

NDM457C EEPROM Programmer

User's Guide

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1. PREFACE

This manual will guide you through the installation and operation of the NDM457C Programmer, referenced hereafter as the NDM457-Programmer.

The NDM457-Programmer has been designed for reading and programming of Electrically-Erasable Programmable Read-Only Memory (EEPROM):

- ✓ NDM457C
- ✓ 51006A
- ✓ 16911G
- ✓ TC97101P



Note: Most number of devices can be programmed in two operating modes In-Circuit and On-Board.



Note: Devices that not mentioned above in list can't be guaranteed of correct reading, programming by NDM457-Programmer.

2. CHECKLIST AND REQUIREMENTS

The following describes what items are supplied with the NDM457-Programmer and the system requirements if used by a PC.

- ✓ NDM457-Programmer – *supplied*
- ✓ Cable -A DB9 “straight-thru” cable - *supplied*
- ✓ NDM457-Programmer PC software on CD-ROM – *Optional Extra*

- Desktop PC and a free Serial Communication Port (COM1...8)
- Memory - Minimum 32 Mbytes
- Display - Color SVGA display recommended
- Power supply 12 Volt/200 mA linear power supply source
- OS-MS-Windows (Win98, Win ME, Win2000/XP)

3. INSTALLATION AND USE

The NDM457-Programmer includes two LED's and mode jumper (Figure 1). LED's indicates programmer state and external power supply voltage (Table 1, 2).

GREEN	NDM457-Programmer is ready.
GREEN Flashing	NDM457-Programmer is busy.
DARK	Voltage applied to NDM457-Programmer lower than 6 Volt.

Table 1. LED D1 color meaning

GREEN	Target EEPROM powered on. All bus signals are active.
DARK	Target EEPROM powered off. All bus signals are in three-state.

Table 2. LED D3 color meaning

Jumper-1 (JP1) is intended for NDM457-Programmer mode selection (see Table 3).

JP1 Shorted	Normal programmer operation.
JP1 Opened	Service mode. NDM457-Programmer firmware update.

Table 3. NDM457-Programmer operation modes

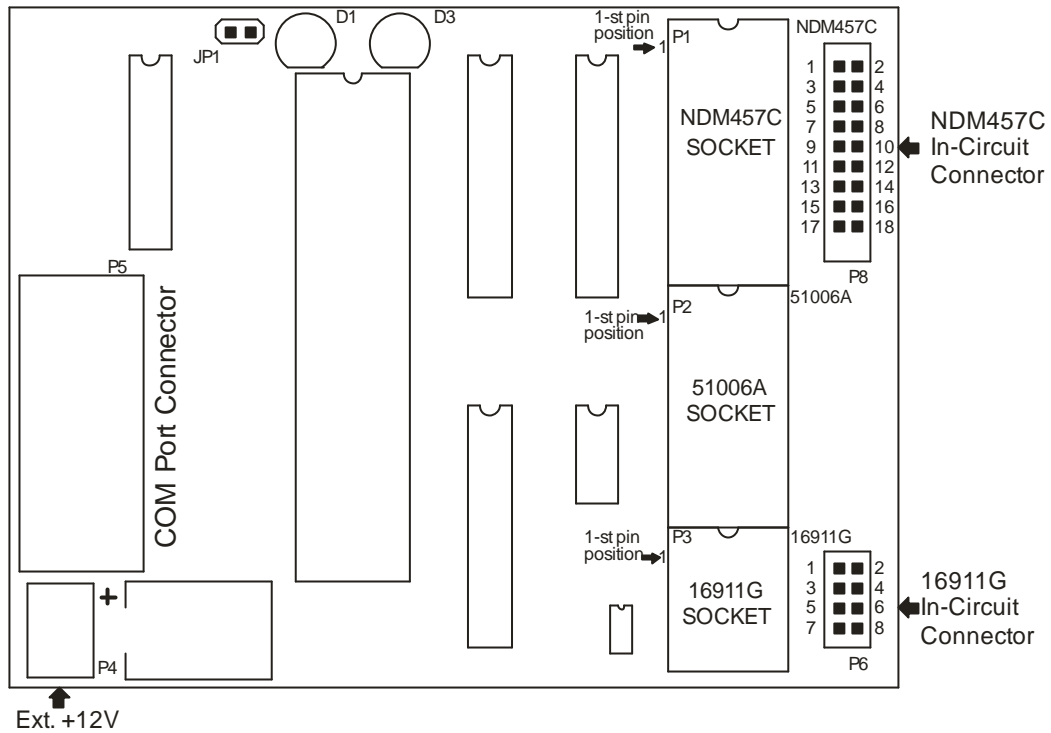


Figure 1. The NDM457-Programmer board layout

3.1 PROGRAMMER CHECK AND CONNECTION TO PC

- Connect the power supply source to [NDM457-Programmer](#) (an external 12 V DC power supply source is required).
- Attach a COM port cable to the 9-pin connector on the programmer and to a COM port on the PC.
- Insert jumper JP1 (see Figure 1).
- Remove EEPROM ICs from all sockets and flat cables form P6, P8.
- Turn On power supply source and make sure that LED D1 appear green.
- Start [NDM457-Programmer](#) software.
- After few seconds you should see on display message: “NDM457C Programmer Ver-X.X detected”.
- In case when you should see message: “NDM457C Programmer Ver-X.X not found”, change COM port number. To do that select “Tools” menu item and than select “Comm Port Options”. Select new COM port number. After pressing “OK” button the new setting will be applied and software reattempts connection with programmer.
- Now [NDM457-Programmer](#) ready to operate.



