

Software
for joint work of electrocardiographs
single/three-channel EK1T-1/3-07 "AXION",
3-6-channel EK3TC-3/6-04 "AXION",
defibrillator automatic external DA-N and
defibrillator-monitor DKI-N-11 "AXION"
with personal computer

User guide

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This manual is intended for studying the CadioPC Ltd software designed for the joint operation of EK1T-1 / 3-07 "AXION" and EK3TTC-3 / 6-04 "AXION" electrocardiographs, an automatic external DA-N defibrillator and a defibrillator - monitor DKI-N-11 "AKSION" with a personal computer.

The software performs the following functions:

- ECG monitoring in real time;
- saving the ECG in the software database;
- transfer of the ECG archive from the memory of the electrocardiograph to a personal computer and saving in the software database;
- viewing ECGs saved in the software database;
- printing of the saved ECG;
- viewing the defibrillator data recorded on the micro SD card.

1 General Provisions

1.1 Requirements for personal computers

1.1.1 Personal computer (hereinafter PC) must be compatible with an IBM personal computer.

1.1.2 Minimum PC requirements:

- operating system Windows XP and higher;
- capacity of random access memory not less than 512 Mbytes;
- the amount of memory on the hard disk for installing the software is not less than 200 MB;
- drive for reading CDs;
- free USB port for connecting an electrocardiograph.

1.2 Installing the software

1.2.1 Install the CardioPC Ltd software on your PC from the supplied CD-ROM. To install the program, run the installation file "Setup_CardioPC Ltd.exe" and follow the installation instructions.

Run the program using the CardioPC Ltd.exe file. In the status bar from the combo box select the type of device with which you will continue to work (EK1T-1 / 3-07, EK3TTC-3 / 6-04, DA-N, DKI-N-11).

2 Working with an electrocardiograph

2.1 Connection

Connect the electrocardiograph to a PC using an interface cable. The cable must have a USB type A plug on one side, connected to the PC, and a USB type B plug on the other side, connected to the electrocardiograph.

The PC and all its components must be located at a distance of at least 1.5 m from the patient.

2.2 Customization

After starting the program, the CardioPC Ltd. program window will appear on the PC monitor. At the top are the menu bar and status bar.

The status bar contains information about the set parameters of ECG registration:

- sensitivity "**Scale**";
- the selected leads "**Leads**";
- recording speed "**Speed**".

The parameters of ECG registration can be changed using the menu that opens by pressing the "▼" button in the corresponding parameter window. If necessary, the parameters can be changed after recording the ECG.

The menu bar contains the **Patient**, **Setup**, **Language** and **Exit** buttons. The "**Patient**" menu command has a submenu "**Card file**", "**Memory**", "**Import from the file**", "**Print setup**", "**Print**".

By the command "**Patient / Card file**" a window opens for entering, changing or deleting information about the patient, searching and viewing the recorded ECG, recording a new ECG.

The "**Patient / Memory**" command opens a window with the "**EC Memory**" tab for transferring information from the electrocardiograph memory to the PC memory.

The **"Patient / Import from the file"** command opens the standard **"Open"** window, in which you select the required directory, select the file in it and press the **"Open"** button. An ECG, stored in the selected file, appears on the PC monitor.

The **"Patient / Print setup"** command opens the standard print settings window.

On the command **"Setup / Parameters"** a dialog box opens with a tab **"Print"** and functional buttons **"OK"**, **"Cancel"** and **"To apply"**.

To enter patient data, open the **"Patient"** dialog box by the **"Patient / Card file"** command (see Figure 1).

