TWINGO

8 Electrical equipment

88B MULTIPLEXING

V3   **Edition Anglaise**

INTRODUCTION

Description of the multiplex network:

The multiplex network consists of a twisted pair of wires connected to several vehicle computers.
These two wires are called multiplex line H and multiplex line L.

Depending on the vehicle options, there is a single multiplex network.
– the **Vehicle multiplex line** (injection, anti-lock braking system/electronic stability program, instrument panel, air conditioning, rev counter, sequential gearbox, UCH, airbag/pretensioners) is always present,
– the **Multimedia multiplex line** (navigation, radio, display, hands-free telephone) depending on the vehicle options.

Note:
The Vehicle and Multimedia multiplex line networks support fault finding using the RENAULT tool.

Data is exchanged by the computers on the **Vehicle multiplex line** and **Multimedia multiplex line** networks at a communication speed of 500 kbit/s.

The **Vehicle multiplex line** network has two computers, each with an internal resistance of **120Ω**
(network terminating resistors):
– the injection computer,
– the airbag computer.

The **Multimedia multiplex line** network has two computers, each with an internal resistance of **120Ω**
(network terminating resistors):
– the A2/A3 display,
– the radio.

PURPOSE

– The purpose of the multiplex network test is to determine the computers present on the vehicle's multiplex network as well as the cause of possible inter-computer communication faults.

– It also serves to determine the functions installed in the vehicle which are often housed in various computers (distributed functions, e.g.: Air conditioning, Security access, etc.).

– The test also checks the condition of multiplex network segments.

– The multiplex network test can also run fault finding on computers disconnected from the multiplex network; this provides an overview of the vehicle's electronic layout.

MULTIPLEX NETWORK OPERATION TEST

Vehicle computer power supply for fault finding:

Depending on the type of vehicle equipment, proceed as follows:

Standard key/radio frequency key, switch on the ignition with the key.

To cut off + after ignition feed, proceed as follows:

Standard key/radio frequency key, switch off the ignition with the key.

This step is the essential starting point for any computer fault finding procedure.

It ensures that the network is correctly connected at the terminals of each computer and that the signal is correctly sent to it and received by it. This function also reads the number of faults present in the computers.

The multiplex network test function is started after the user selects the vehicle then selects the Test computers icon.

After the network check, the other functions become accessible.

MULTIPLEX NETWORK TEST PROCEDURE

– Establish dialogue with the computers storing the vehicle configuration (read identification).

– Read the vehicle configuration in the two computers that store the multiplex network configuration (**UCH and Airbag**) for the **Vehicle multiplex line** network.

– Read the vehicle configuration in the computer that stores the multiplex network configuration **(A2/A3 display computer**) for the **Multimedia multiplex line** network.

– List of computers which support fault finding read from the two configuration computers.

– Computer interrogation.

– Physical (electrical) measurements on the multiplex line network.

IMPORTANT

There are three diagnostic lines, depending on the vehicle options:

Fault finding on the computer using the vehicle multiplex network:
– Injection systems,
– ABS or ABS/ESP or vehicle speed computer (depending on the vehicle equipment),
– UCH,
– Automatic transmission (depending on the vehicle equipment),
– Lighting (depending on the vehicle equipment),
– Instrument panel,
– Airbag/pretensioners,
– Climate control (depending on the vehicle equipment),
– Driving school unit (depending on the vehicle equipment),
– LPG injection (depending on the vehicle equipment).

Fault finding on computers using the multimedia multiplex network (depending on the vehicle equipment):
– Radio (R1-08 or R2-08),
– Multimedia interface (A2/A3 display),
– Multimedia connection (C-box).

Fault finding on the computer using the K line (depending on the vehicle equipment):
– Parking distance control and power-assisted steering.

If the following error messages appear during a multiplex network test:

– **Communication cannot be established with some computers: check their supply and their diagnostic line before rerunning the test**: the network topology is visible. Check to see if there are many computers that have not been configured: update the multiplex network according to the computers present on the vehicle (see Multiplex network configuration).

– **Incorrect configuration of computers that support fault finding: check the configuration before rerunning a test**: the network topology is not visible, a network configuration is requested (see Multiplex network configuration).

– **Incorrect configuration: check the computer configuration before rerunning a test**: the network topology is not visible, a network configuration is requested (see **Multiplex network configuration**).

ACQUISITION AND DISPLAY OF THE RESULTS

The acquisition screen is made up of a bar graph which changes when the various initialisation, acquisition and data analysis stages are updated.
At the end of the test, the tool displays a screen with the test result.

How to read the topological diagram:

The results display screen consists of three screens:
– the upper zone: fault finding procedure result message,
– the left-hand centre zone: topological diagram (not always available),
– the right-hand centre zone: interpretation of the results from the various vehicle computers and list.

COMPUTERS

– **Valid:** green border, green lettering.
– **Not detected:** red border, red lettering.
– **Do not support fault finding:** black border, black lettering.
– **Not recognised:** red border, red lettering + exclamation mark.

SEGMENTS

– **Valid:** green dash.
– **Faulty:** red dash.
– **Cannot support fault finding:** black dash.

Interpreting test result charts

On the **Faults** tab, the computers are organised into the following groups:
– **Not detected** if the computer failed to respond to the tool's identification request.
   Within the **undetected** category, the computers are subdivided into **Stores multiplex network configuration** and **Does not store multiplex network configuration**.
– **Not recognised** if the computer is detected but cannot be identified from its response.

On the **Information** tab, the computers are organised and listed as follows:
– **Cannot support fault finding**, if the computer cannot support fault finding with the tool and therefore was not queried.
– **Valid** if the computer responded correctly to the tool's request.

If the **Proceed** icon in the bottom right-hand corner is selected, a new screen will appear with the following tab:

Under the **Results** tab the computers are organised into the following groups:
– **Faulty** if the computer is known and has a non-zero number of faults.
– **OK** if the computer was detected, recognised and has no faults.
– **Not recognised** if the computer was detected but could not be identified from its response.
– **Not detected** if the computer can support fault finding but failed to respond.