Note: Update [NDM457-Programmer](#) firmware if required (see Section 3.2).

3.2 PROGRAMMER FIRMWARE UPDATE

This section describes how to update firmware (ATMEGA16) of [NDM457-Programmer](#).

- Remove JP1 (see Figure 1).
- Turn On power supply; make sure that LED D1 appears green.
- Start [NDM457-Programmer](#) software.
- Compare firmware version “NDM457C Programmer **Ver-X.X** detected” and version specified in “Help>About” menu item.
- If versions not coincide, follow next steps to update firmware.
- Select menu item “Tools>Firmware Update”.
- After message box “Firmware Update” appeared, press “OK” button.
- After firmware update completed, turn Off power supply, close [NDM457-Programmer](#) software.
- Insert JP1.
- Turn On power supply. Make sure that LED D1 appears green.
- Start [NDM457-Programmer](#) software on PC. New firmware version “NDM457C Programmer **Ver-1.0** detected” will appear.

4. INTERFACE TYPES

This section describes two interfaces, In-Circuit Programming (ICP) and On-Board Programming (OBP) of **NDM457-Programmer**.

4.1 IN-CIRCUIT PROGRAMMING

In-Circuit programming interface is optional for **NDM457-Programmer**. Using of this mode possible not for all EEPROM memory. For example 51006A EEPROM can not be read, program in this mode. To use In-Circuit mode programmer must be connected with help of wire bus to target EEPROM. For wiring information refer to Appendix Section. At the beginning of read, program sequence programmer starts pins testing. If some pin(s) shorted to GND or +5V programmer displays Error Message, for example: "BUS(s):0 must be disconnected from external circuit". Such message indicates that BUS0 must be disconnected from external circuit. For pin assignment information refer to Appendix section. Also if power supply protection errors appear in this mode disconnect +5V signal from programmer and apply external power to explore board.



Note: Wire bus length used for connection between **NDM457-Programmer** and target EEPROM must be 20 Cm (7 Inch) or lower.



Note: When using In-Circuit programming interface remove any EEPROM from on-board sockets (see Figure 1).

4.2 ON-BOARD PROGRAMMING

On-Board programming interface is basic for **NDM457-Programmer**. Using of this mode possible for all EEPROM memory. To use On-Board mode target EEPROM must be inserted in to corresponding socket (See picture 1). At the beginning of read, program sequence programmer starts pins testing. If some pin(s) shorted to GND or +5V programmer displays Error Message, for example: "BUS(s):0 must be disconnected from external circuit". In this mode pin tester message indicates that EEPROM has damaged pin connected internally to GND or +5Vpin. To make sure of this, remove EEPROM from socket and start read, program sequence again. If error message diapered, probably, EEPROM damaged. If error message remain, possible, programmer ports damaged. In this case contact AMAZING VENTURE technical support for further instruction.



Note: Before insertion EEPROM into socket clean pins from colophony otherwise correct reading, programming not guaranteed. Also superfluous solder can lead to socket damage.



Note: When On-board programming interface used, remove cable from ICP connectors (see Figure 1).

5. WORKING WITH TARGET EEPROM

This section contains EEPROM reading, programming examples in both On-Board and In-Circuit programmer modes. When **NDM457-Programmer** successfully installed (see Section 3) target EEPROM can be read, program and verify.

5.1 In-Circuit EEPROM reading example

- Connect required pins from programmer to target EEPROM with help of wire bus. Refer Appendix Section for wiring diagram.
- Remove any EEPROM from On-Board sockets (see Figure 1).
- Apply power to **NDM457-Programmer**. LED D1 became to green light (see Table 1).
- Select “Read Sequence” panel in **NDM457-Programmer** software.
- Select corresponding device in **NDM457-Programmer** software (“Device” button).
- Press “EEPROM button.
- Press “Start” button.
- LED D3 on **NDM457-Programmer** became to green light. That means that +5 voltage regulator switched on and VCC applied to target EEPROM.
- When LED D1 on **NDM457-Programmer** became permanent green, reading completed. Target EEPROM powered off.
- After read sequence successfully completed it is necessarily to save memory dump to file (see Section 6.2).
- If some errors appeared during reading process refer to Section 7.



Note: Wire bus length used for connection between **NDM457-Programmer** and target EEPROM must be 20 Cm (7 Inch) or lower.