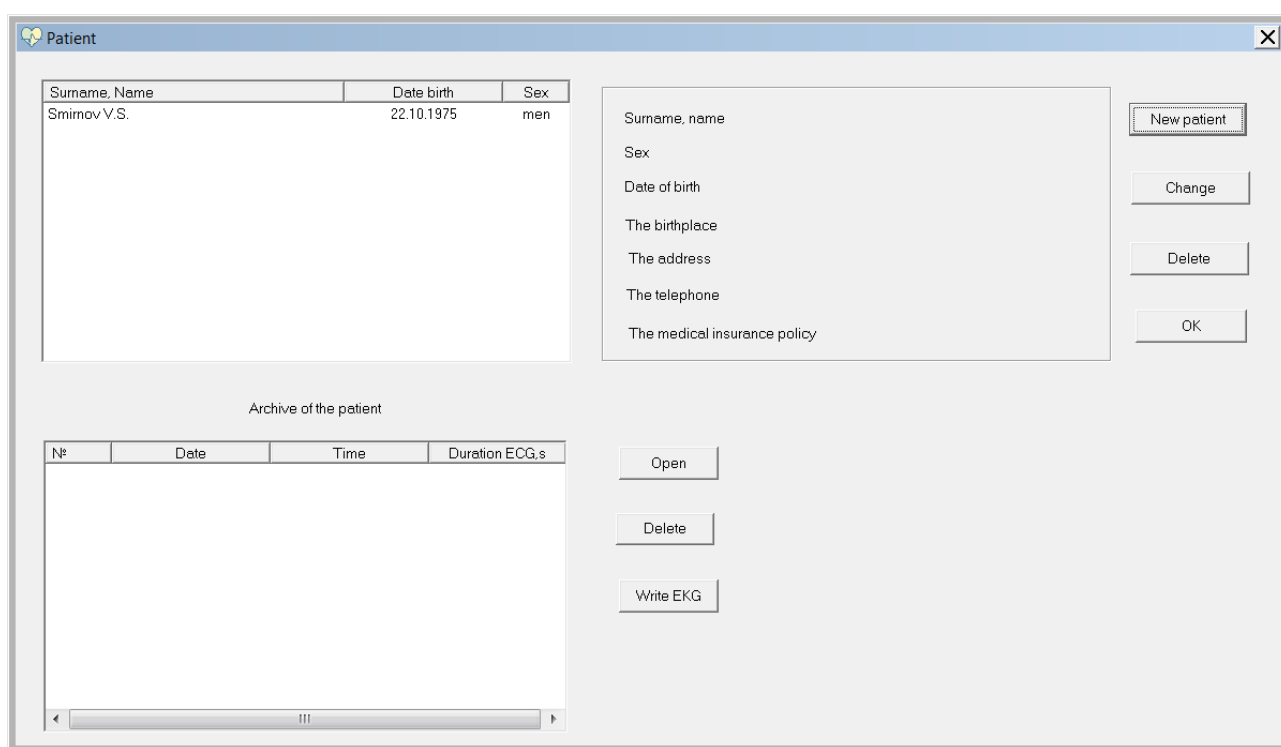


Figure 1 - The dialog box **"Patient"**

Press the **"New patient"** button. A dialog box will open for entering patient information, as shown in Figure 2.

Place the cursor in the window corresponding to the inscription **" Surname, Name "**. To enter a surname, a name of the patient.

Place the cursor in the window corresponding to the inscription **"Sex"** and to choose from the offered menu the necessary parameter (**"men"** or **"wom"**).

In the window corresponding to an inscription "**Date of birth**" the current date is displayed. It is necessary to install the cursor in a window and to enter date of birth of the patient, or, having pressed the button "▼", to open a calendar and to choose date of birth of the patient.

Consistently installing the cursor to enter the necessary data into the windows corresponding to inscriptions "**Birthplace**", "**Address**", "**Phone**" and "**The medical insurance policy**".

To press the button "**OK**", the entered information will be reflected in the window "**Patient**".

