CR-508

M.2 GPS/GLONASS module with PCI-express

User manual

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1.INTRODUCTION

The CR-508 module can be installed in fixed and mobile computers, onboard control units and controllers having an expansion slot M2. The product provides the receipt of satellite navigation information from GPS and GLONASS systems and the transfer of navigational data to the computer - global coordinates, altitude, speed, exact time.

Main features:

- **Standard M.2 module with dimensions 2242**
- **PCI-express x1 interface bus**
- **Messages format NMEA 0183**
- **External active antenna**
- **Battary powered for fast start**
- **Drivers for Windows XP, Vista, 7, 8, 8.1,10, Linux >= 2.6.32**

2. TECHNICAL DATA

General characteristics	
Form factor	M.2 2242, keys B,M
Dimensions	42x22x7 mm
Interface bus	PCI-express 2.0 Gen 1
Logical interface	UART 4800..115200 kbit/s (9600 default)
Satellite Systems	GPS, GLONASS, the same time
Ambient temperature	-40..+80°C
Battary	Yes
RF module	
GPS range	1575,42 ±0,5 MHz
GLONASS range	1597,5…1605,9 MHz
Sensivity	-148dbm (detection) -165 dbm (tracking)
Time of first determination (signal level -130 dbm)	35s (cold start) 1s (hot start)
Accuracy of positioning	3 m (Longitude Latitude) 4 m (sea level)
Antenna input	
Socket type	MMCX (female)
Antenna type	Active, power 3.3V 100 mA

3. CR-508 STRUCTURE

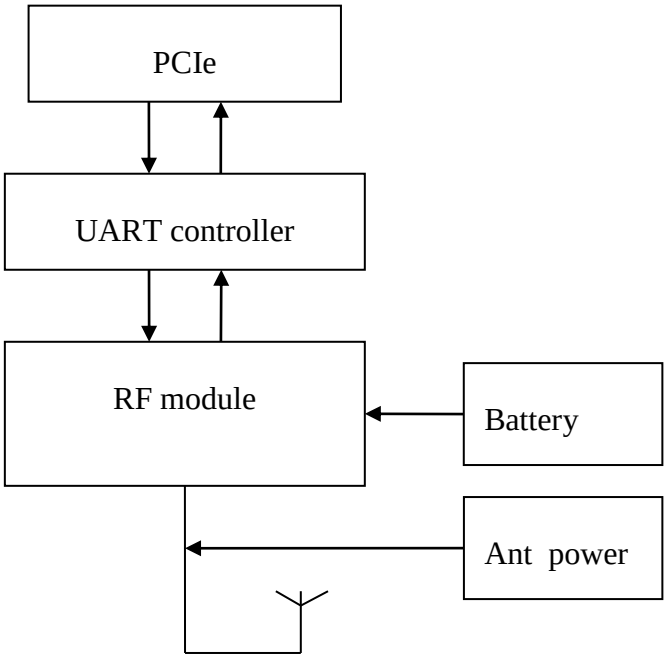
The CR-508 module consists of the following functional blocks:

UART – com port interface chip

RF module - GPS/GLONASS receiver

Battery - autonomous battery for fast start

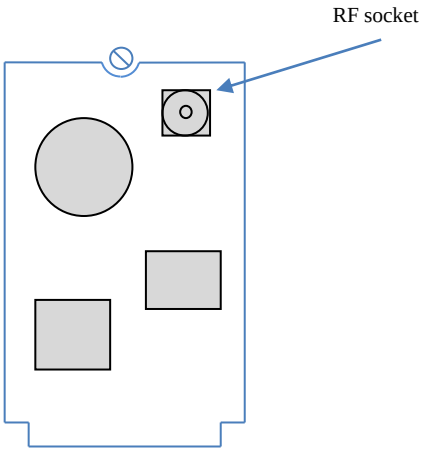
Ant power – active antenna power circuit



3. INSTALLATION AND CONNECTION

The CR-508 module is installed in the M.2 slot of the controller (system board). Please make sure the slot supports PCI-express bus before installation.

1. Install the module into the slot connector
2. Fix the module with the screw on the system board, in position 2242
3. Connect the active antenna cable to the RF connector (MMCX connector type)



M.2 slot

4. INSTALLING THE DRIVER

4.1. WINDOWS

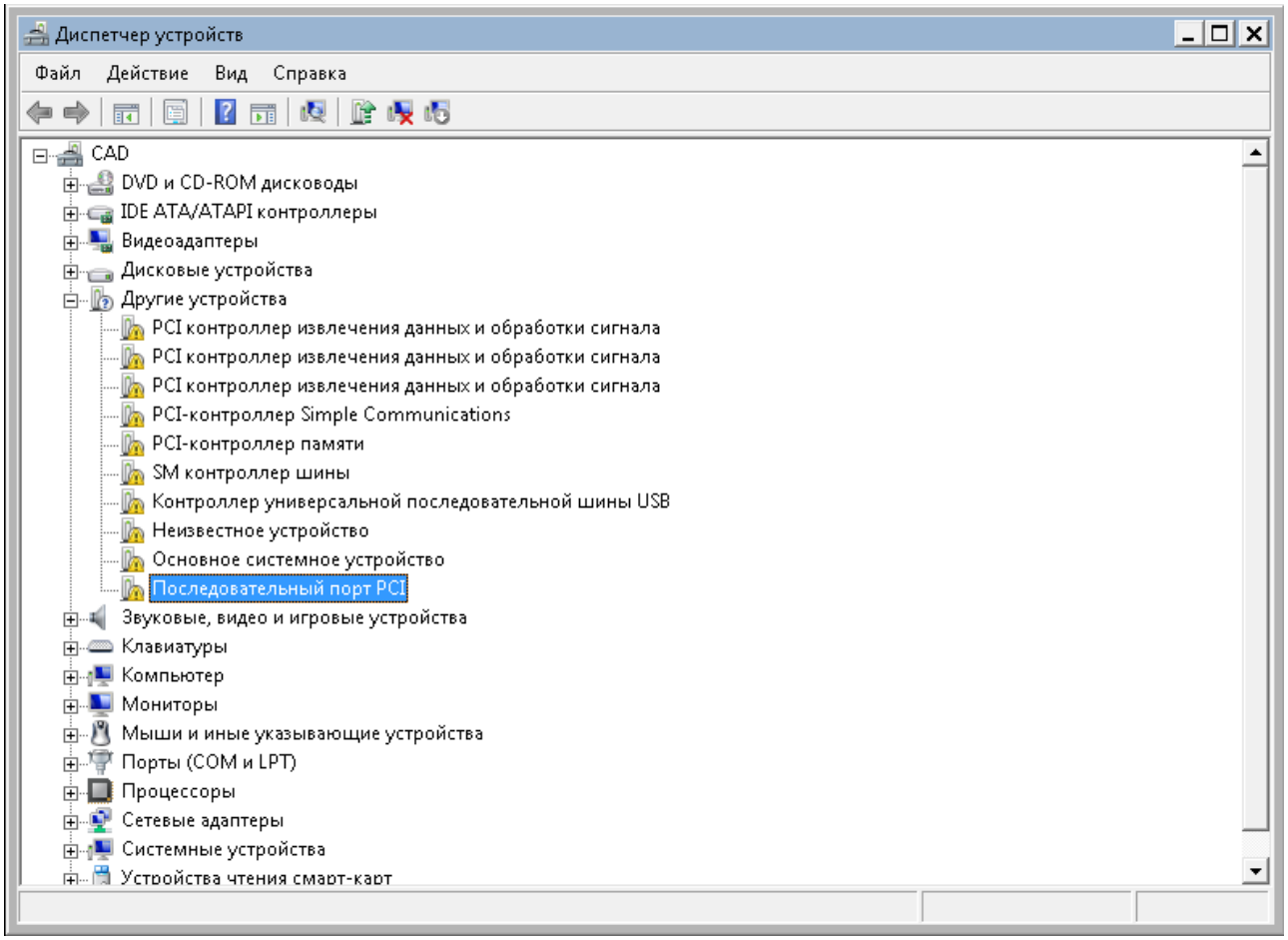
Download the device driver from the chip manufacturer's website.

