** .

Upon selecting "Update software" a measures plan will be generated.

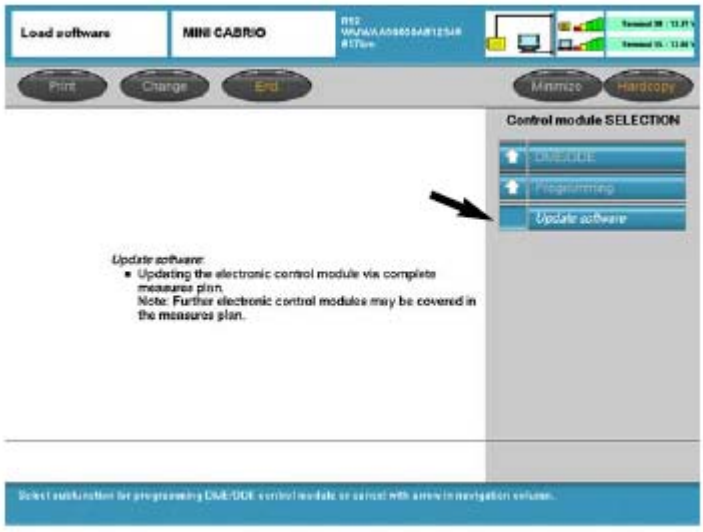

Fig. 77: Display Screen - Update Software
Courtesy of BMW OF NORTH AMERICA, INC.

A measures plan for the selected system or module is displayed.

A measures plan identifies the programmed part number for the control module(s) installed:

- "Old part no. prog. ctrl. mod.", indicates p/n for software currently installed.

- "New part no. prog. ctrl. mod.", indicates the p/n if the module is updated, by accepting the displayed measures plan the module will be updated to the new number and software.

Select **Accept** .

NOTE: The "update" does not need to be performed if the two part numbers are the same.

Fig. 78: Display Screen - Accept
Courtesy of BMW OF NORTH AMERICA, INC.

After programming is complete a final report will be generated.

The report contains information on procedures completed and their results.

- If a procedure was completed successfully, a green check appears next to the operation.
- If a procedure occurred with errors, a red X appears next to the operation.

Fig. 79: Display Screen - Final Report
Courtesy of BMW OF NORTH AMERICA, INC.

Points to remember:

- A "Measures plan" provides information on updates that are available for selected control modules.
- Always print out a copy of the measures plan and final report and attach it to the repair order to document the work performed.
- The SSS stores the last 16 report in memory for printout at a later date.
- If the measures plan identifies any control modules that will need to be replaced exit CIP, replace the module, and then re-enter CIP and program the module.
- After reprogramming a control unit, delete all fault code via diagnosis or CIP.

Retrofits (w/ Progman v. 16 & higher)

Select **Retrofits** to view a list of functions/features that can be modified or installed.

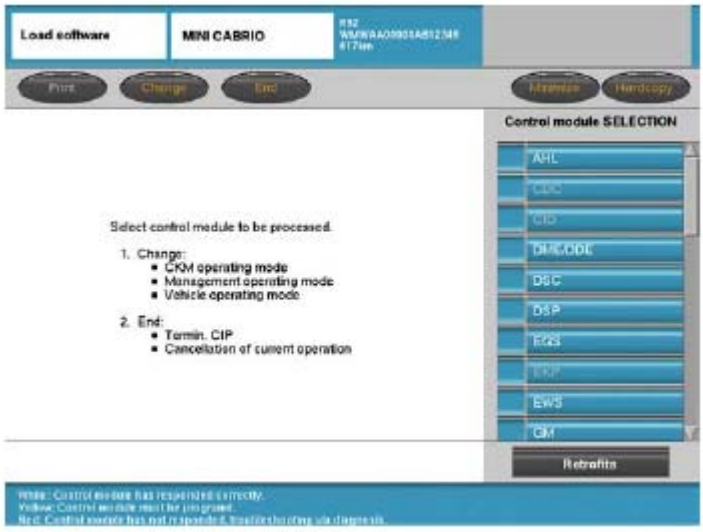

Fig. 80: Display Screen - Retrofits
Courtesy of BMW OF NORTH AMERICA, INC.