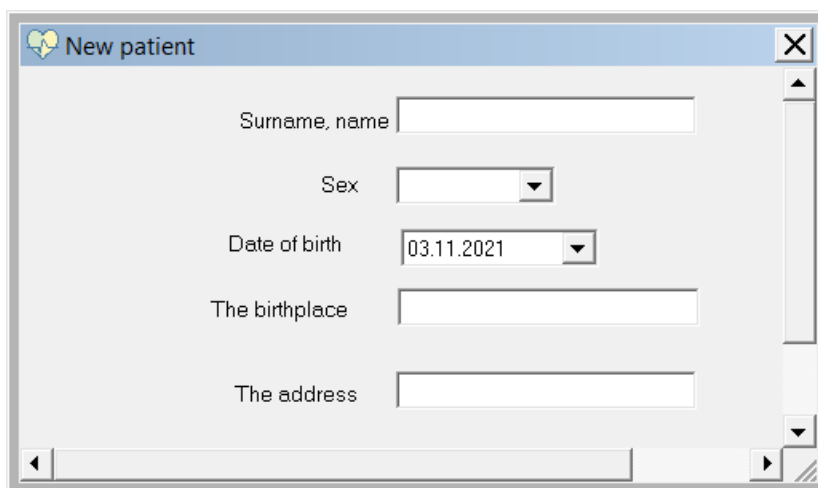


Figure 2 - The dialog box "**New Patient**"

2.3 Monitoring and registration ECG

For ECG registration, the electrocardiograph should be prepared for operation in accordance with clause 2.1 of the Operation Manual included in the delivery set of the device.

Switch on the electrocardiograph. Select a patient in the "**Patient**" window, press the "**Write ECG**" button to start ECG registration. The "**Patient**" window is closed, and the ECG being taken is displayed on the PC monitor. To start ECG

registration, press the **"Start"** button at the bottom of the monitor screen. Registration duration thus is reflected in the **"Duration ECG, s"** window.

To complete the registration, press the "Stop" button at the bottom of the PC monitor screen. In the opened question window **"To save the data?"** select the desired answer (**"Yes"** or **"No"**). After answering **"Yes"**, the recorded ECG is displayed on the PC monitor.

The ECG is saved both in the built-in program database and in the **"c: \ ECG_BASE"** directory, where the file name has the form **"MPCDD-MM-YY.HH-MM.ecg"**, where **DD-MM-YY** is the date, **HH- MM** - ECG registration time).

When re-examining a patient, select the menu command **"Patient / Card file"**. In the **"Patient"** window that opens, find the patient's data by highlighting his surname with the cursor and register the ECG.

2.4 Viewing ECG Records

To view the ECG saved in the built-in database of the program, on the PC monitor, open the **"Patient"** dialog box by the **"Patient / Card file"** command, select the patient, highlight the number of the record of interest in the **"Archive of the patient"** window with the cursor and press the **"Open"** button.

When viewing an ECG on a PC monitor, you can change the viewing parameters by setting the desired values in the corresponding windows of the status bar:

- sensitivity **"Scale"**: 5, 10, 20 mm / mV;
- selected leads **"Leads"**: I, II, III, I - III, aVR - aVF, I - aVF, V1 - V3, V4 - V6, V1 - V6, I - V6;
- recording speed **"Speed"**: 5, 10, 25, 50 mm / s.

By pressing the operating command buttons at the bottom of the window, you can shift the ECG image:

- the button **"Forward"** - to the next window;

- the button "**Back**" - to the previous window.

To view an ECG from the "**c: \ ECG_BASE**" directory, select the "**Patient / Import from the file**" command in the program menu, in the window that opens, select the required file from the list.

2.5 Copying ECG records from EC memory

To transfer information from the memory of the electrocardiograph to the built-in database of the program on this PC, you must turn on the device, open the program and select the "**Patient / Memory**" command. In the "**Memory**" window that opens (see Figure 3) on the "**Memory EC**" tab, click the "**To download archive from the EC**" button.