https://www.exar.com/design-tools/software-drivers

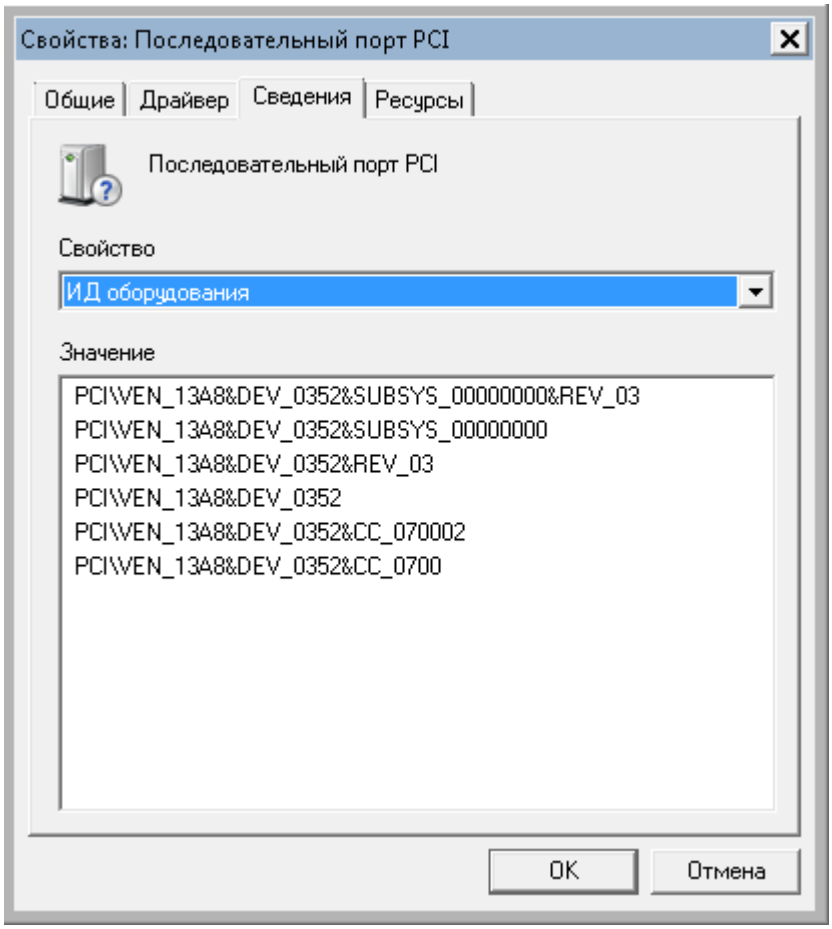
Select the link to download the driver for the XR17V352 chip. Unpack the downloaded archive into a folder, for example:

c:\data\xr17v35x_win_5100_x64_signed

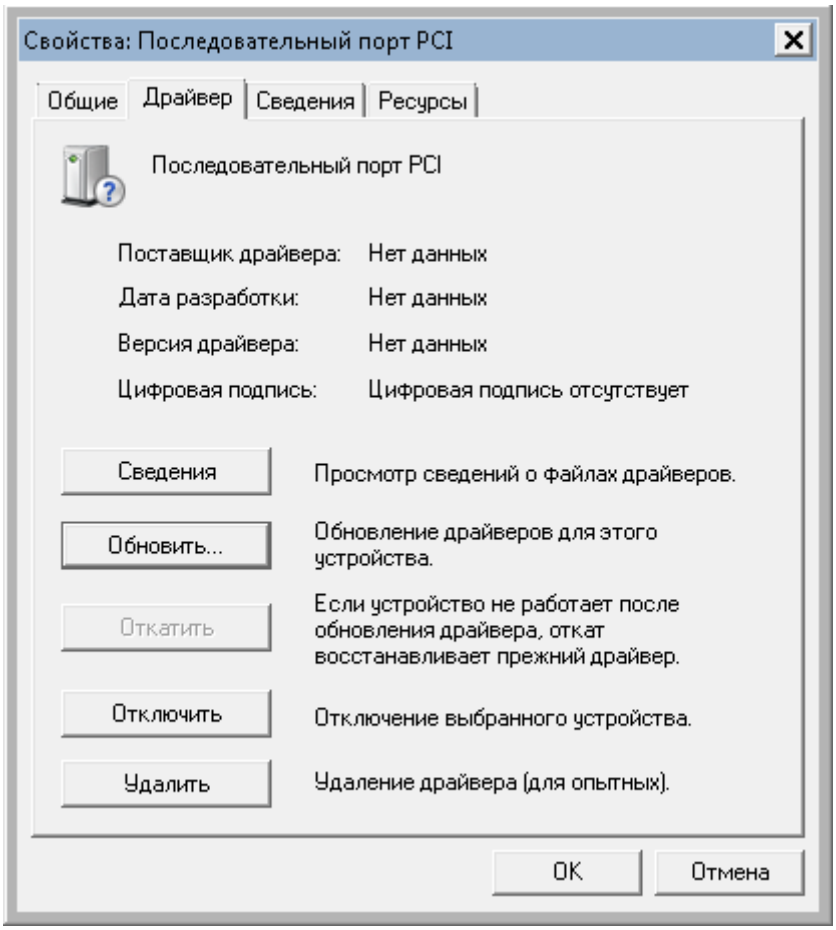
After installing the module, the device "Serial PCI port" should appear in the Device Manager. Right-click the "Properties" menu.



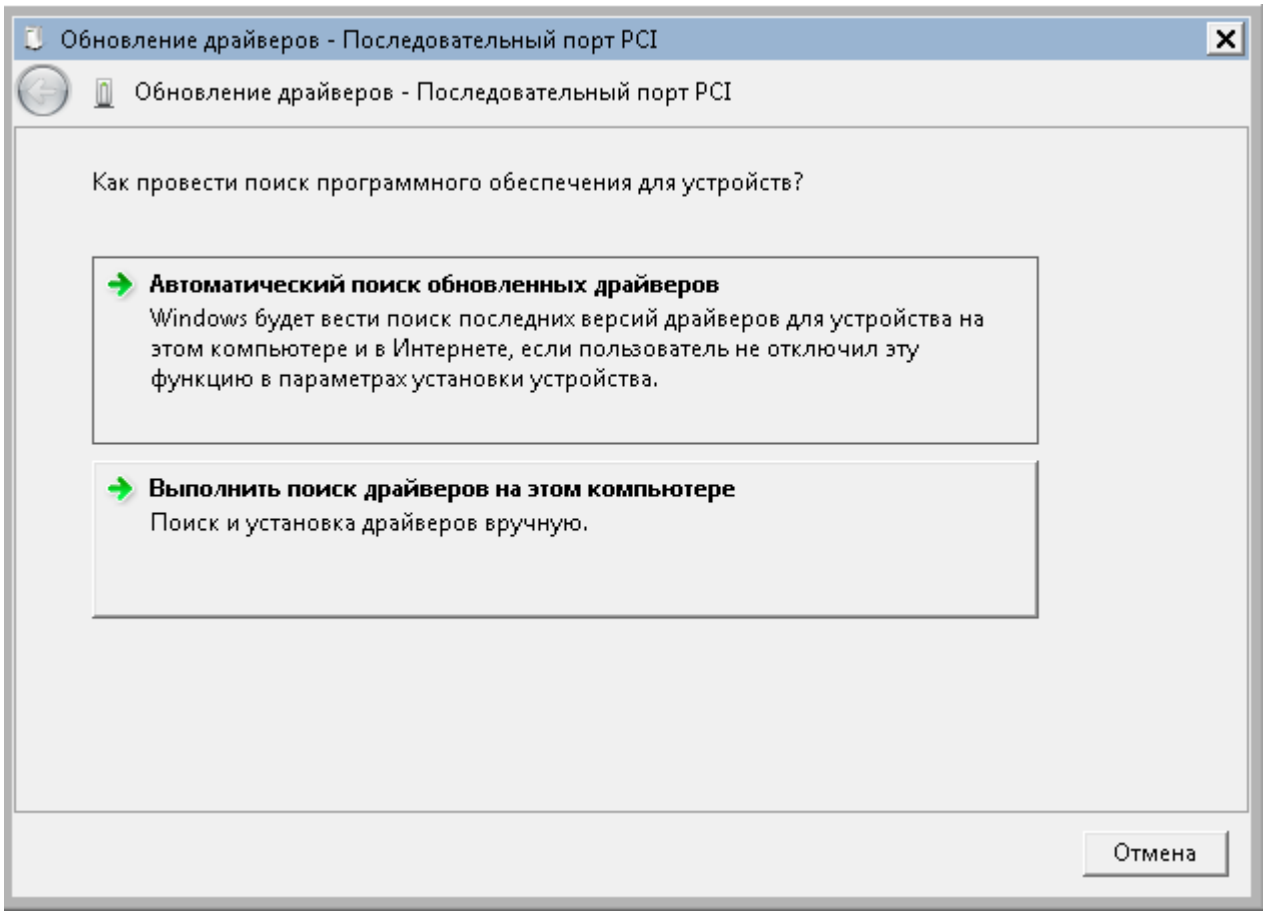
In the device properties, make sure that the manufacturer identifier (VEN) is 13A8, the device identifier is 0352. This corresponds to the XR17V352 chip manufactured by Exar.