The initial screen displays information pertaining to:

- Airbag activation/deactivation.
- Telematics On/Off.
- Language (setting control display/monitor language).
- Maintenance interval - reset/checking.
- USA-Canada conversion.
- Retrofits - listing accessories installed or available for installation.

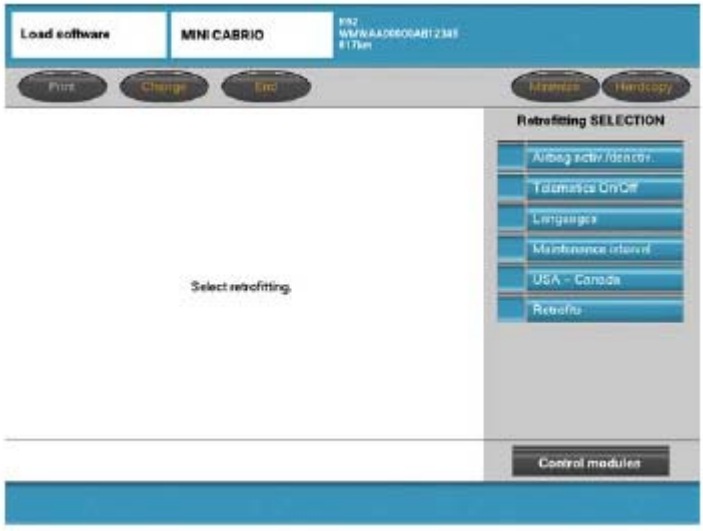

Fig. 81: Initial - Screen Display
Courtesy of BMW OF NORTH AMERICA, INC.

By selecting "Retrofits" on the previous screen a list of accessory systems available for installation is obtained.

NOTE: Some of the items listed may not be available as retrofits for US vehicles.

Fig. 82: Display Screen - Retrofits
Courtesy of BMW OF NORTH AMERICA, INC.

Example: *ULF was selected on previous screen. If this system/module is installed the vehicle order will be modified to reflect the addition of this module/accessory to the vehicle by selecting "Continue".*

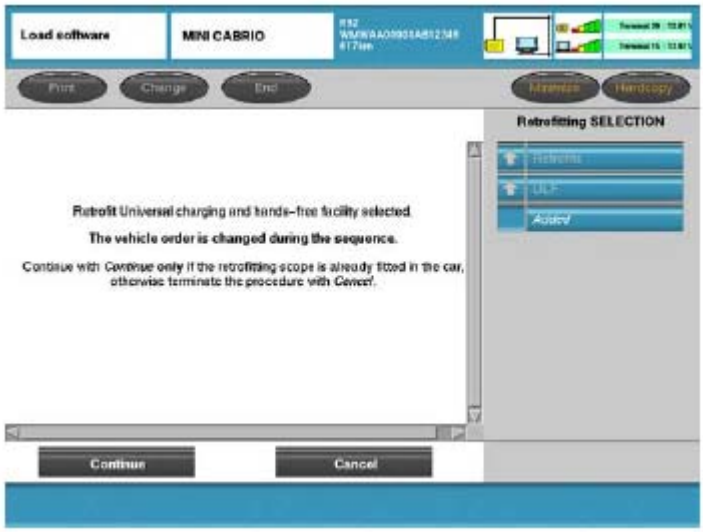

Fig. 83: Display Screen - Continue
Courtesy of BMW OF NORTH AMERICA, INC.