Note: When using In-Circuit programming interface remove any EEPROM from on-board sockets (see Figure 1).

5.2 In-Circuit EEPROM programming example

- Connect required pins from programmer to target EEPROM with help of wire bus. Refer Appendix Section for wiring diagram.
- Remove any EEPROM from On-Board sockets (see Figure 1).
- Apply power to **NDM457-Programmer**. LED D1 became to green light (see Table 1).
- Select “Program Sequence” panel in **NDM457-Programmer** software.
- Select corresponding device in **NDM457-Programmer** software (“Device” button).
- Load EEPROM data from file (see Section 6.1) or enter data to Hex Editor.
- Press “EEPROM button.
- Press “Start” button.
- LED D3 on **NDM457-Programmer** became to green light. That means that +5 voltage regulator switched on and VCC applied to target EEPROM.
- When LED D1 on **NDM457-Programmer** became permanent green, programming completed. Target EEPROM powered off.
- If some errors appeared during reading process refer to Section 7.



Note: Strongly recommended before EEPROM programming, for a first time, read EEPROM contents and save it to file.

5.3 On-Board EEPROM reading example

- Insert EEPROM into corresponding socket (see Figure 1).
- Remove wire bus from In-Circuit connectors (see Figure 1).
- Apply power to **NDM457-Programmer**. LED D1 became to green light (see Table 1).
- Select “Read Sequence” panel in **NDM457-Programmer** software.
- Select corresponding device in **NDM457-Programmer** software (“Device” button).
- Press “EEPROM button.
- Press “Start” button.
- LED D3 on **NDM457-Programmer** became to green light. That means that +5 voltage regulator switched on and VCC applied to target EEPROM.
- When LED D1 on **NDM457-Programmer** became permanent green, reading completed. Target EEPROM powered off.
- After read sequence successfully completed it is necessarily to save memory dump to file (see Section 6.2).
- If some errors appeared during reading process refer to Section 7.



Note: Before insertion EEPROM into socket clean pins from colophony otherwise correct reading, programming not guaranteed. Also superfluous solder can lead to socket damage.



Note: Do not remove EEPROM from socket in time of LED D3 green, otherwise EEPROM or **NDM457-Programmer** can be damaged.

5.4 On-Board EEPROM programming example

- Insert EEPROM into corresponding socket (see Figure 1).
- Remove wire bus from In-Circuit connectors (see Figure 1).
- Apply power to **NDM457-Programmer**. LED D1 became to green light (see Table 1).
- Select “Program Sequence” panel in **NDM457-Programmer** software.
- Select corresponding device in **NDM457-Programmer** software (“Device” button).
- Load EEPROM data from file (see Section 6.1) or enter data to Hex Editor.
- Press “EEPROM button.
- Press “Start” button.
- LED D3 on **NDM457-Programmer** became to green light. That means that +5 voltage regulator switched on and VCC applied to target EEPROM.
- When LED D1 on **NDM457-Programmer** became permanent green, programming completed. Target EEPROM powered off.
- If some errors appeared during reading process refer to Section 7.



Note: Before insertion EEPROM into socket clean pins from colophony otherwise correct reading, programming not guaranteed. Also superfluous solder can lead to socket damage.



Note: Do not remove EEPROM from socket in time of LED D3 green, otherwise EEPROM or **NDM457-Programmer** can be damaged.

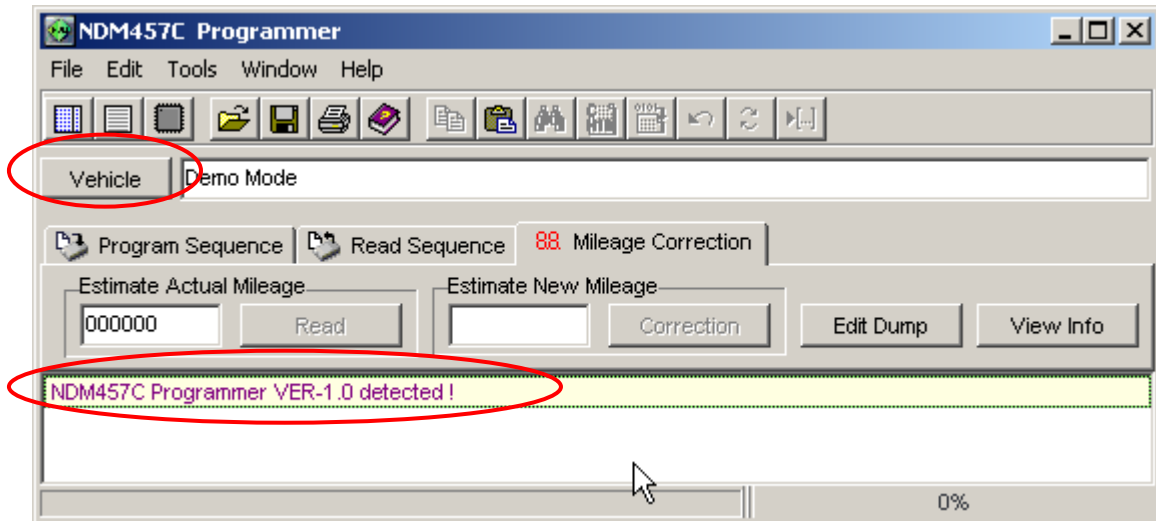


Note: Strongly recommended before EEPROM programming, for a first time, read EEPROM contents and save it to file.