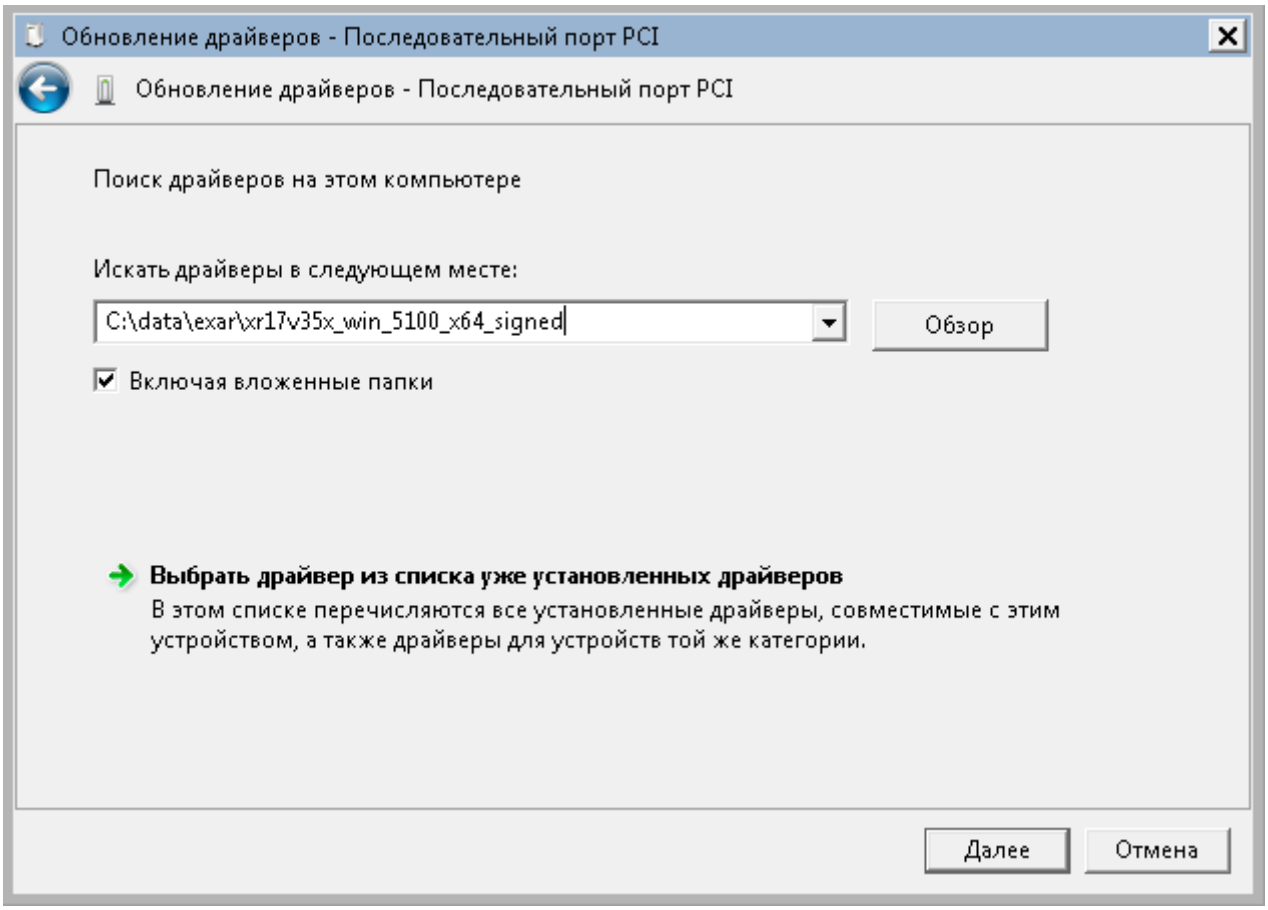
To install the driver, select the "Driver" tab, click the "Update" button.



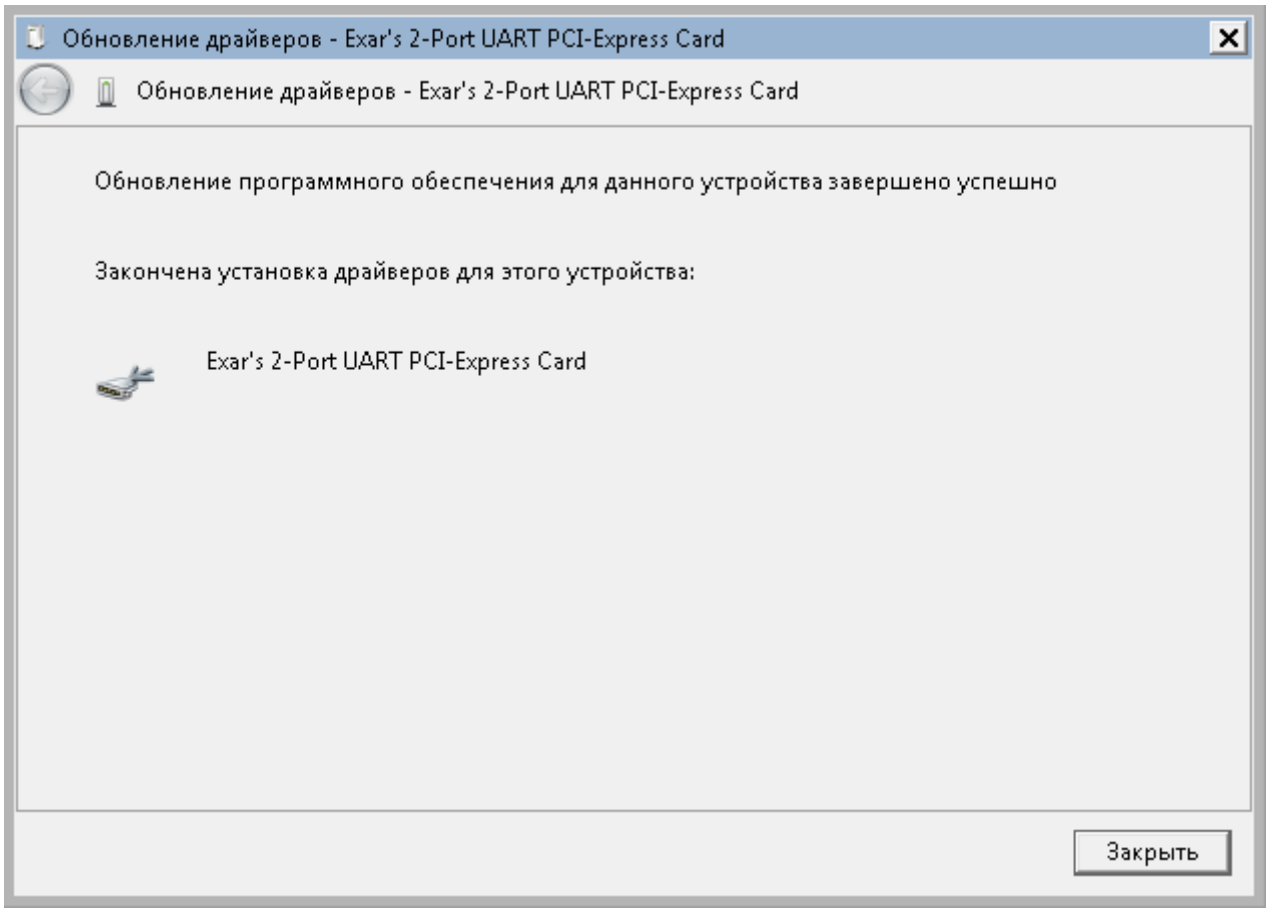
In the window that opens, select "Search and install drivers manually".