FUNCTION TESTING

The function test can be accessed by clicking on the **List of functions** icon.
– The vehicle function tests screen resembles the multiplex network test screen with a diagram of the network layout if this is known and displayed.
– The **Function** tab displays the different computers involved in the functions, which may be distributed over several computers.
Examples for the **Vehicle multiplex line** network:
- **Air conditioning**: **UCH**, **INJ**, and **CLIM**.
- **Access** - **Safety**: **UCH** and **INJ**
- **Wiping: UCH**
- **Lighting: UCH**

Examples for the **Multimedia multiplex line** network:
- **Radio**.
- **Multimedia interface (A2/A3 display)**
- **Multimedia connection (C-box)**

– The **Info** tab displays the other possible functions found on the vehicle concerned.
– Selecting a function from the list of functions enables computers not involved in this function to be shaded, thus indicating the computers involved in this function.
– The **Fault finding** button runs fault finding on the function selected from the list.

REPAIR HELP

➡ **Help with detecting computer or faulty segment:**
If the multiplex network is completely frozen, this command can isolate multiplex network segments and thereby rule out those that respond properly to the tool. This makes it easier to pinpoint the cause of the fault.
The algorithm for help with locating faults is intended for dealing with electrical faults present solely in the multiplex line; it is therefore essential that connectors and computers not attached to the multiplex line V are not taken into consideration.

➡ **A test for multiplex network faults by using physical measurements:**
When a multiplex network segment has a short circuit, the computers can no longer communicate with each other or with the diagnostic tool. At this point, the network test is not operational.
The CLIP tool can identify several types of faults by taking electrical measurements on the multiplex line H and multiplex line L multiplex network. It can detect a multiplex line L / multiplex line H short circuit, a multiplex line L / +12 V short circuit, a multiplex line H / +12 V short circuit, and a multiplex line H / earth short circuit.
By disconnecting the connectors then the computers, it is possible to determine or indicate the segment causing the fault on the multiplex network.

Multiplexing enables signals to be sent between different computers on the vehicle, such as:

119	Automatic transmission computer		756	Airbag pretensioners/computer
120	Injection computer		995	Electronic rev counter
247	Instrument panel		1094	ABS/ESP computer
419	Air conditioning computer		1222	Parking distance control computer
502	Power-assisted steering computer		261	Radio
645	UCH		225	Diagnostic socket
653	Multimedia interface (A2/A3 display)		1959	Multimedia connection (C-box)
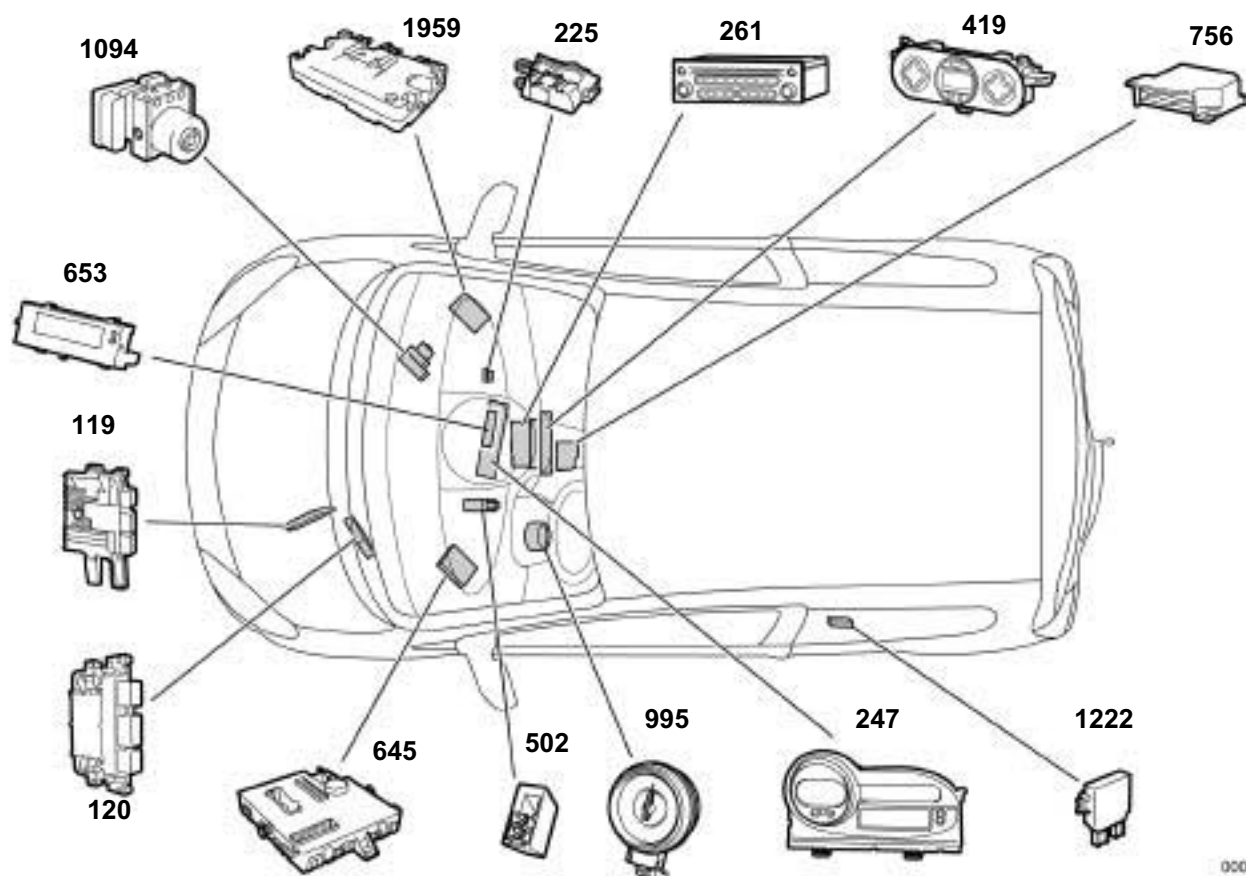
0000001019