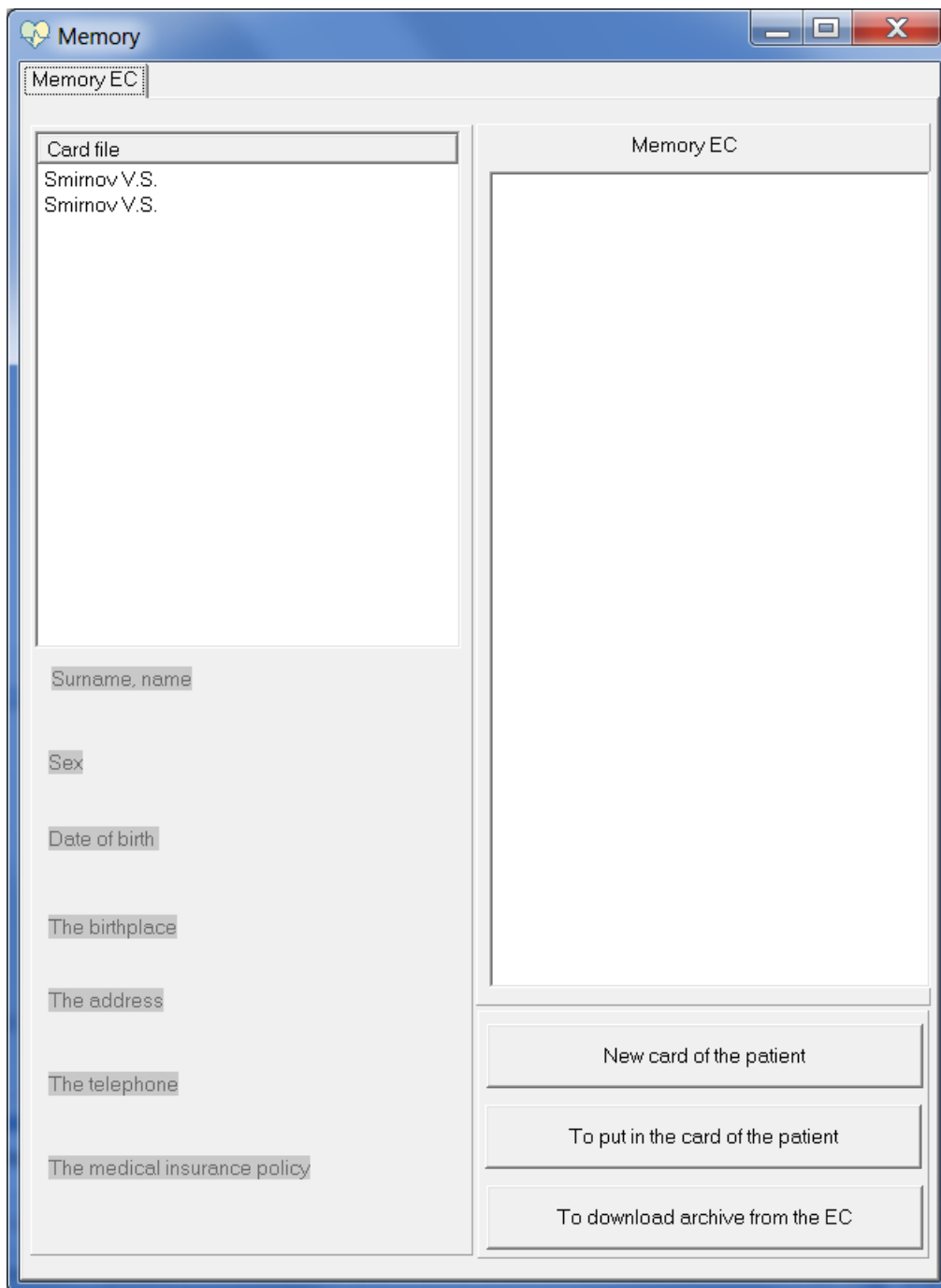


Figure 3 - The window "**Memory**", the tab "**Memory EC**"

The "**Memory EC**" window will appear on the screen (Figure 4). To view the archive of electrocardiograph records, press the "**To update**" button. A list of ECG records will appear on the left side of the window.