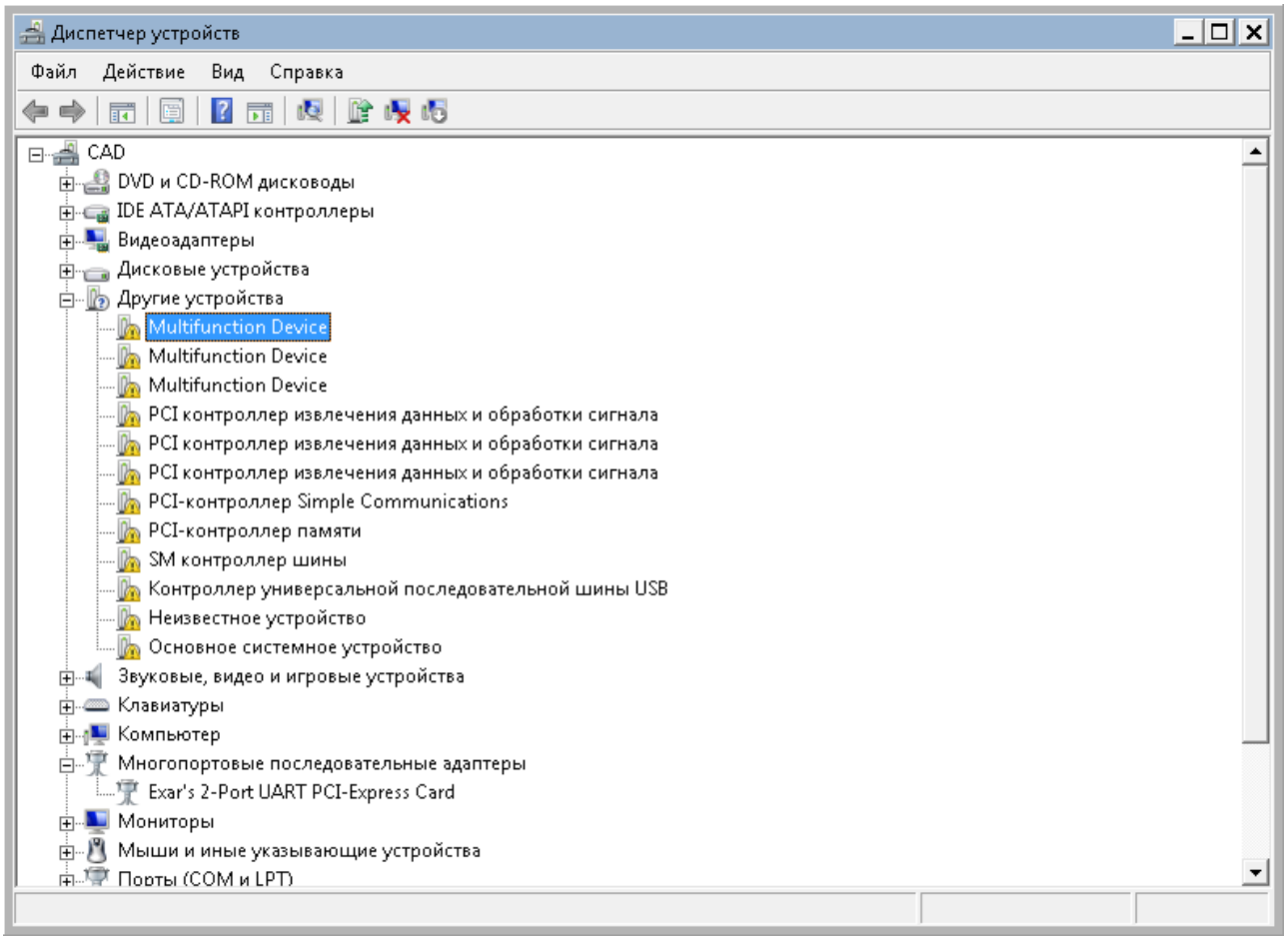
Specify the path to the folder with the unpacked driver.



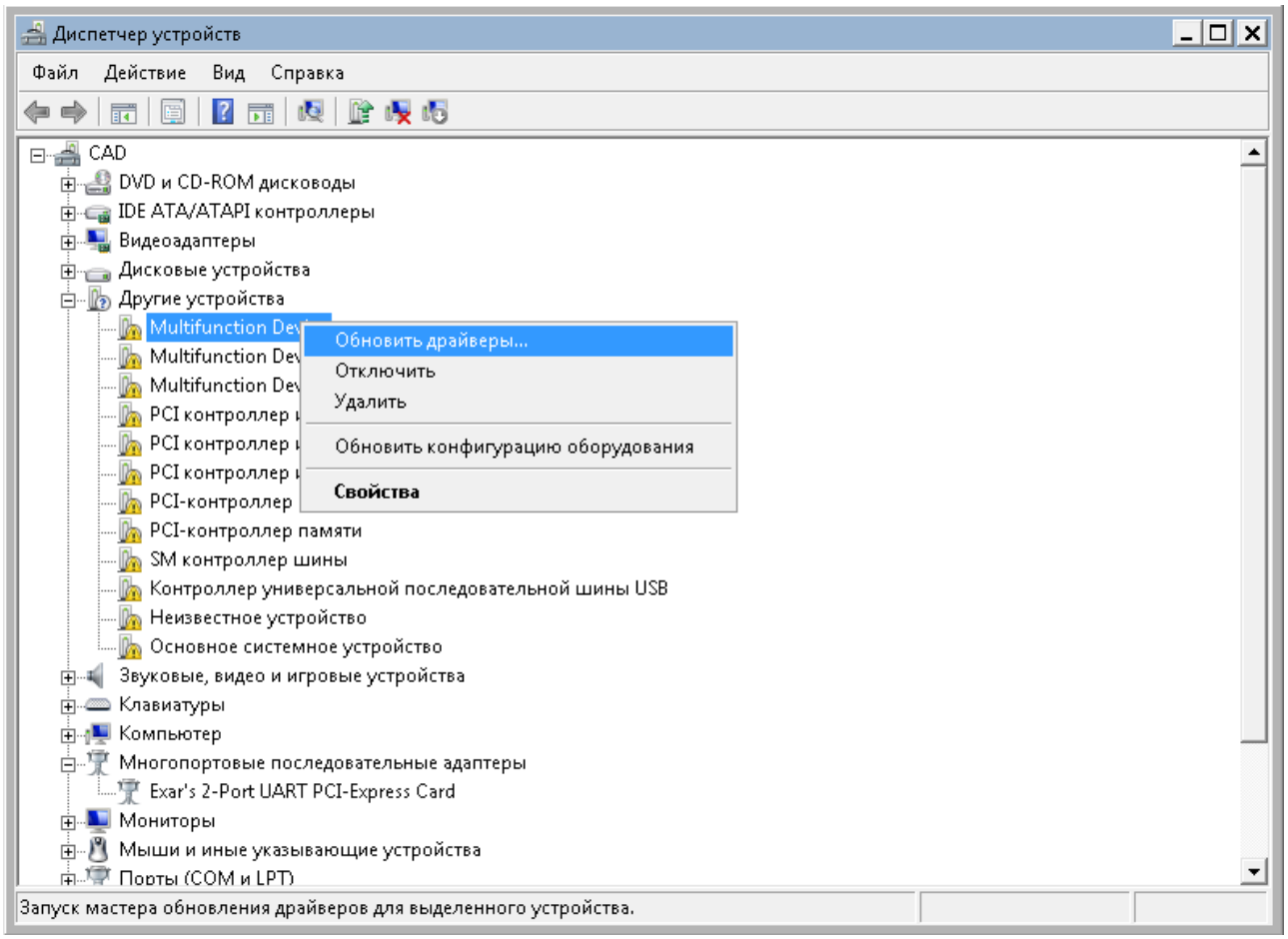
Installation of the driver for Exar will be completed



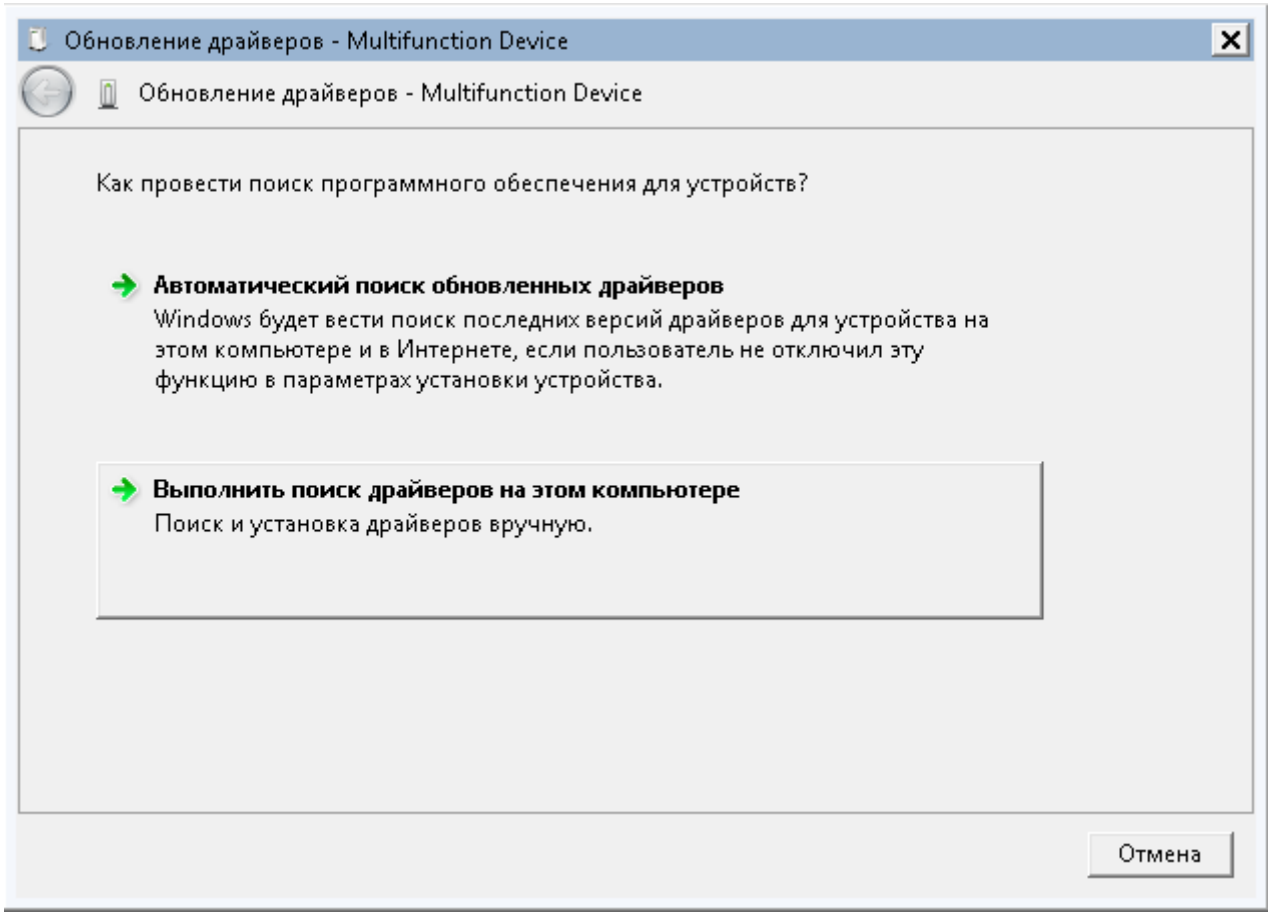
A new device "Exar's 2-Port UART PCI-express Card" will appear in the device manager, as well as three devices "Multifunction Devices" for which you also need to install drivers.