5.5 Mileage Correction example

This section describes step by step operation with LEXUS instrument cluster. All steps must be done in order described below.

- Connect NDM457-Programmer board to PC using DB9 cable.
- Power-up the NDM457-Programmer LED D1 (see Figure1) will light green.
- Start NDM457-Programmer software on PC. Next screen will appear:

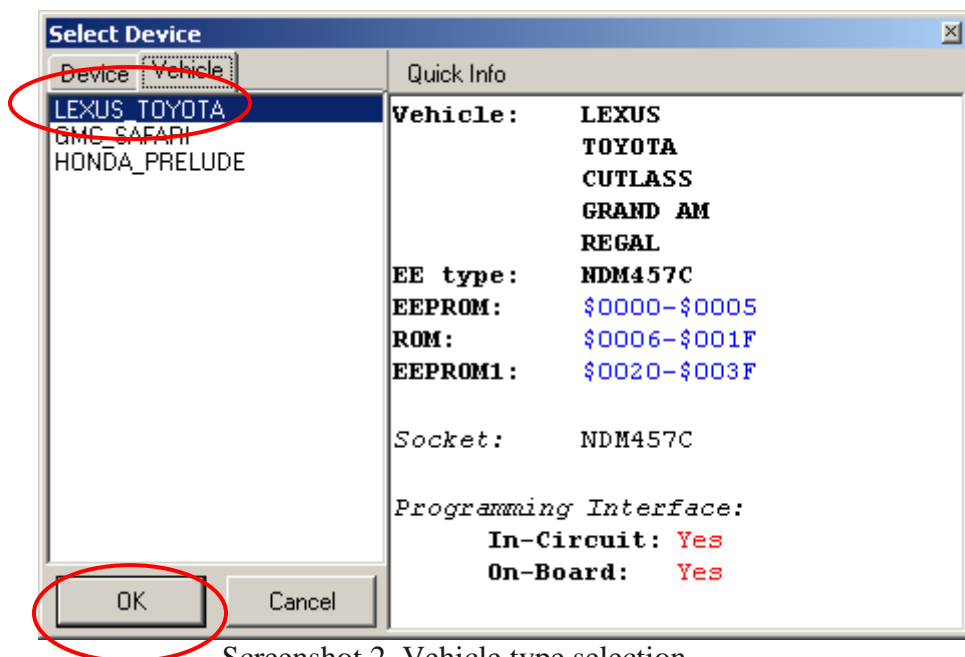


Screenshot 1. NDM457-Programmer software after startup



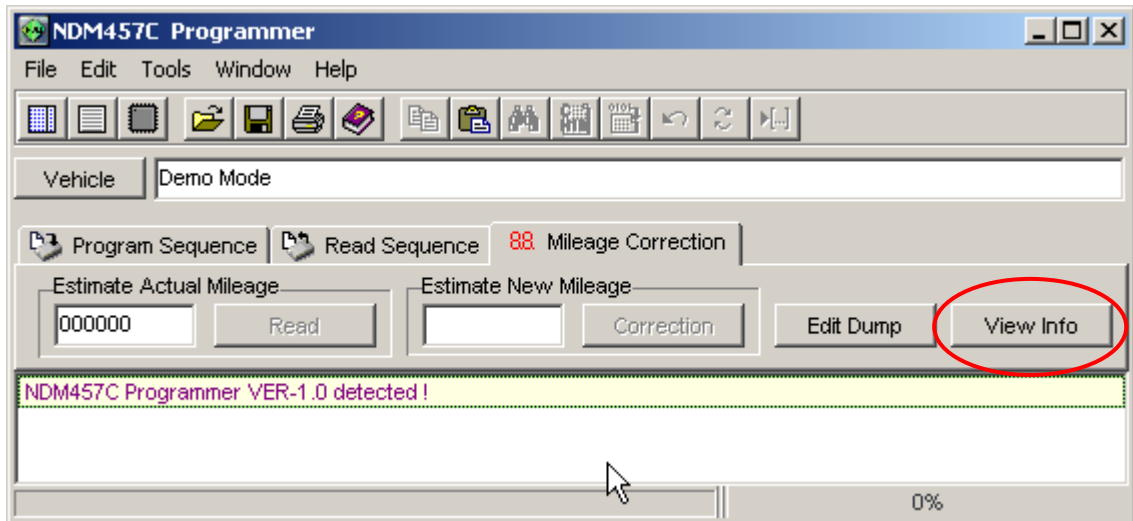
Note: If message "NDM457C Programmer not found" appeared refer to Section 3.1 for troubleshooting. If after changing the Communication port number message "Programmer not detected" appeared restart the PC and try again the procedure described in Section 3.1.