653
247
419
1959
1222
225
1094
995
119
120
502
756
645
261

0000001020
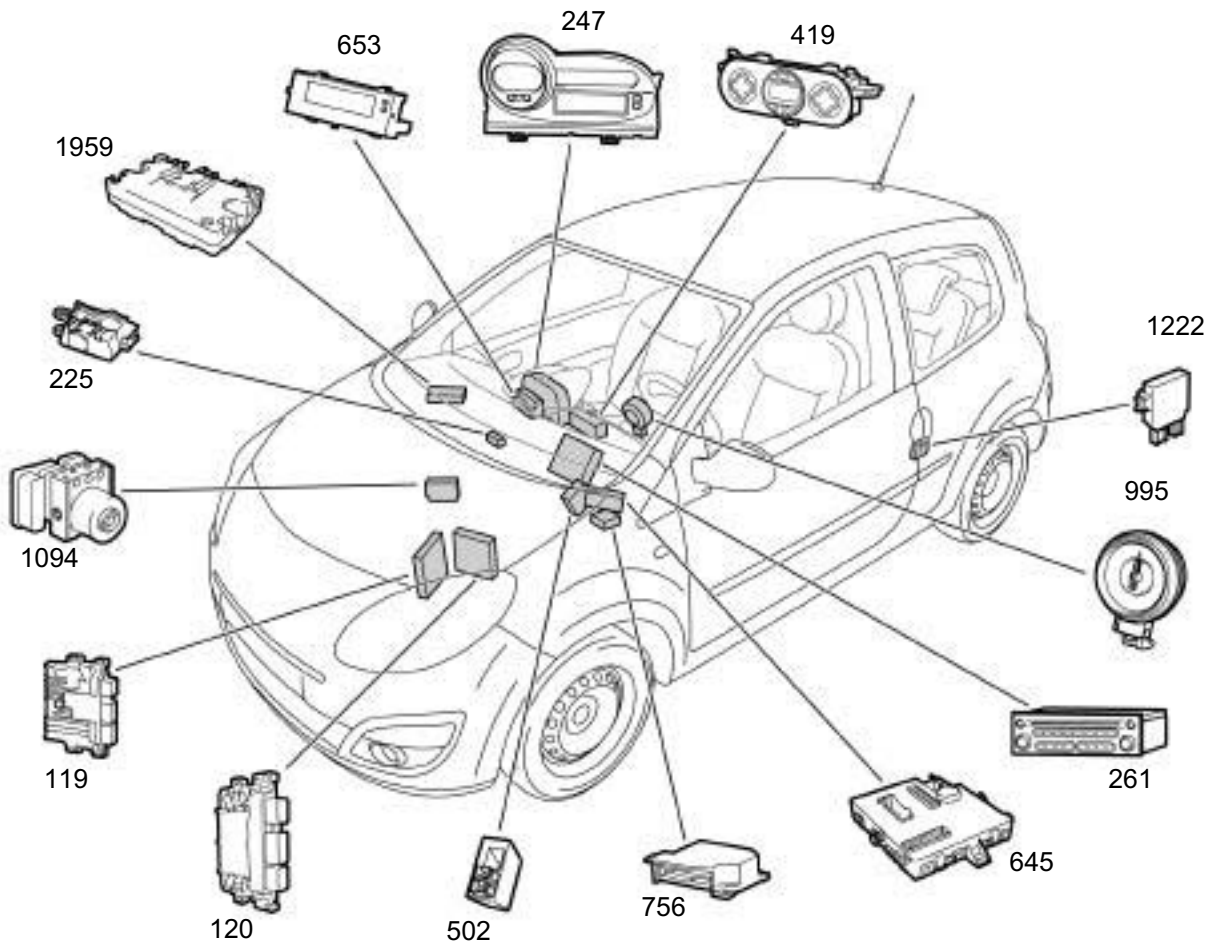
Operating diagram of the CAN Vehicle network
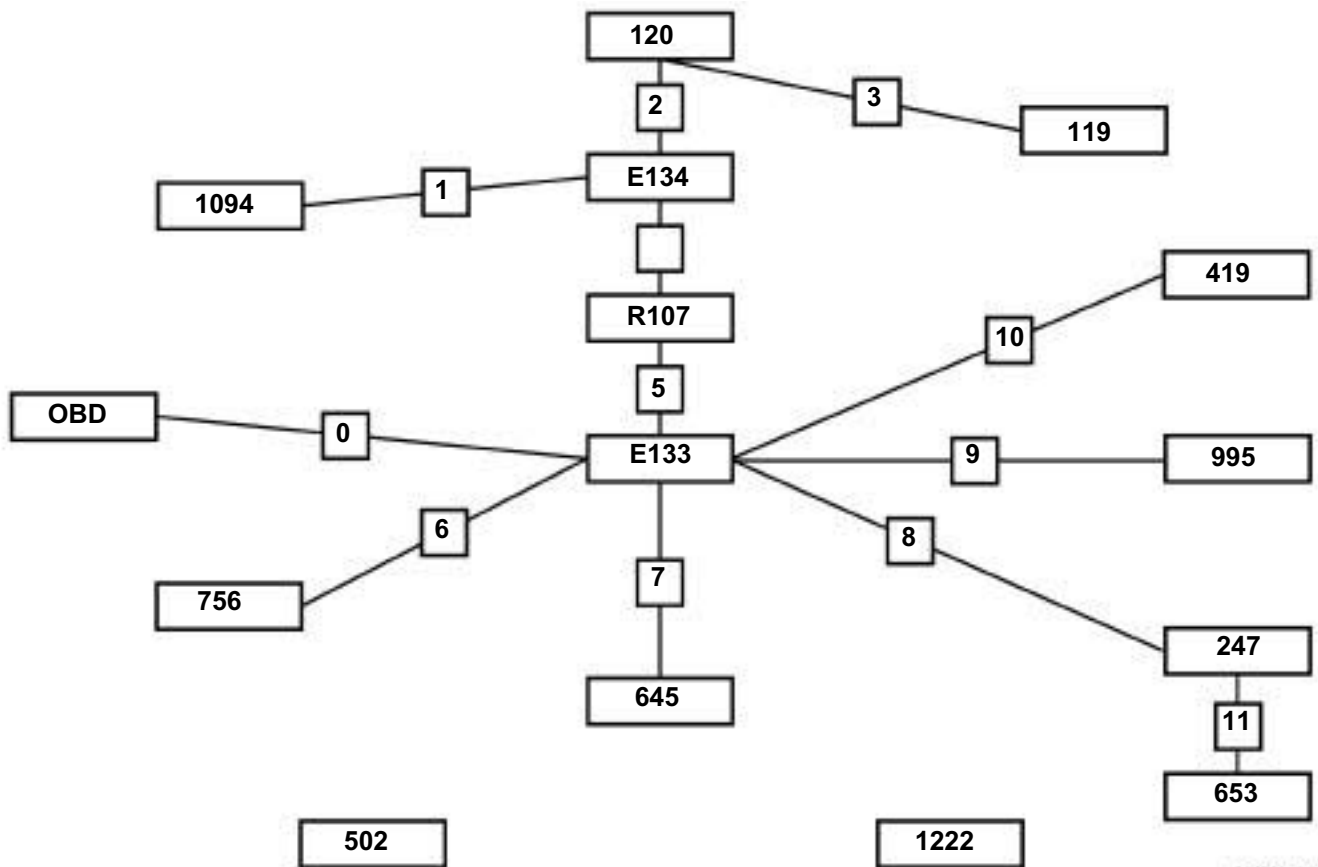
00000001021