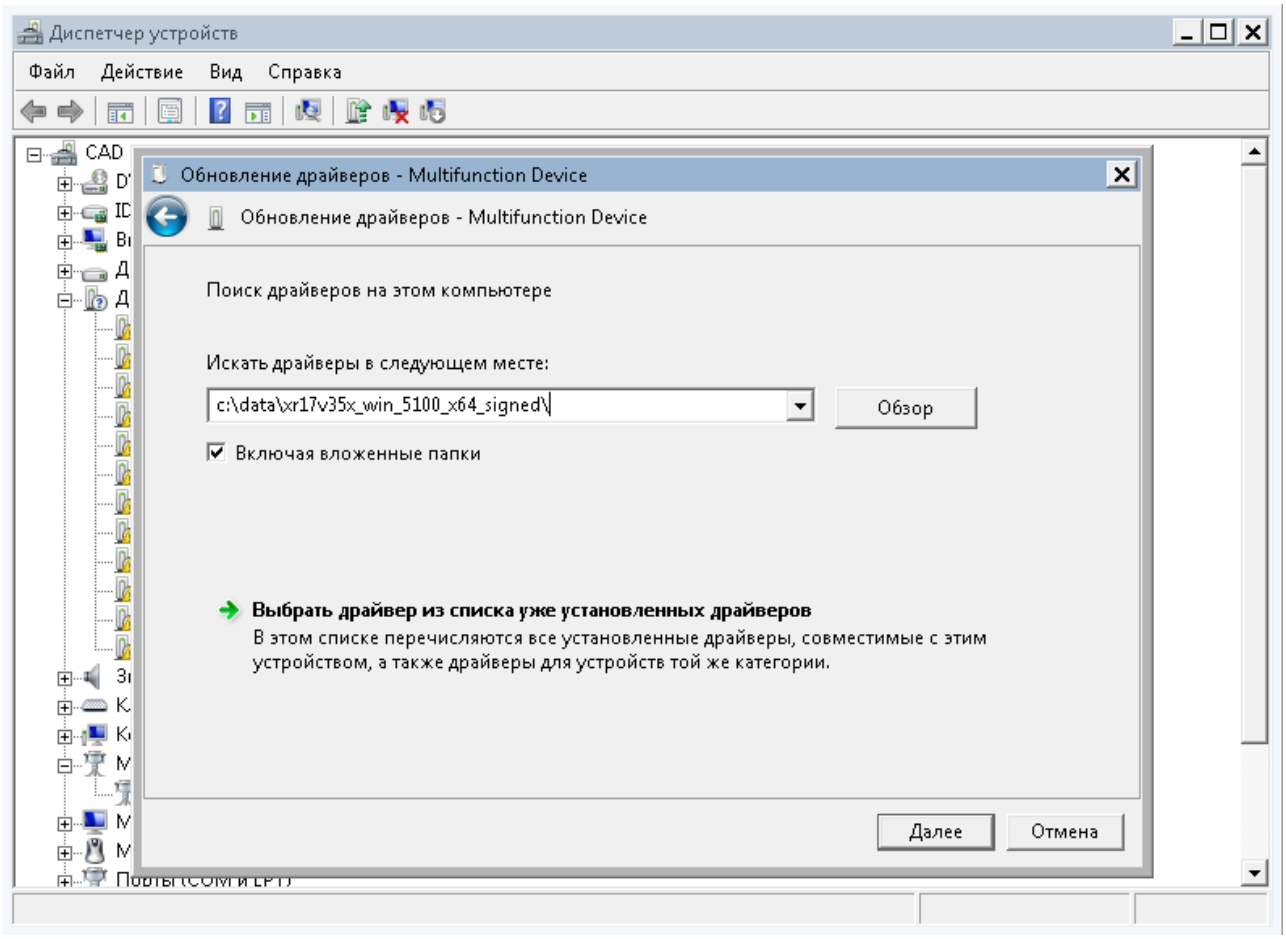
To do this, right-click on "Update drivers".



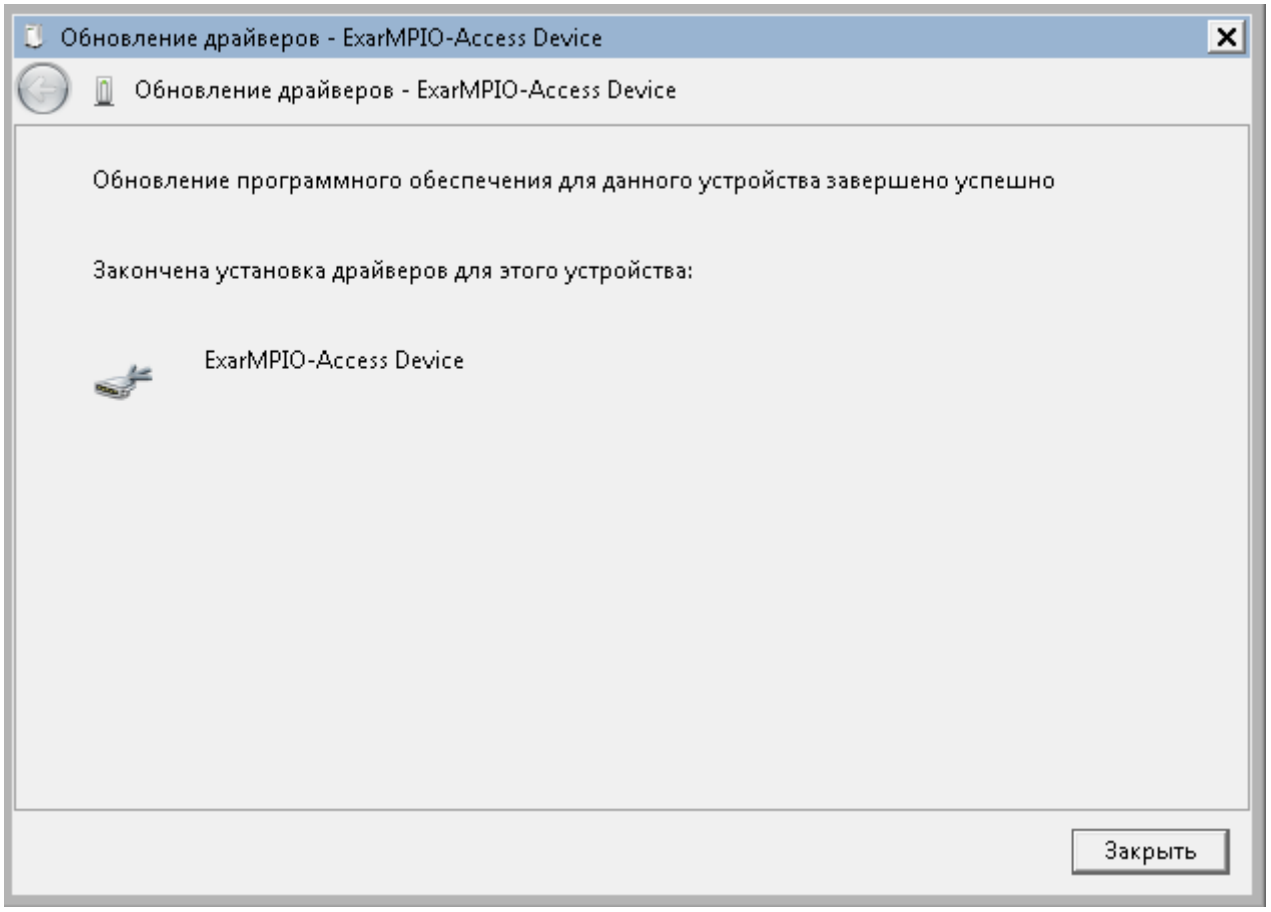
Select "Search and install drivers manually" again.



Specify the path to the folder with the unpacked driver.