- Select Vehicle type from list. To do this press "Vehicle" button (see Screenshot 1).
- If required vehicle selected, press "OK" button.

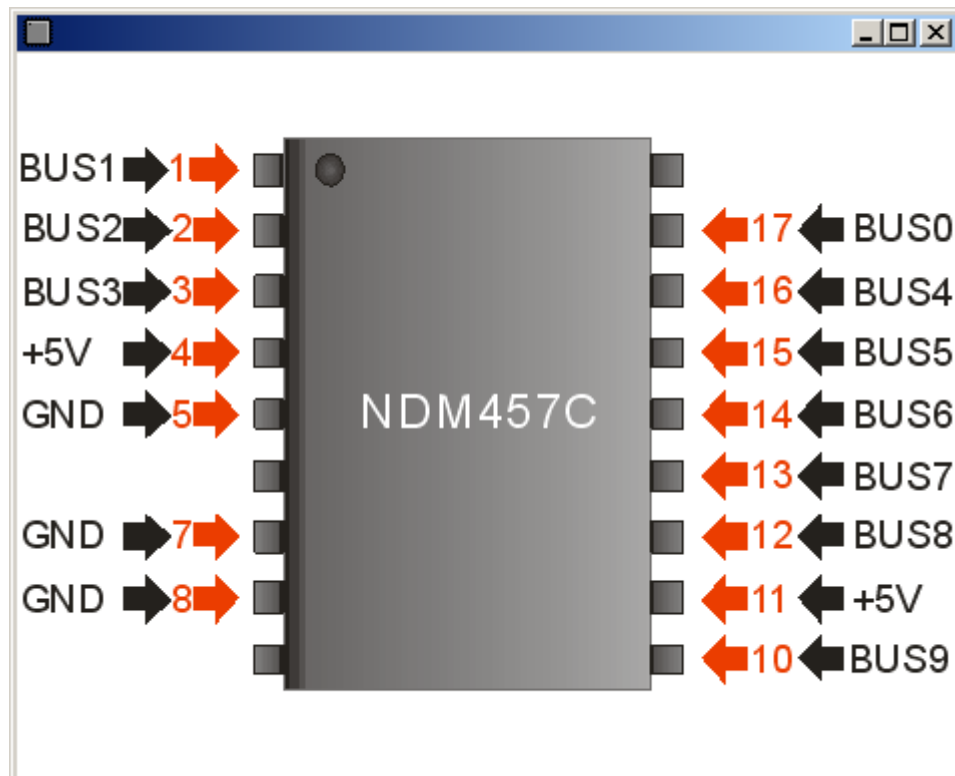


Screenshot 2. Vehicle type selection

- After "LEXUS" selected the Graphic Information for connecting [NDM457-Programmer](#) to dashboard is available. To see this information press "View Info" Button.



Screenshot 3. Find graphical wiring information.



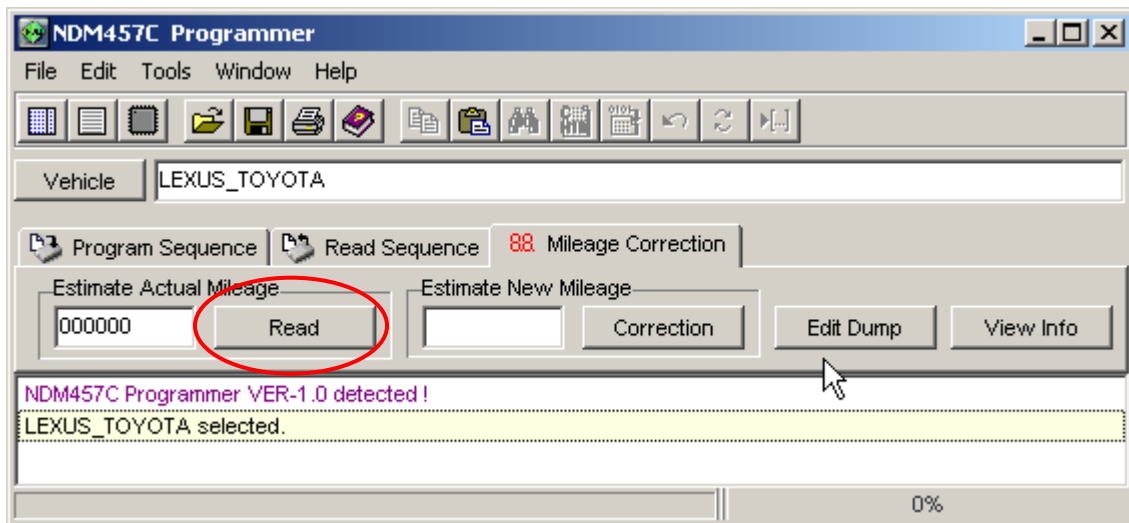
Screenshot 4. Graphical wiring information

- Solder pins from [NDM457-Programmer](#) to LEXUS dashboard.