Number	Description
119	Automatic gearbox
120	Injection computer
247	Instrument panel
419	Air conditioning
502	Power-assisted steering
645	UCH
653	Multimedia interface
756	Airbags
995	Electronic rev counter
1094	ABS
1222	Parking distance control
OBD	Diagnostic socket
E134	Splice
R107	Dashboard - front of engine connection
E133	Splice

Operating diagram of the CAN Multimedia network

```
                    ┌──────────┐
                    │   653    │
                    └──────────┘
                         │
                      ┌─────┐
                      │  0  │
                      └─────┘
                         │
┌──────────┐  ┌───┐  ┌──────────┐  ┌───┐  ┌──────────┐
│   OBD    │──│ 1 │──│    E1    │──│ 3 │──│   1959   │
└──────────┘  └───┘  └──────────┘  └───┘  └──────────┘
                         │
                      ┌─────┐
                      │  2  │
                      └─────┘
                         │
                    ┌──────────┐
                    │   261    │
                    └──────────┘
```
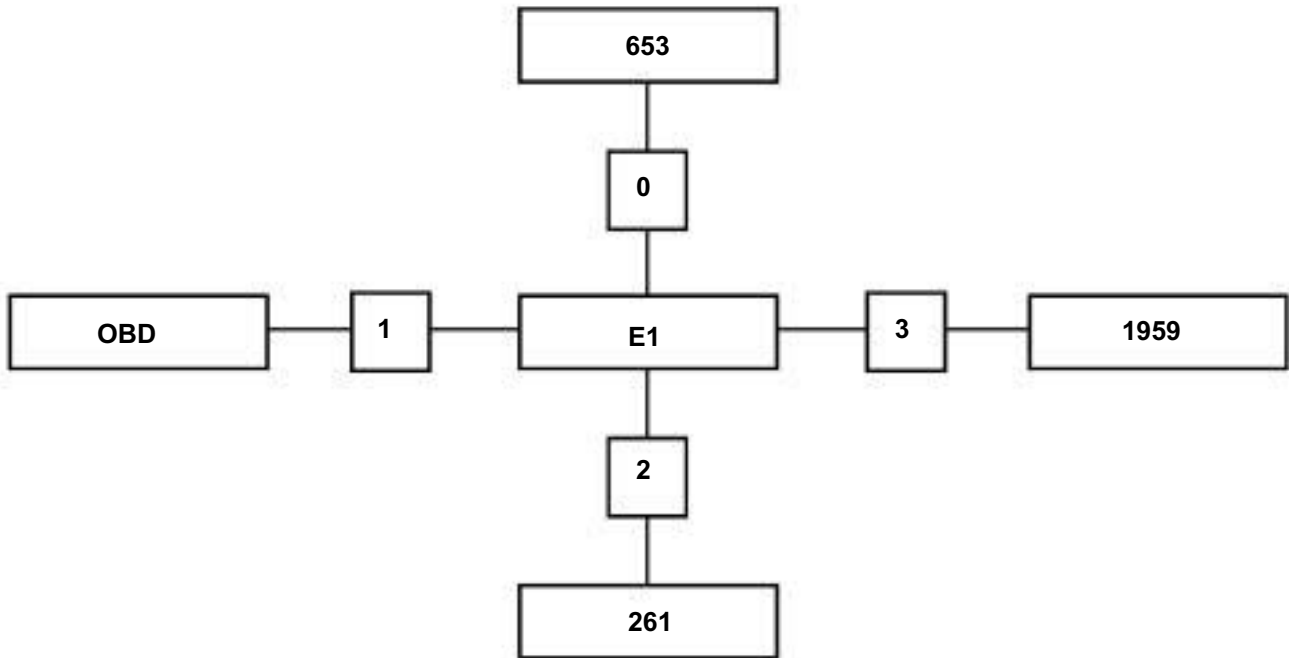
0000001022

Number	Description
E1	Splice
OBD	Diagnostic socket
653	Multimedia interface
261	Radio
1959	Multimedia connection

To improve the performances of vehicles, more computers are needed to share more information in order to achieve optimal operation.

With multiplexing, numerous signals can be sent from one computer to several others via a single electrical connection.

Solution without multiplexing
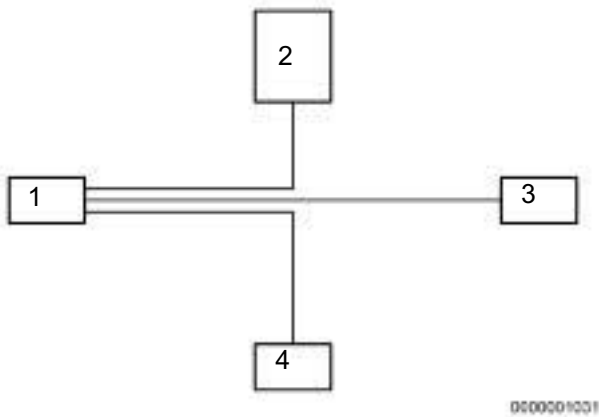
1	ABS computer	**3**	Instrument panel
2	Automatic gearbox computer	**4**	Injection computer

Example: each computer should have its own electrical connection in order to use the vehicle speed signal sent by the anti-lock braking system vehicle speed computer (depending on vehicle equipment). The number of connections increases when there are more signals to be communicated.

Solution with multiplexing

000000 1002
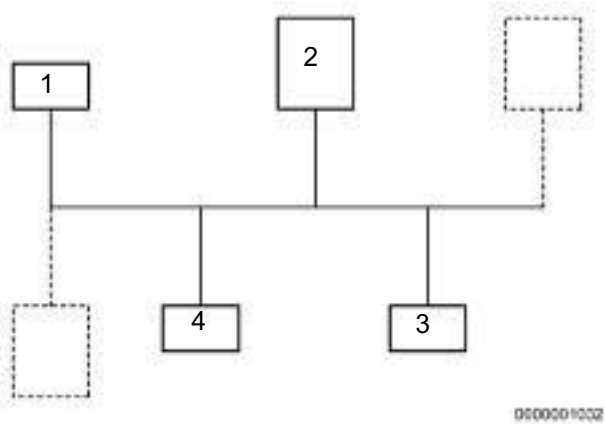
1	ABS computer	**3**	Instrument panel
2	Automatic gearbox computer	**4**	Injection computer

In this case, the vehicle speed signal is shared by the anti-lock braking system vehicle speed computer (depending on vehicle equipment), and as many computers as necessary via a single electrical connection. All other signals are transmitted via this connection as well. Thus there is only one connection regardless of the number of signals to be exchanged.