To delete unnecessary ECG records from the memory of the electrocardiograph, select these records and press the "**Delete**" button.

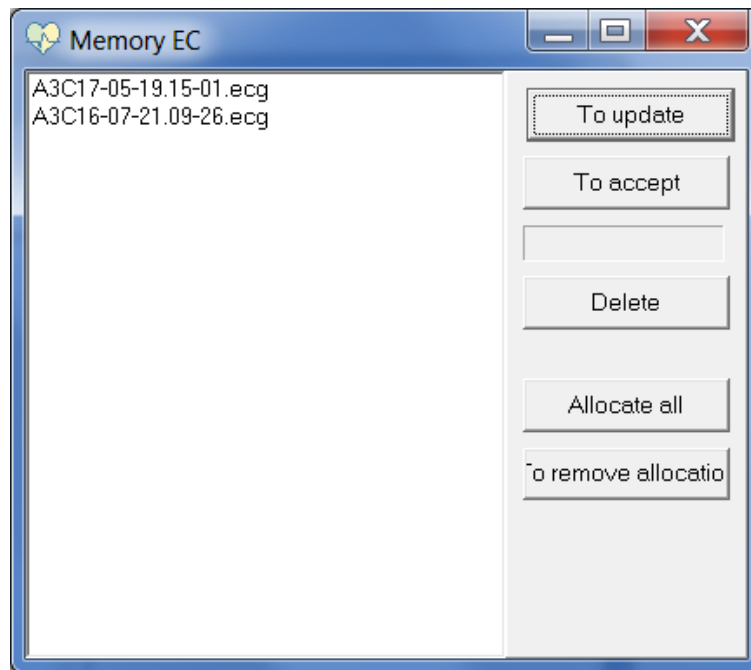


Figure 4 - The window "Memory EC"

To transfer ECG records from the device to the built-in database of the program on this PC, you need to select the necessary records (to select the entire list, press the **"Allocate all"** button). Press the **"To accept"** button, the transfer will begin. When the process is complete, close the window.

Simultaneously with the transfer of ECG records to the built-in database of the program, these records are saved as files in the **"c: \ ECG_BASE"** directory with the same name as in the list of the **"Memory EC"** window. You can view the ECG from this directory by selecting the **"Patient / Import from the file"** command from the menu.

A list of files transferred from EC will appear in the right part of the **"Memory"** window. To save these files in the PC database, select the patient's surname in the Card file. If there is no patient record in the database, create it. To do this, click the **"New card of the patient"** button. In the **"New patient"** window that appears, enter the patient data. Click **"OK"** to save the data.

After selecting the patient's surname, select the file to save, press the **"To put in the card of the patient"** button (see Figure 5). The file saved in the database will

disappear from the list.