Management - Reports

By selecting "Management"

- Print previously performed Service Measure reports
- Display the current version of CIP installed
- Run a test on the software currently installed on the system (SSS)

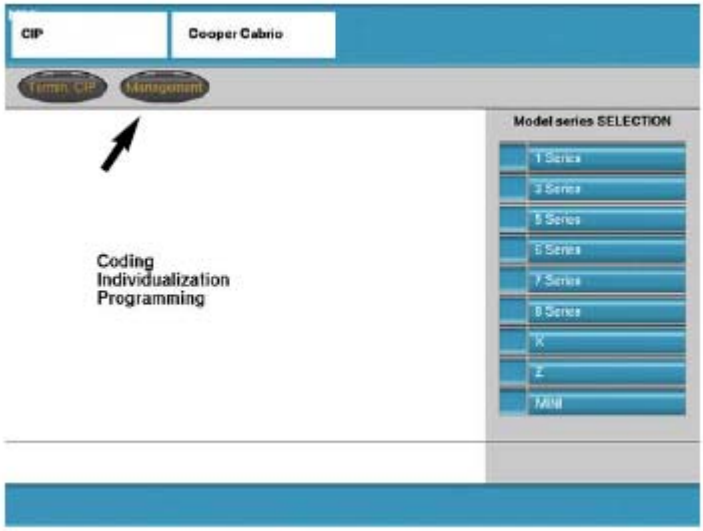

Fig. 84: Display Screen - Management
Courtesy of BMW OF NORTH AMERICA, INC.

To access the most recently generated measures plans select **Reports** .

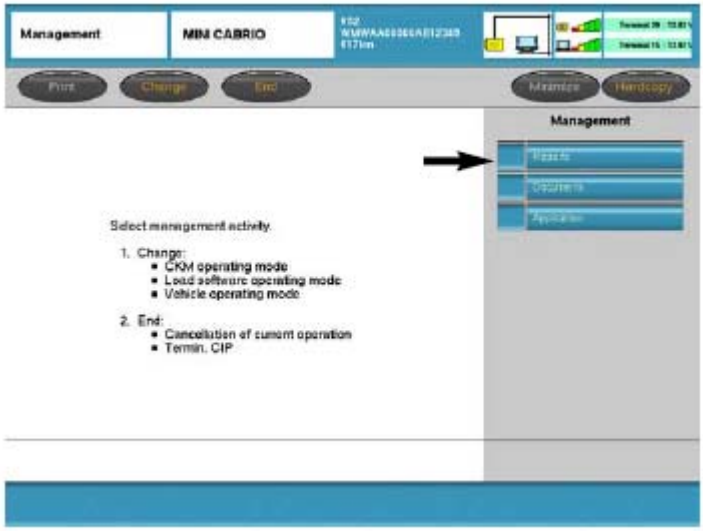

Fig. 85: Display Screen - Reports
Courtesy of BMW OF NORTH AMERICA, INC.

The 16 most recently generated measures plans can be accessed/viewed.

Fig. 86: Display Screen - Management Activity
Courtesy of BMW OF NORTH AMERICA, INC.

Management - Application - Test & Version

The "Application" function provides the ability to:

- Run a system test.
- Determine information regarding the version of CIP currently installed.

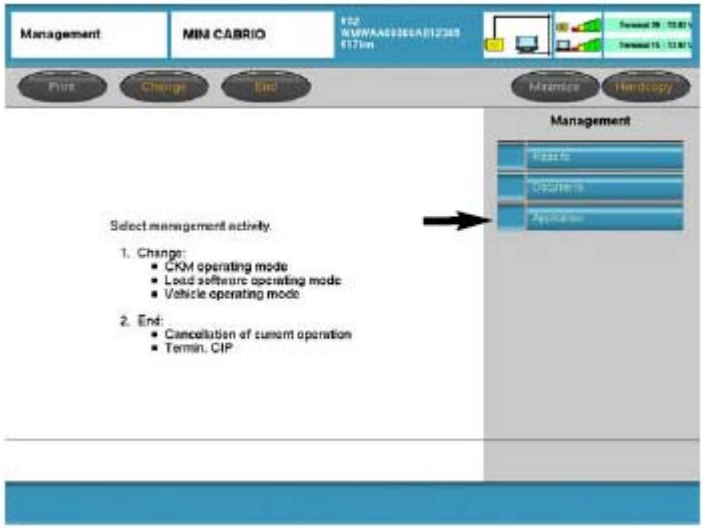

Fig. 87: Display Screen - Application
Courtesy of BMW OF NORTH AMERICA, INC.