Advantages of multiplexing

- Reduction in costs as there is a reduction in wire length and there are fewer connectors.
- Less weight due to wiring harness.
- Increased reliability due to there being fewer connectors.
- Easier to locate a faulty component in some cases.

Multiplex operation

The operation of a multiplex network can be compared to an underground line which transports a number of passengers. All the passengers use the same line even though they get on and off at different points and they take different trains depending on when they started their journeys.

The multiplex network operates in a very similar way.

1. The transmitting computer formats the signal to be sent into a frame that can be identified by other computers.

2. The transmitting computer waits until the network is free, i.e. no other frames are being sent by another computer.

3. The computer sends its frame.

4. All the other computers receive the transmitted frame. As the frame has already been formatted by the transmitting computer, the receiving computer can determine whether the frame was meant for it or not.

5. The receiving computers acknowledge receipt of the frame. The transmitting computer will resend the frame if it does not receive this acknowledgement.

Transmitting frames

The frames are transmitted on two twisted wires in order to avoid electromagnetic interference. These wires are called multiplex line H and multiplex line L.

To reduce electrical interference when frames are sent, the two wires have differential voltages. In addition, terminating resistors of **120** Ω are fitted at the ends of the network (in the airbag and injection computers) to attenuate electrical signal reflections.

The electric signals are digital which means that there are only two levels of differential voltage known as recessive state (corresponding to logic 1) and dominant state (corresponding to logic 0).

The status is recessive when the potential difference between multiplex line H and multiplex line L is zero (multiplex line H = multiplex line L = 2.5 V). The status is dominant when the potential difference between multiplex line H and multiplex line L is equal to approximately 2 V (multiplex line H = 3.5 V and multiplex line L = 1.5 V).

Content of the frame

A multiplex line frame comprises several groups of contiguous bits:
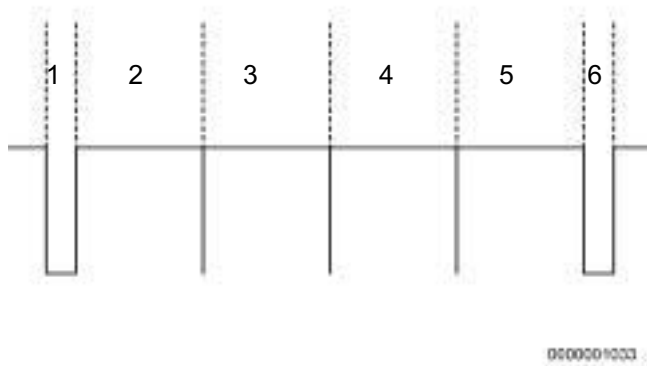
(1) A field indicating the start of the frame.
(2) An arbitration field with a destination code so that receiving computers can recognise the frame. In addition, this field decides on frame priority when several computer want to send a frame at the same time.
(3) A test field supplying various information about the frame.
(4) A field containing the data to be transmitted.
(5) A frame confirmation field ensuring that the signal is correctly transmitted as well as the acknowledgement indicating that the frame has been correctly received.
(6) A field indicating the end of the frame.

Fault finding

Multiplex computers fitted with diagnostic connections have multiplex network fault finding systems.

Each computer monitors its capacity to send and receive frames to and from other computers. Any observed fault is revealed by one or several present or stored faults on the multiplex network. These faults are grouped under a format common to all computers and are communicated via a special frame to the diagnostic tool.

In the After-Sales Centre, these faults can be viewed on a diagnostic tool in order to identify the faulty connections(s) between computers and to deduce the fault type and its location.

The diagnostic tool always runs a multiplex network test when it is connected to the vehicle.

The multiplexing function does not have a safe mode program.

However, the multiplexing function may have special operation features.

The multiplex network still functions when multiplex line L is in short circuit to earth. The voltage in multiplex line H is identical to that in multiplex line L.

MULTIPLEX NETWORK CONFIGURATION

NOTES	**The configuration is entered with the ignition on; apply the forced + after ignition feed procedure (see Introduction).** **It can be run from the multiplex network test results screens.**

For the **CAN Vehicle** network:

The tool displays the **UCH** and/or **Airbag** configurations.
The **Configuration** screen consists of two tabs for displaying and modifying the:
– The first tab, **Multiplex network configuration,** indicates the multiplex network version and the list of computers defined as **present** on the multiplex network.
– The second tab, **Configuration of computers which support fault finding,** indicates the relevant diagram number, and the list of computers defined as **supporting fault finding** with the RENAULT tool.

> **WARNING**: the network version number is 1.
> This is the diagram version which changes each time the multiplex network wiring is modified on this vehicle.

First repair the computers containing the multiplex network configuration (Airbag and UCH) in order to display the screen with the multiplex network configuration diagram for the vehicle on which fault finding is being run.

For the **CAN Multimedia** network:

The tool presents the configuration of the **A2/A3 display**.
The **Configuration** screen consists of two tabs for displaying and modifying the:
– The first tab, **Multiplex network configuration,** indicates the multiplex network version and the list of computers defined as **present** on the multiplex network.
– The second tab, **Configuration of computers which support fault finding,** indicates the relevant diagram number, and the list of computers defined as **supporting fault finding** with the RENAULT tool.

> **WARNING**: the network version number is 1.
> This is the diagram version which changes each time the multiplex network wiring is modified on this vehicle.

First repair the computer containing the multiplex network configuration (A2/A3 display) in order to display the screen with the multiplex network configuration diagram for the vehicle on which fault finding is being run.

Here is the list of computers according to the radio equipment:
Radio R1-08:
- **Radio R1-08**
- **A2 display**

Radio R2-08:
- **Radio R2-08**
- **A3 display**
- **Multimedia connection (C-box)**

IMPORTANT

A computer connected to the multiplex network but not declared as being among the computers containing the multiplex network configuration will not be checked in the multiplex network test.

Correct the configuration by declaring the missing computer as present in the computer or computers containing the configuration.

Start the multiplex network test again after modifying the configuration.