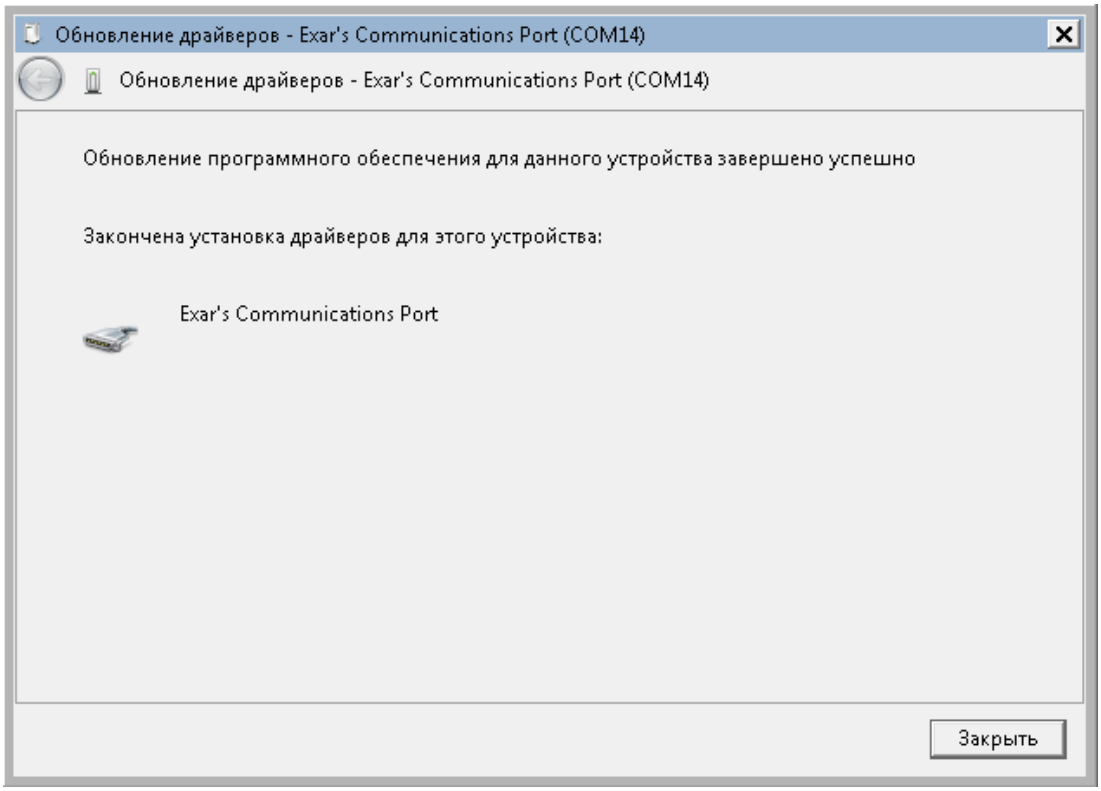


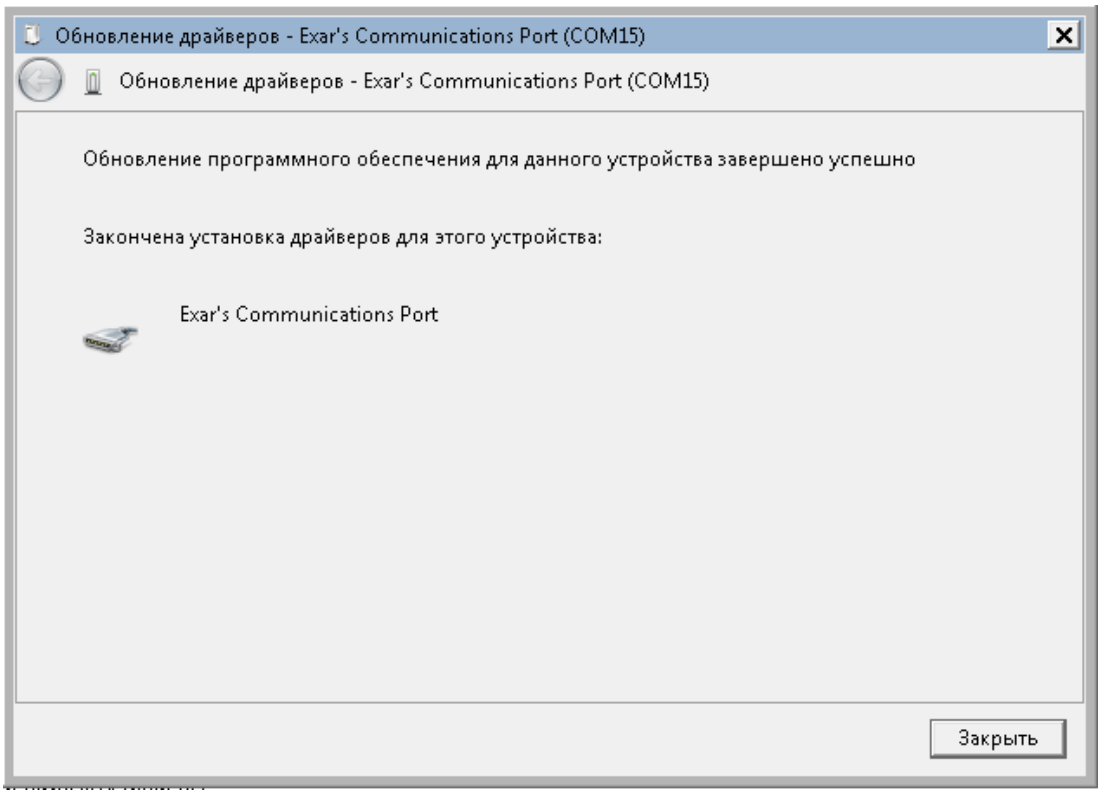
The driver for the ExarMPIO-Access Device will be installed.



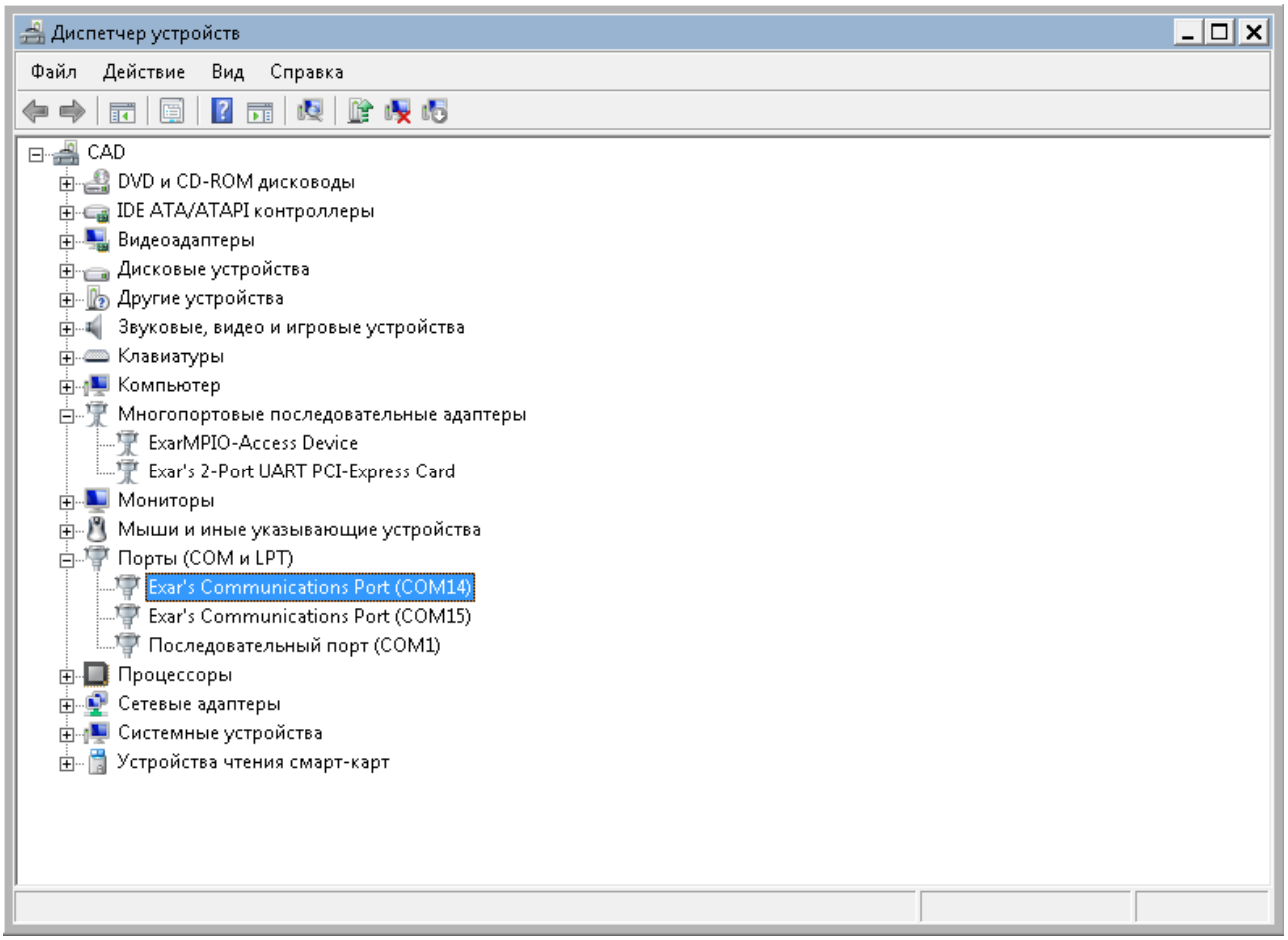
Install the drivers for the two remaining "Multifunction Devices" in the same way.