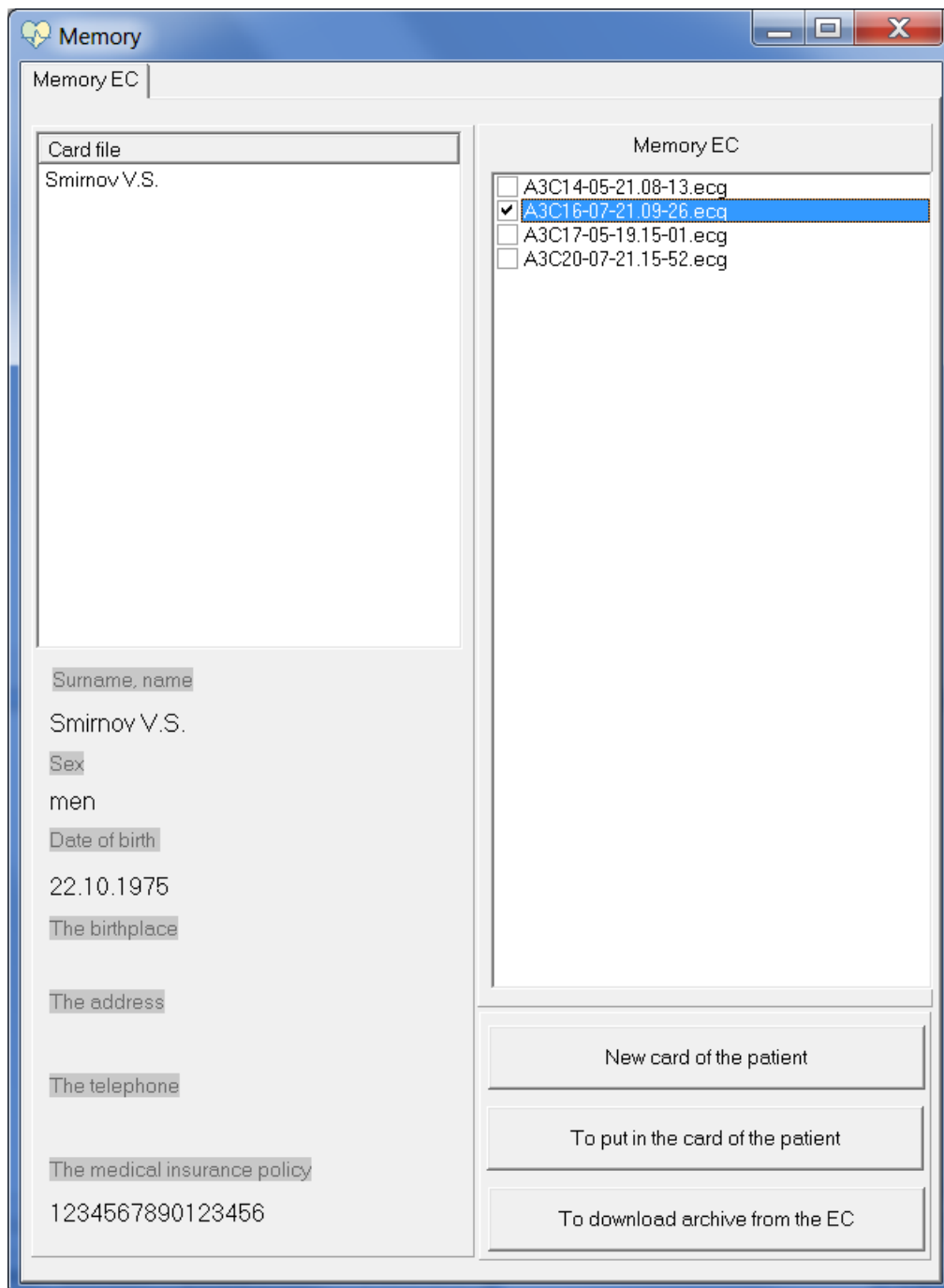


Figure 5 - The window "Memory", the tab "Memory EC"

2.6 Obtaining a printed document

To enable / disable the printing of the diagrammatic grid, select the **"Setup / Parameters"** menu command. In the **"Parameters"** window that opens, select the **"Print"** tab (see Figure 6), which allows you to enable (the "√" sign) or disable the printing of the diagram grid.