CAN Vehicle configuration screen
Make sure that the information displayed on the two tabs is correct.
The same configuration information for the two computers is essential for displaying the network topology.

Computer	Multiplex network configuration	Configuration of computers that can support fault finding
Injection (120)	PRESENT	YES
ABS/ESP (1094)	PRESENT	YES
Instrument panel (247)	PRESENT	YES
UCH (645)	PRESENT	YES
Airbag/pretensioners (756)	PRESENT	YES
Air conditioning (regulated) (419)	PRESENT (option)	YES (option)
Sequential gearbox (119)	PRESENT (option)	YES (option)
Power-assisted steering (502)	ABSENT (option)	YES (on K line) (option)
Rev counter (995)	PRESENT (option)	YES (option)
Parking distance control (1222)	ABSENT	YES (on K line)
A2/A3 display (653)	PRESENT (option)	YES (option)

Option: depending on equipment level

CAN Multimedia configuration screen

Computer	Multiplex network configuration	Configuration of computers that can support fault finding
A2/A3 display (653)	PRESENT	YES
Radio R1-08 or R2-08 (261)	PRESENT or ABSENT (option)	YES or NO (option)

MULTIPLEX NETWORK NOT OPERATIONAL

NOTES	First check that the computer at the end of the faulty segment is properly powered (earth, + battery, + accessories or + after ignition). Always check the computer conformity. Switch off the ignition.

Finding the fault type	NOTES	Obtain a copy of the multiplex network diagram for the vehicle. (Diagnostic socket diagram).

Measure the resistance of component **225** between the following connections:
- Connection code **133B**
- Connection code **133C**

What **is the value obtained**?

0 Ω	The two lines are in short circuit (see **Introduction - Repair advice**).

60 Ω ± 10 Ω	Check first that the computers storing the configuration (**Airbag and UCH**) are correctly supplied: – check for earth on connection **NAP**, and for **+12 V supply** on connection **AP25** on component **756**. – check for **earth** on connections **MAM** and **NAM**, and for **+12 V supply** on connections **AP7, AP43, BP3, BP6, BP15, BP19, BP49** on component **645**.

BETWEEN 70 Ω AND 110 Ω	For each connection **133B** and **133C**, check that there is no interference resistance and then check that there is no short circuit to earth or to the + battery feed.

120 Ω ± 10 Ω	Open circuit on one or two lines. Disconnect the airbag and check the multiplex connection between the diagnostic socket and the airbag. Is the multiplex connection correct?

AFTER REPAIR	Run the multiplex network test again using the **diagnostic tool**. Clear the stored faults on all the computers connected to the network. Deal with any other faults.

MULTIPLEX NETWORK NOT OPERATIONAL (continued)

YES	Check that the resistance is approximately **120** Ω between the two network connections on the airbag computer: – If the resistance is not approximately **120** Ω**, contact Techline**. – If the resistance is **120** Ω, check the continuity and absence of interference resistance on the multiplex connection between the diagnostic socket and the UCH. Repair if necessary.
	Check that the resistance is approximately **120** Ω between the two network connections on the UCH computer: – If the resistance is not approximately **120** Ω**, contact Techline**.

NO	Repair the multiplex connection between the diagnostic socket and the airbag. If the fault is still present, **contact your Techline**.

AFTER REPAIR	Run the multiplex network test again using the **diagnostic tool**. Clear the stored faults on all the computers connected to the network. Deal with any other faults.

MULTIPLEXING

Fault finding – Interpretation of faults

FAULTY SEGMENT ON THE MULTIPLEX NETWORK

NOTES	**First check that the computer at the end of the faulty segment is properly powered (earth, + battery, + accessories or + after ignition).** **Always check the computer conformity.** **IMPORTANT** It may be that the tool cannot exactly determine which segment(s) are faulty. It will then suggest several segments that could be faulty. In this event, repair the segment closest to the diagnostic socket.

Isolate the faulty segment by disconnecting both ends of the segment. Check the condition of the connectors.
Check the continuity and insulation of the CAN H and CAN L lines (connections **133B** and **133C**) between the two connectors of the isolated segment.
Refer to the vehicle's multiplex network diagram for the allocation of tracks on the computers and connections.
Perform the necessary operations to check the continuity of the two lines (for example, replacing the wiring).
Make sure that the computer present in the vehicle is compatible and that the data it is producing is correct.

Reconnect the segment.
Carry out the multiplex network test again using the diagnostic tool.
Is the segment still declared faulty?

NO	End of fault finding.

YES	Are there other faulty segments?

NO	Repeat the multiplex network tests to ensure the continuity and insulation of the CAN H and CAN L lines (connections **133B** and **133C**) between the end of the faulty segment and the diagnostic socket.

YES	Apply the same procedure to each segment.

AFTER REPAIR	Run the multiplex network test again using the **diagnostic tool**. Clear the stored faults on all the computers connected to the network. Deal with any other faults.

FAULTY COMPUTER

Vehicle multiplex network

NOTES	**Make sure that the computers installed in the vehicle are the correct type and are compatible with the vehicle.** **Check that the computers are correctly supplied (earth, + battery feed,** **+ accessories feed or + after ignition feed).**

Make sure that the computer **wake-up mode** is in full working order on the vehicle and is properly assimilated by the computers.

The wake-up mode is:
– **Timed supply:** UCH,
– **+ accessories feed**: Air conditioning, ABS/ESP.
– **+ after ignition feed**: Injection, Airbag/Pretensioners, Sequential gearbox, Instrument panel.
In **+ accessories feed** these computers will not appear.

– Switch to **computer fault finding** mode.

Attempt to establish dialogue with computers.
➡   No communication from computers to diagnostic tool: see **ALP 1**
   No communication with the computer or computers not communicating with the diagnostic tool.
   Check the connections to the computers and that there are no open circuits.
   Repair if necessary.

➡   Computers are not displaying all the information on their identifications:
   Check in the Workshop Repair Manual or the World Vehicle Database that the computer is compatible with the vehicle.
   Check that the CLIP diagnostic tool update is recent enough to be able to deal with faults on the vehicle.

If no faults or open or short circuits have been detected after these checks, contact Techline.

AFTER REPAIR	Run the multiplex network test again using the **diagnostic tool**. Clear the stored faults on all the computers connected to the network. Deal with any other faults.

FAULTY COMPUTER (continued 1)

Multimedia multiplex network

NOTES	Switch off the vehicle ignition.

Measure the resistance of component **225** between the **following Multimedia multiplex line** connections: – **connection code 107X** – **connection code 107W** What is the value of the resistance?