This will install two additional COM ports.





In Device Manager, the complete set of drivers should appear as shown in the picture.



4.2. LINUX

To install the driver, you need to do the following.

1. Make sure the module is recognized by the system.

lspci | grep Exar

01:00.0 Serial controller: Exar Corp. Device 0352 (rev 03)

2. Download the device driver from the chip manufacturer's website.

https://www.exar.com/design-tools/software-drivers

Select the link to download the driver for the XR17V352 chip. Unpack the downloaded archive into a folder.

3. Go to the folder and run the make command. If the compilation is successful, the driver is located in the xr17v35x.ko file.

4. Load the driver into the system.

insmod xr17v35x.ko

5. The driver will create two device files for new com ports, the device names can be viewed in the log /var/log/syslog.

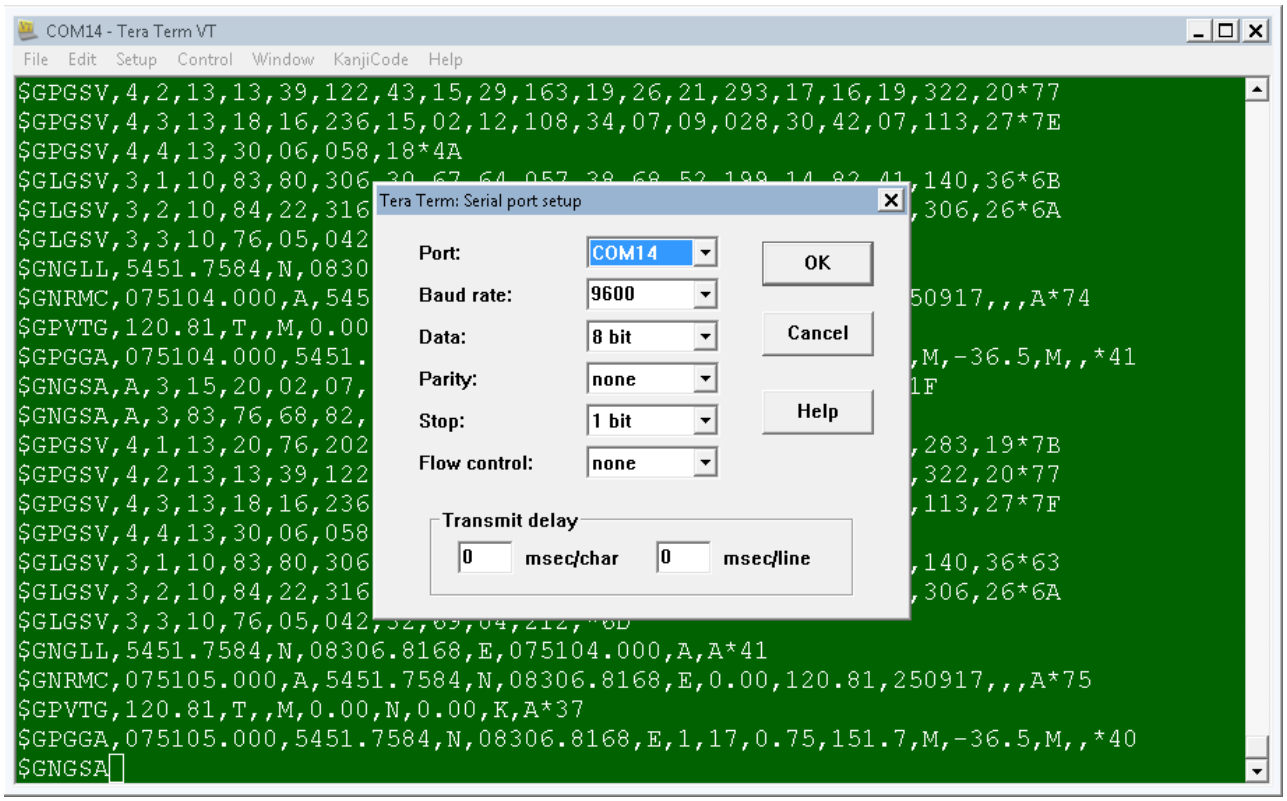
```
Sep 25 16:21:00 debian-test kernel: [  850.615569] Exar PCIe (XR17V35x) serial driver Revision: 2.2
Sep 25 16:21:00 debian-test kernel: [  850.615769] 0000:01:00.0: ttyXR0 at MMIO 0xffa00000 (irq = 16) is a XR17v35x
Sep 25 16:21:00 debian-test kernel: [  850.624044] init_one_xrpciserialcard line:0
Sep 25 16:21:00 debian-test kernel: [  850.624071] 0000:01:00.0: ttyXR1 at MMIO 0xffa00400 (irq = 16) is a XR17v35x
Sep 25 16:21:00 debian-test kernel: [  850.640031] init_one_xrpciserialcard line:1
```

In our case, these are /dev/ttyXR0 and /dev/ttyXR1.

6. The working port is /dev/ttyXR0 with a default baud rate of 9600.

5. OPERATION CHECK

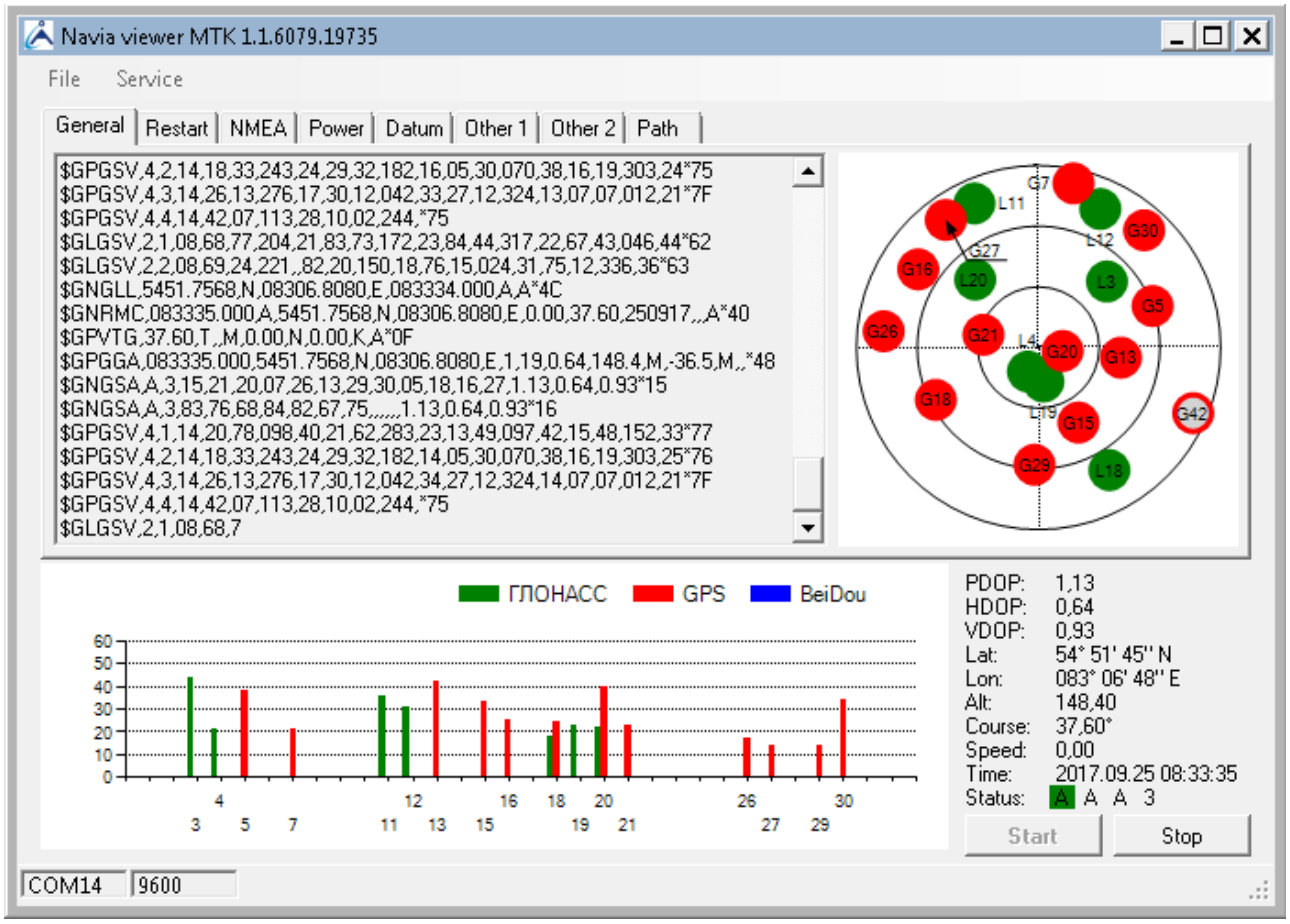
The module is ready to work immediately after installing the driver.