Select **Test** if system files are to be checked.

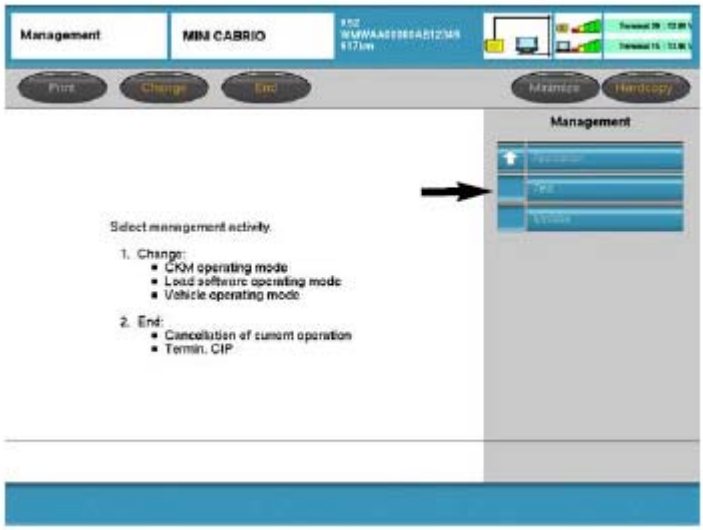

Fig. 88: Display Screen - Test
Courtesy of BMW OF NORTH AMERICA, INC.

By selecting the "Start" button a brief test of the system files will be performed.

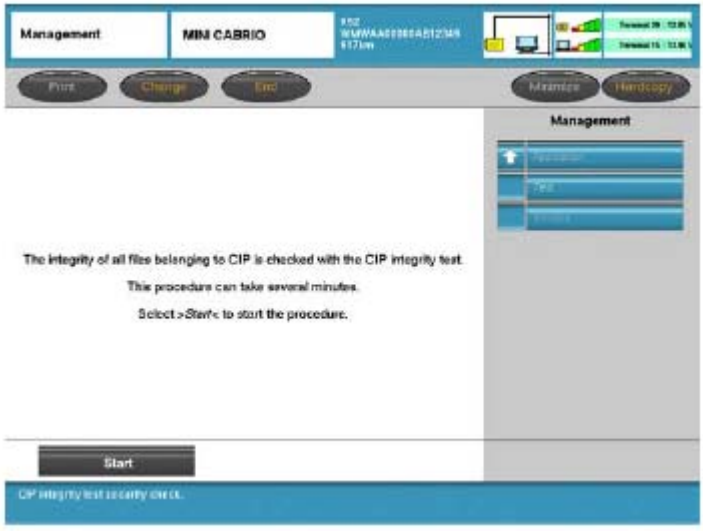

Fig. 89: Display Screen - "Start" Button
Courtesy of BMW OF NORTH AMERICA, INC.

By selecting "Version", the installed application information will be displayed.

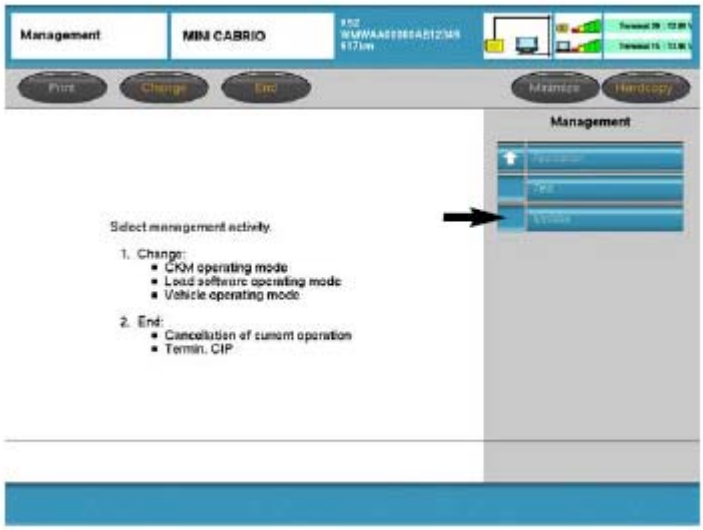

Fig. 90: Display Screen - "Version"
Courtesy of BMW OF NORTH AMERICA, INC.