0 Ω	The two lines are in short circuit (see **Introduction - Repair advice**).

60 Ω ± 10 Ω	**For radio R1-08 and radio R2-08:** Check for **earth** on connection **MA0**, and for **+12 V** supply on connection **BCP4** to the radio **261**. Check for **earth** on connection **NAM**, and for **+12 V** supply on connection **BCP4** and **BPT** to the display **653**. **For the Multimedia connection (C-box):** Check for **earth** on connection **NAM**, and for **+12 V** supply on connection **BCP4** to the Multimedia connection computer (C-box) **1959**.

BETWEEN 70 Ω AND 110 Ω	For each of **Multimedia multiplex line** connections **107X** and **107W**, check that there is no interference resistance and then check that there is no short circuit to earth or to the + battery feed.

120 Ω ± 10 Ω	Open circuit on one or both lines **For radio R1-08 and radio R2-08** Disconnect component **261** and check the **multimedia multiplex connections 107X** and **107W** between components **225** and **261**. **For the Multimedia connection (C-box):** Disconnect component **1959** and check the **multimedia multiplex connections 107X** and **107W** between components **225** and **1959**. Is the multiplex connection correct?

AFTER REPAIR	Run the multiplex network test again using the **diagnostic tool**. Clear the stored faults on all the computers connected to the network. Deal with any other faults.

FAULTY COMPUTER (continued 2)

Multimedia multiplex network

YES	**For radio R1-08 and radio R2-08** Check that the resistance is approximately **120 Ω** between the two connections **107X** and **107W** on component **261**: – If the resistance is not approximately **120** Ω, contact Techline. – If the resistance is **120 Ω**, check the continuity and the absence of interference resistance of **multimedia multiplex connection 107X** and **107W** between components **225** and component **653**. If the connection or connections are faulty and there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace it. Check that the resistance is approximately **120 Ω** between the two connections **107X** and **107W** on component **653**: – If the resistance is not approximately **120** Ω, contact Techline.
	For the Multimedia connection (C-box) Check that the resistance is approximately **120 Ω** between the two connections **107X** and **107W** on component **1959**: – If the resistance is not approximately **120** Ω, contact Techline. – If the resistance is **120 Ω**, check the continuity and the absence of interference resistance of **multimedia multiplex connection 107X** and **107W** between components **225** and component **653** If the connection or connections are faulty and there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace it. Check that the resistance is approximately **120 Ω** between the two connections **107X** and **107W** on component **653**: – If the resistance is not approximately **120** Ω, contact Techline.

NO	Repair the **multimedia multiplex connections 107X** and **107W** between components **225** and **653**.

AFTER REPAIR	Run the multiplex network test again using the **diagnostic tool**. Clear the stored faults on all the computers connected to the network. Deal with any other faults.

FAULTY COMPUTER (continued 3)

Isolate the faulty segment by disconnecting both ends of the segment. Check the condition of the connectors.
Check the continuity and insulation of the **multiplex network H** and **multiplex network L (connection code 107W** and **107X**) between the two connectors of the isolated segment.
To obtain the track allocation for the computer and connections, refer to the multimedia multiplex network diagram for the vehicle.
Perform the necessary operations to check the continuity of the two lines (for example, replacing the wiring).
Make sure that the computer present in the vehicle is compatible and that the data it is producing is correct.

Reconnect the segment.
Run the multiplex network test again using the **diagnostic tool**.
Is the segment still declared faulty?

NO	End of fault finding.

YES	Are there other faulty segments?

NO	Repeat the multiplex network tests to check the continuity and insulation of the multimedia **multiplex network lines H** and **L** (**connection code 107W and 107X**) between the end of the faulty segment and component **225**.

YES	Apply the same procedure to each segment.

AFTER REPAIR	Run the multiplex network test again using the **diagnostic tool**. Clear the stored faults on all the computers connected to the network. Deal with any other faults.

UNRECOGNISED COMPUTERS ON THE NETWORK

NOTES	– **Check computer compatibility with the vehicle.** **E.g.: Certain computers such as Radio R1-08 might not be recognised because a type A3 display is fitted (in place of a type A2 display).**

Check that the CLIP diagnostic tool update is recent enough to be able to deal with faults on the vehicle.

– Switch to **computer fault finding** mode.
 	
Attempt to establish dialogue with computers.
➡ If there is no communication from the computers to the diagnostic tool: see ALP 1
    No dialogue with the computers or computers not communicating with the diagnostic tool.
    Check the connections to the computers and that there are no open circuits.
    Repair if necessary.
 	
➡ If there is communication with computers:
    Make sure that the computer identification information is correct and matches the vehicle in fault finding.

– Check that the following computer information is correct:
    – Vdiag:
    – Program No.: (injection computer)

If no faults or open or short circuits have been detected after these tests, contact Techline.

AFTER REPAIR	Run the multiplex network test again using the **diagnostic tool**. Clear the stored faults on all the computers connected to the network. Deal with any other faults.

ALP 1	No dialogue with computers

NOTES	**Vehicle computer power supply for fault finding:** Engine stopped, ignition on. Connect the **diagnostic tool** and perform the required operations.

Try the **diagnostic tool** on another vehicle.
Check that the tool has been updated with the latest version.

Check:
– the connection between the **diagnostic tool** and the diagnostic socket (**component 225**) (connection and cable in good condition),
– the supplies of the computers,
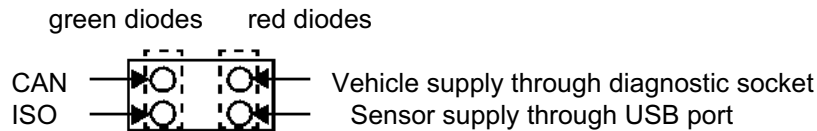– the engine and passenger compartment fuses.

ALP 1 **CONTINUED 1**	

Check for the supply and earth on the diagnostic socket (component **225**) through the following connections: **BP19** (**+12 V**), **NAM** and **MAM** (earth). If the checks are correct then move on to the next step, depending on the type of sensor used:

1. **Renault fault finding sensor** (with wire connection only):

Check that the CLIP sensor is supplied through the computer's USB port and the diagnostic socket by checking that the red diodes illuminate. If it is not, try with another cable, another sensor or another clip in order to determine the defective component.
Check that the CLIP sensor communicates with the vehicle computers by checking that the two green LEDs on the sensor light up. If it is not, check that the test conditions have been met (+ after ignition feed, vehicle selection etc.) otherwise apply the electrical checks below.

green diodes   red diodes

CAN ———— Vehicle supply through diagnostic socket
ISO ———— Sensor supply through USB port

ALP 1 CONTINUED 2	

2. **Alliance fault finding sensor** (with wireless connection possible):

Deal with the fault finding for each warning light in the following order of priority: from warning light 1 to warning light 3.