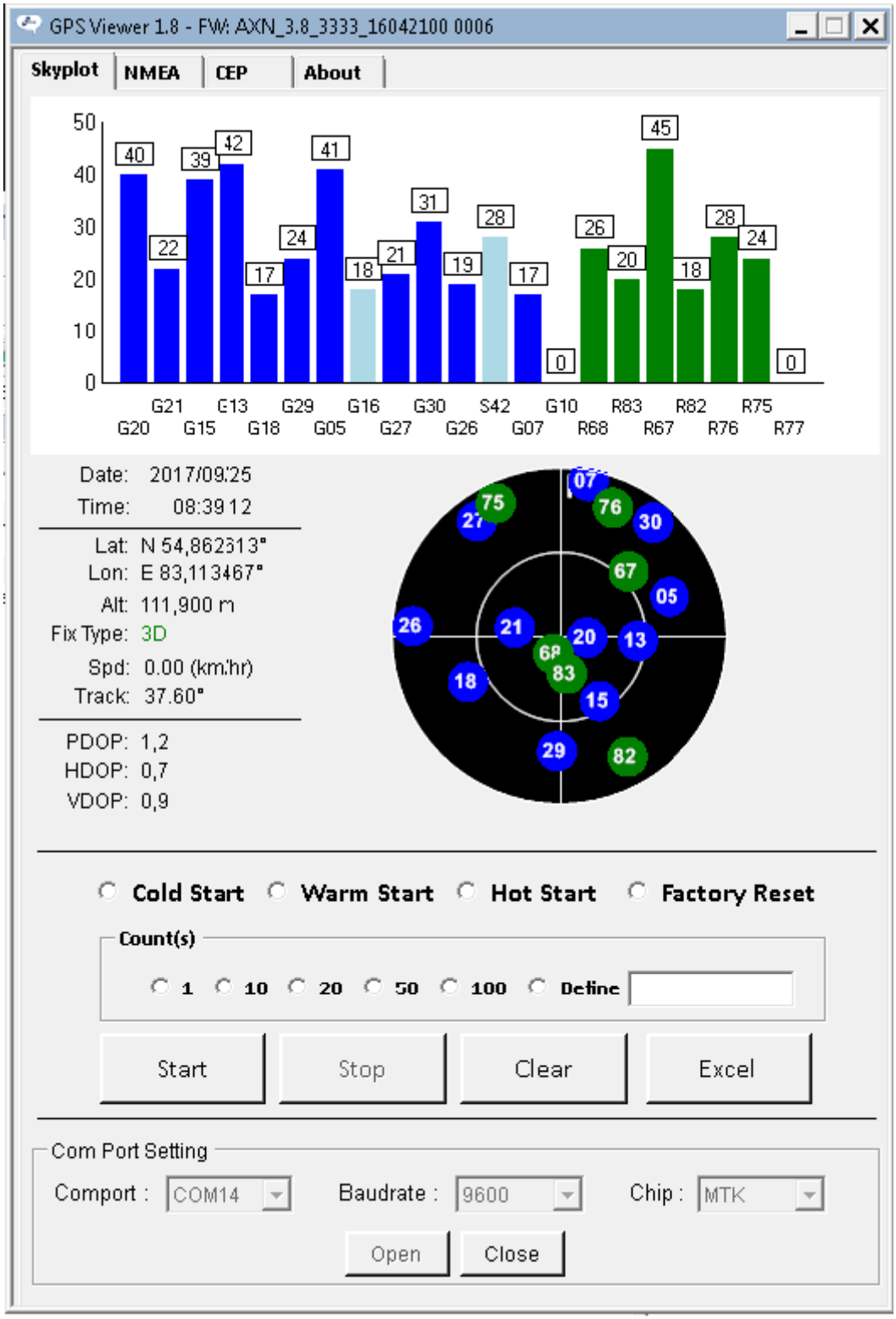
To check, you can use any terminal program for working with serial ports - TeraTerm, Putty (Windows), or Minicom (Linux). By default, the port parameters are set as shown in the picture. After opening the terminal program, messages in NMEA language with encoded navigation information are displayed in the window.

To visualize the output of the module, it is necessary to use specialized navigation programs. Many of them are available for free download. Below are snapshots of navia_viewer_mtk and GlobalTop GPS Viewer.

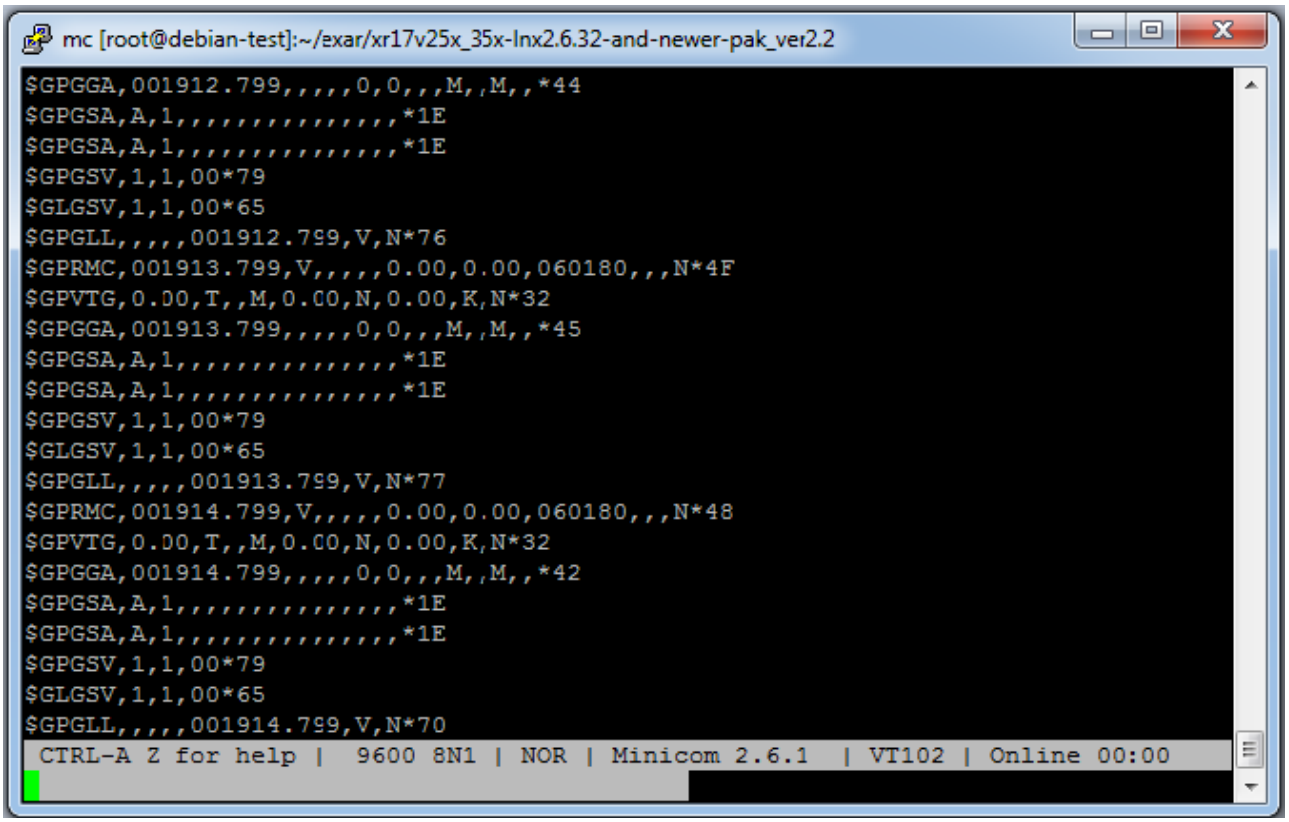
Navia viewer program, module operation with active antenna, antenna is located near the outer wall of the building. Found 12 GPS satellites, 7 GLONASS satellites.



GPS viewer software, the module works with an active antenna, the antenna is located near the outer wall of the building. Found 11 GPS satellites, 6 GLONASS satellites.



Output of the module in Linux through the Minicom program.



6. CONTENTS OF DELIVERY

- Adapter board
- CD with driver and user manual
- Warranty card
- Packing box

Kit weight no more than 0.5 kg.