A list of the various files/applications installed as well as their software levels is displayed.

Fig. 91: Display Screen - List Of Various Files
Courtesy of BMW OF NORTH AMERICA, INC.

Vehicle - Initialization

The "Initialization" function provides access to three different functions:

- Start system time - Used to synchronize all modules contained on the vehicles byte flight bus.
- Delete fault memory.
- CAS or EWS calibration.

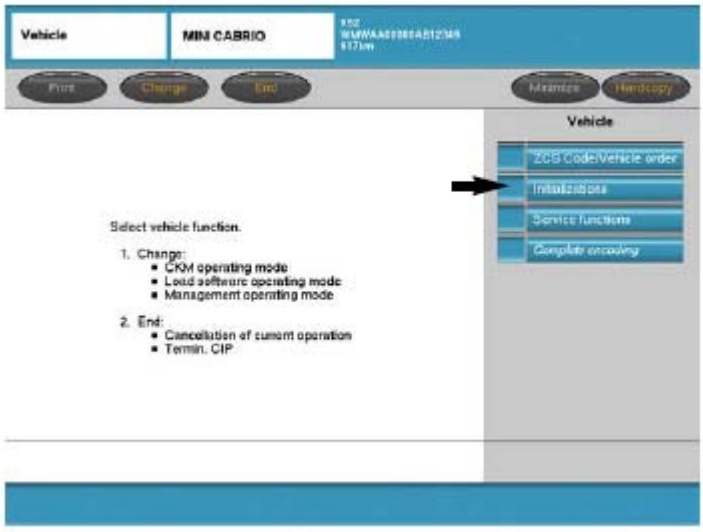

Fig. 92: Display Screen - "Initialization" Function
Courtesy of BMW OF NORTH AMERICA, INC.

By selecting "Delete fault memory" the fault memory of all installed control modules will be cleared.

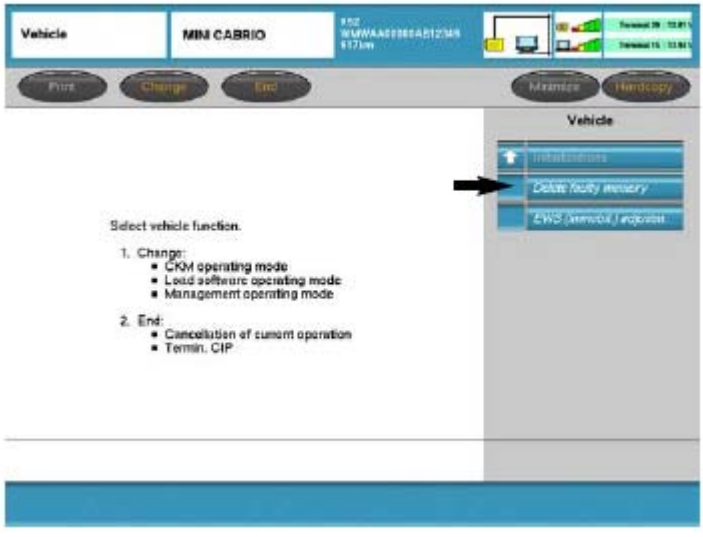

Fig. 93: Display Screen - "Delete Fault Memory"
Courtesy of BMW OF NORTH AMERICA, INC.

Displays a report pertaining to the clearing of the fault memory on all installed modules.

Fig. 94: Display Screen - Final Report
Courtesy of BMW OF NORTH AMERICA, INC.