Description of warning lights displayed on the sensor from left to right	○ **Warning light 1 shows the supply status**	○ **Warning light 2 shows the type and status of the connection**	○ **Warning light 3 shows the level of communication with the vehicle**	○ **Reserved for the Nissan tool**
Off	Sensor not connected to the vehicle or connection fault	No connection to clip or connection fault	No dialogue with the computers	-
Green	Sensor supplied	Wireless connection	Green flashing: communication in progress	-
Orange	-	Connection with USB port	-	-
Red	Initialisation fault	-	Communication error	-
To be checked	**If red or off:** – Initialisation or connection fault. Disconnect and reconnect several times. If the result is not conclusive, try with another sensor.	**If off:** – Wireless connection: Try connecting with a USB cable. If the warning light illuminates orange, then check the configuration of the wireless connection. If it is not correct, call Techline. – Wire connection: Try with another USB cable or another CLIP sensor or even another sensor to determine the faulty component.	**If warning light 3 is off or red and warning light 2 is on:** – in this case, during the multiplex network test check that the green warning light flashes and that the test conditions have been met (+ after ignition feed, vehicle selection, etc.) otherwise apply the electrical checks below.	**If the warning light is on:** Contact Techline.

ALP 1 CONTINUED 3	

Check the following connections on the diagnostic socket:
BP 19 ⟶ **+ Battery**
NAM and MAM (or MAN) ⟶ **Earth**
If the connection or connections are faulty and there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace the wiring.

Computer connected to multiplex line V
If the fault is still present, check the **continuity** and the **insulation** of the following connections:
133B of component 225.
133C of component 225.

Use a multimeter to check that the voltages at the terminals of component **225** are approximately:
– **2.5 V** between **CAN H (133B)** and earth (**NAM and MAM**) (Average values)
– **2.5 V** between **CAN L (133C)** and earth (**NAM and MAM**) (Average values).

Computer connected to Multimedia multiplex line
If the fault is still present, check the **continuity** and the **insulation** of the following connections:
107W of component 225.
107X of component 225.

Use a multimeter to check that the voltages at the terminals of component **225** are approximately:
– **2.5 V** between **CAN H (107W)** and earth (**NAM and MAM**) (Average values)
– **2.5 V** between **CAN L (107X)** and earth (**NAM and MAM**) (Average values).

Refer to the **Introduction - Repair advice** to detect a short circuit on the vehicle's multiplex network.

ALP 2	**No topology diagram or configuration table display at the end of the multiplex network test**

The topology cannot be displayed under the following conditions:
1. The two computers storing the multiplex network configuration have failed to respond.
2. The multiplex network is not operational; therefore dialogue is impossible.
3. The two computers storing the multiplex network configuration do not have the same configurations.
4. On the **Multiplex network** tab on the configuration screen, an incorrect **Diagram version** number has been entered into one of the two computers that store the network configuration.
5. No **Network version** has been entered into the two computers that store the configuration.

1 –
Vehicle multiplex network
The two computers storing the multiplex network configuration did not respond.
Check first that the computers storing the configuration (**Airbag and UCH**) are correctly supplied:
– check for **earth** on connection **NAP**, and for **+12 V supply** on connection **AP25** on component **756**.
– check for **earth** on connections **MAM** and **NAM**, and for **+12 V supply** on connections **AP7, AP43, BP3, BP6, BP15, BP19, BP49** on component **645**.
Check the condition of the multiplex network and the continuity and insulation of the CAN H and CAN L lines between the computers storing the configuration.

Multimedia multiplex network
The computer containing the multiplex network configuration did not respond.
Check first that the computer storing the configuration (**A2/A3 display**) is correctly supplied:
check for **earth** on connection **NAM**, and for **+12 V supply** on connection **BCP4** and **BPT** to the display **653**.
Check the condition of the multiplex network and the continuity and insulation of the CAN H and CAN L lines between the computers storing the configuration.

2 – The multiplex network is not operational, therefore dialogue is impossible
 (see **fault "Multiplex network not operational"**).

3 – The computers storing the multiplex network configuration do not have the same configurations
(see **configuration "Multiplex network configurations"**).

4 –On the multiplex network tab of the configuration screen, an incorrect diagram version number has been entered on one of the two computers storing the network configuration
(see **configuration "Network configuration"**).

5 – No diagram version has been entered on the two computers storing the configuration.
(see **configuration "Network configuration"**).

ALP 3	**Configuration table display at the end of the multiplex network test**

NOTES	ALP to use if the tool loads the configuration screen at the end of the multiplex network test. The configuration chart is always accessible through the **Configuration** icon. Update the vehicle configuration again then restart the multiplex network test. Make sure that the two tabs are consistent before rerunning the test.

The RENAULT diagnostic tool loads the configuration screen directly under the following conditions:

➡ **MULTIPLEX NETWORK** tab
  – Inconsistency in the "**network version**" numbers entered into the two computers that store the multiplex network configuration. If the numbers are inconsistent, the following error message is displayed when the multiplex network test is being run: Inconsistent configuration of computers supporting fault finding: check configuration before rerunning test.
  – Inconsistent list of computers entered into the computers that store the multiplex network configuration.
  – The **network version** number on at least one of the two computers storing the multiplex network configuration is incorrect (see configuration **"network configuration"**). In this instance, the following message is displayed when the multiplex network test is being run: "Unknown vehicle configuration: Check tool update".
  – One of the two computers that store the network version is blank (if the **airbag or UCH** computer has been replaced).

➡ **COMPUTERS SUPPORTING FAULT FINDING** tab
  – Inconsistency in the "**network version**" numbers entered into the two computers that store the configuration.
  – The list of computers that can support fault finding entered into the two computers that store the list of computers that can support fault finding is inconsistent.
  – Inconsistency between the list of computers entered and the computers actually detected on the vehicle. Some computers are entered as absent in the computer that stores the network configuration even though they are present on the vehicle (see the **Multiplex network configuration** configuration). In this instance, the following error message is displayed when the multiplex network test is being run: "Some computers respond to the diagnostic tool even if they are not listed in the computer configuration".