Note: The safe way to connect [NDM457-Programmer](#) to dashboard is to use ribbon cable with 18 pin connector. After soldering completed connect it to programmer. If wires directly connected to [NDM457-Programmer](#), disconnect programmer from PC and external power supply during soldering. Also ESD safe soldering iron must be used to avoid damaging of [NDM457-Programmer](#) and dashboard.

- When wiring finished **NDM457-Programmer** ready to read estimate actual mileage. Press "Read" button (see Screenshot 5).

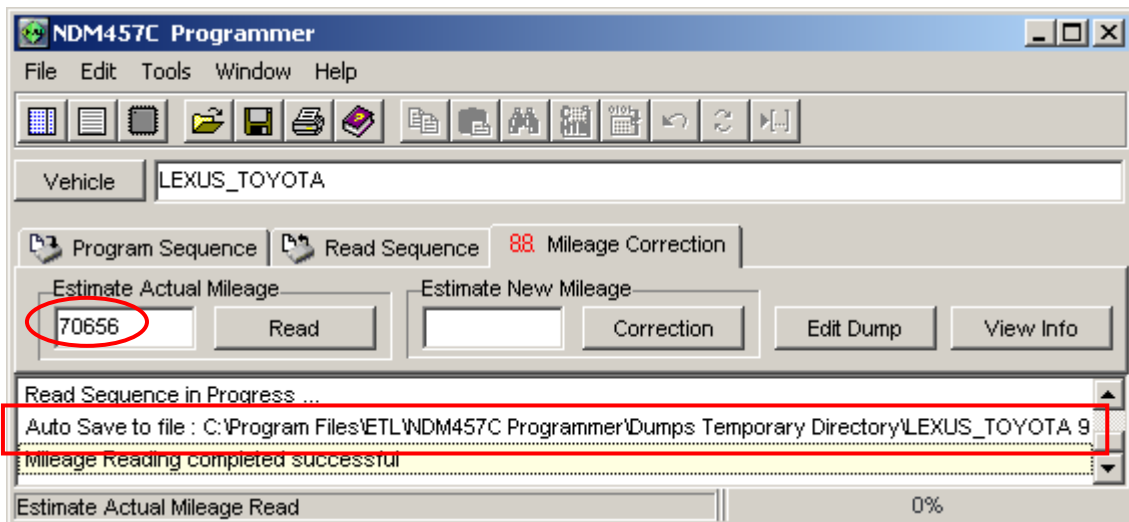


Screenshot 5. Start Actual mileage read

- Estimate actual mileage appeared in edit box located left from "Read" button (see Screenshot 6).



Note: If during reading some errors like: "Pin Tester Errors" appeared, refer for section 7-Errors and troubleshooting.



Screenshot 6. Actual mileage reading

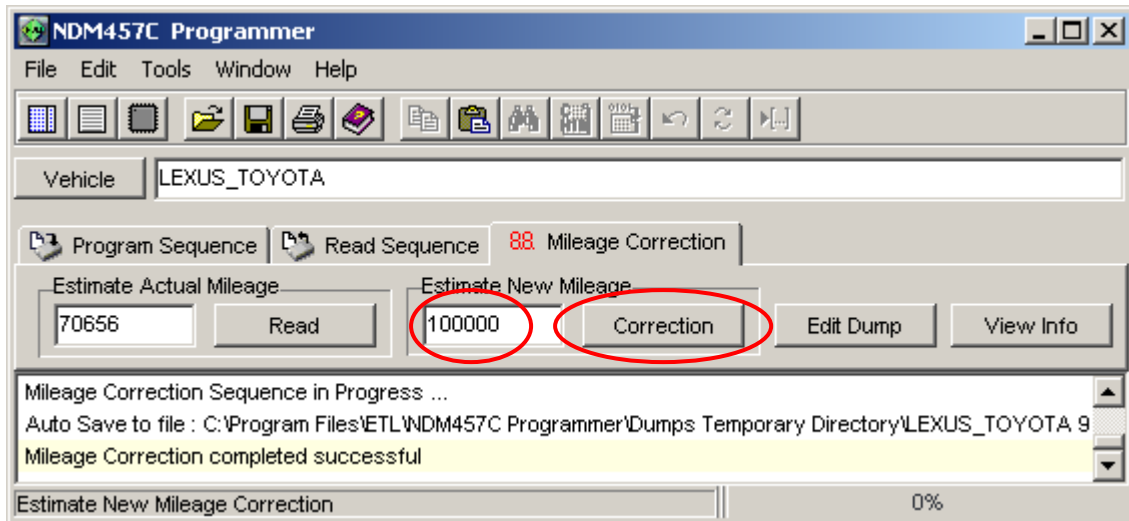


Note: During reading **NDM457-Programmer** made a Backup copy of all EEPROM contents. The Backup copy located in "Dumps Temporary Directory".



Note: If after mileage reading message "Mileage Calculation Error: Wrong EEPROM data" appeared, don't start mileage correction procedure. Possible calculation algorithm not corresponds with algorithm used in instrument cluster.

- Mileage correction procedure similar to mileage read except for new estimate mileage must be entered before operation (see Screenshot 7)
- After new mileage entered press "Correction" button.

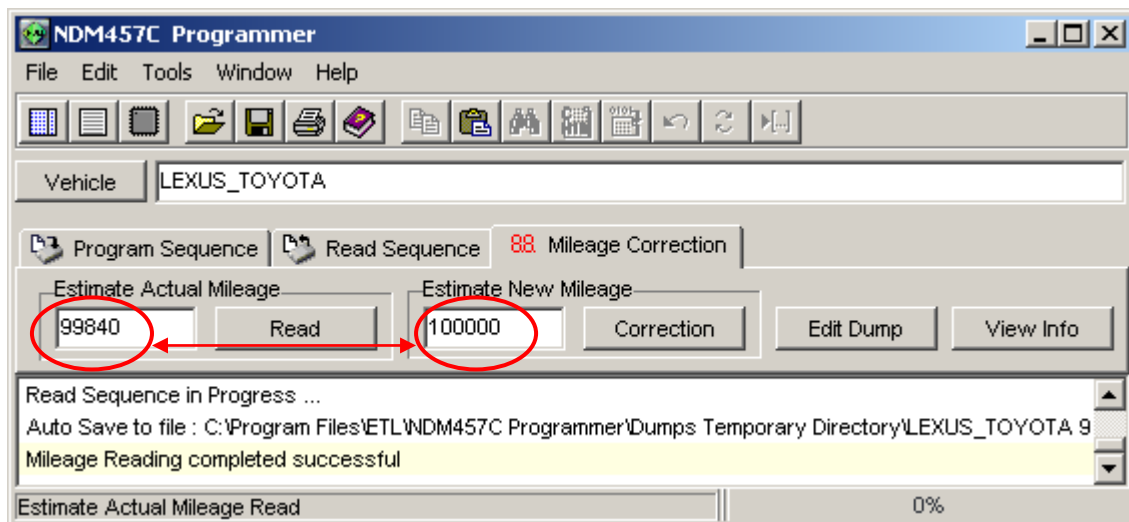


Screenshot 7. Mileage correction



Note: During mileage correction NDM457-Programmer made a Backup copy of all EEPROM contents. The Backup copy located in "Dumps Temporary Directory".

- To make sure that new mileage successfully set up, estimate actual mileage can be read back.



Screenshot 8. Mileage correction procedure verification

6. FILE OPERATIONS

This section describes basic rules working with files. Memory dump from Hex Editor (Buffer) can be load/save from/to hard disk. Also short descriptions such as project name, EEPROM type and memory cell assignment can be done for future fast remind. [NDM457-Programmer](#) accepts tree types of file formats:

- ✓ BIN (Binary format)
- ✓ Motorola S-Record (4 byte address)
- ✓ Motorola S-Record (6 byte address)
- ✓ EEF (Extended ETL Format)

6.1 LOAD FILE INTO BUFFER

- Select “File>Open” menu item.
- Press “Browse” button.
- In File Open Dialog window, select file witch need to be open.
- Press “Open” button.
- Than opposite “Auto Format Detected:” text, select correct file format. Note that software try automatically detects file format, but unknown records in file will fail this detection. “Load Entire file” check box must be checked if automatically loading procedures required.
- Than press “OK” button.

Sometimes load data from file to specific buffer allocations required. For Example if required load buffer from \$B600 address from binary file beginning from \$0000 address follow next steps:

- Select “File>Open” menu item.
- Press “Browse” button.
- In File Open Dialog window, select file which need to be open.
- Press “Open” button.
- Than, opposite “Auto Format Detected:” select Binary format.
- Uncheck “Load Entire File” check box.
- In field “Offset Value to Place Data to Buffer:” enter 0xB600.
- Than press “OK” button.
- Now data placed to Hex Editor Buffer from the beginning of 0xB600 address.

If more complicated operations with files required, for example load Hex Editor Buffer from many files “Lowest Address From File To Load”, “Highest Address From File To Load” and “Clear Buffer Before Loading File” options are available.

6.2 SAVE FILE FROM BUFFER

- Select “File>Save” menu item.
- Press “Browse” button.
- Select directory in which file will be saved.
- Type file name, for example “test1”
- Press “Save” button.
- Than select format in which file will be saved*.
- Press “OK” button.



Note: Use EEF Format for future “Load File Into Buffer” automatically processing. Also, only in EEF Format Project Description, Device Name and Memory Cells attributes can be saved.

7. ERRORS AND TROUBLESHOOTING

This section describes most recently encountered problems, errors and fixing solutions.

- **Problem:** LED D1 (see Figure 1) Dark.
- **Causes:** This problem can accrue when external power supply connected to **NDM457-Programmer** is damaged or connected in wrong polarity.
- **Solutions:** Check voltage on **NDM457-Programmer** power clamps. It must be 12 V +/- 1V.

- **Error Message:** NDM457C Programmer not found
- **Causes:** This message can appear when **NDM457-Programmer** software couldn't establish connection with **NDM457-Programmer** board.
- **Solutions:** Check connection of COM port cable from PC to **NDM457-Programmer** board. Apply power from external power supply to **NDM457-Programmer**. In menu item "Tools>Comm Port Options" select correct COM port number.

- **Error Message:** PC to Programmer Communication Error
- **Causes:** This message can appear when communication between **NDM457-Programmer** and PC is broken. In some cases this message can appear after programmer fatal error.
- **Solutions:** Try to close programmer software and start it again. If it doesn't help try to use another available communication port. Also this message can appear when COM port cable has poor contact with DB-9 connectors.

- **Error Message:** Pintester Error:
- **Causes:** This message can appear if some pin(s) shorted to GND or +5V.
- **Solutions:** If In-Circuit interface used, disconnect pins mentioned in error message from external circuits. Cut electrical trace connected to this pin if require. If On-Board interface used remove EEPROM from socket and start read, program operation again. If error message diapered probably EEPROM damaged. If error message remain, possible, programmer ports damaged. In this case contact AMAZING VENTURE technical support for further instruction.

- **Error Message:** Programming/Erasing Error
- **Causes:** This message can appear in time of EEPROM programming or erasing.
- **Solutions:** Check EEPROM type selection. Try to realize device programming in On-board mode.

- **Error Message:** Overcurrent protection
- **Causes:** This message can appear when current consumption from built-in power supply grater than 100 mA or +5V and GND pins are shorted.
- **Solutions:** Check target EEPROM power pins on short circuit. Also check that +5V terminal connected to EEPROM +5V pin and GND terminal connected to EEPROM GND pin.

- **Error Message:** +10V Power Supply voltage out of range
- **Causes:** This error can appear if voltage on +10V pin lower then 7V.
- **Solutions:** If In-Circuit interface used, disconnect +10V pin form external circuits. Cut electrical trace connected to this pin if require. If On-Board interface used remove EEPROM from socket and start read, program operation again. If error message diapered probably EEPROM damaged. If error message remain, possible, programmer ports damaged. In this case contact AMAZING VENTURE technical support for further instruction.

- **Error Message:** WRONG SUBROUTINE CALL
WRONG DEVICE TYPE
- **Causes:** These messages can appear when fatal problems with NDM457-Programmer hardware/firmware occurred.
- **Solutions:** Contact AMAZING VENTURE technical support.



Note: NDM457-Programmer has Log Window which can be stored to file. To perform this operation right clicks on Log Window. Than click on “Save to ndm457p.log file“ menu item. Now this file can be found in the same directory as NDM457-Programmer software. Log File can be send by E-mail to amazingventure@gmail.com for non described problem solution.

8. WARRANTY STATEMENT AND DISCLAIMER

AMAZING VENTURE warrants that Product delivered shall conform to applicable. Report any defects for a 30 days period, from the applicable data on invoice.

All AMAZING VENTURE 's product are intended for lawful service, repair or replacement of various electronic equipment with the laws of the country in which the product is being sold or used.

9. APPENDIX

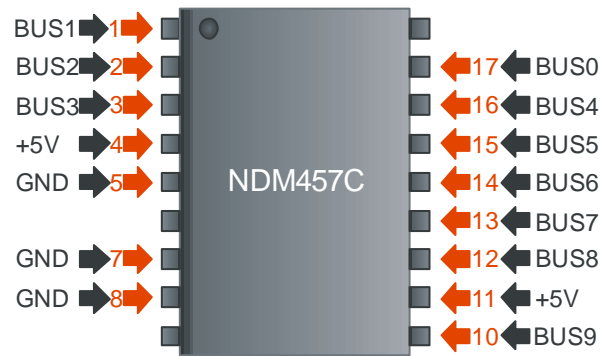


Figure 2. Wiring diagram for NDM457C EEPROM

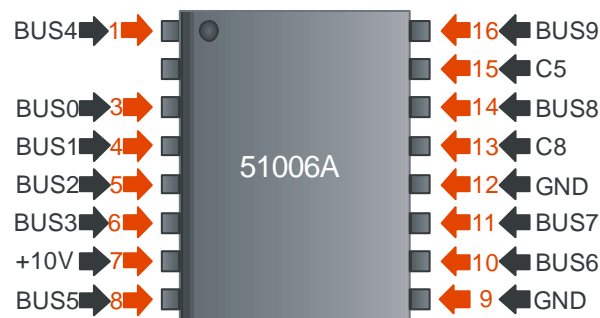


Figure 3. Wiring diagram for 51006 EEPROM



Figure 4. Wiring diagram for 16911G EEPROM



Figure 5. Wiring diagram for TC97101P EEPROM