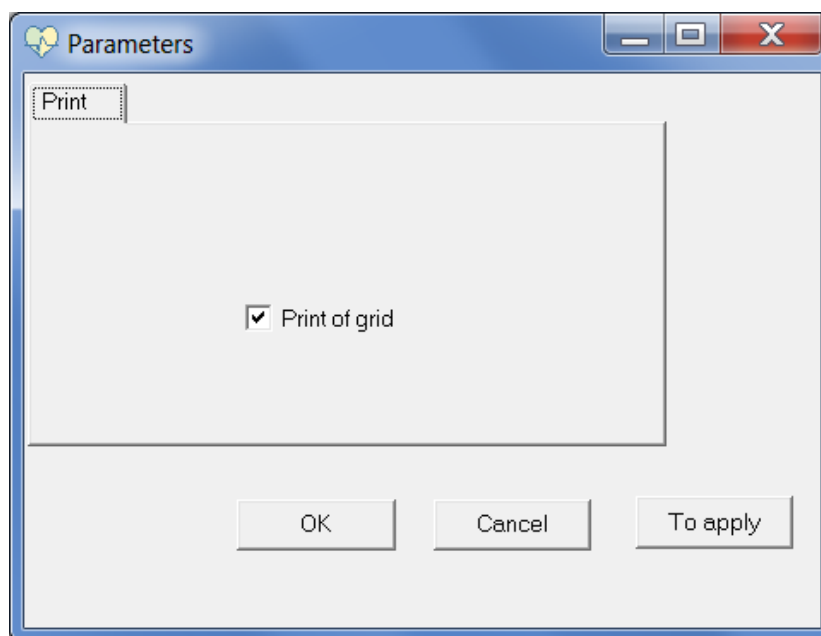


Figure 6 - The dialog box **"Parameters"**, the tab **"Print"**

To print the selected ECG (displayed on the PC monitor) select the **"Patient / Print"** command.

A standard **"Print"** window will appear on the monitor, press the **"OK"** button. Next, the **"Printout range"** window will appear, as shown in the figure 7.

By default, the entire ECG is printed (the **"All"** item is selected). If it is necessary to print out individual fragments, select the **"Selectively"** item. In this case, the **"Start, sec"** and **"End, sec"** windows become active. Set the required time interval in the windows (in seconds) and click the **"OK"** button.

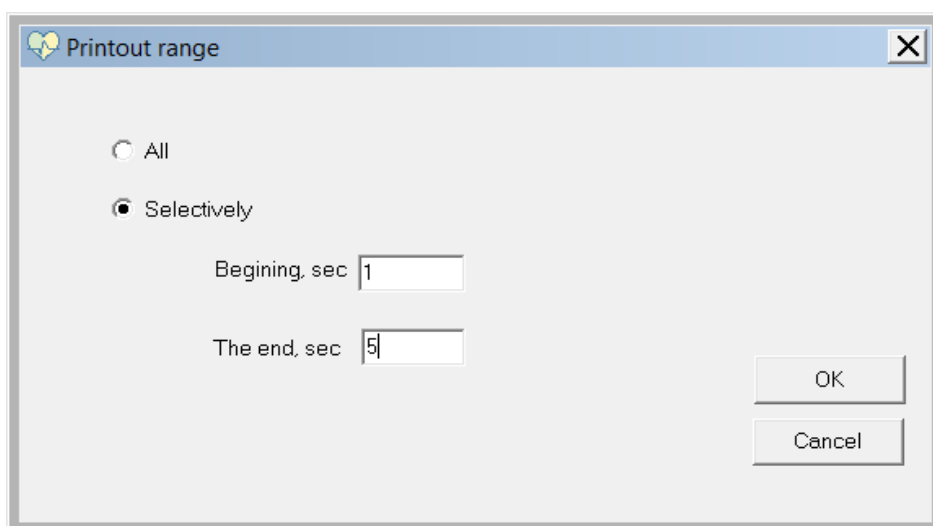


Figure 7 - The dialog box "Printout range"

The printout in the upper part displays the patient's name, the date and time of the ECG recording, the values of the ECG recording sweep speed, and sensitivity. If the duration of the printed ECG or its fragment is long, several sheets will be displayed.

2.7 Viewing and correcting data

If you need to view and correct the data in the archive, open the program and select the "**Patient / Card file**" command.

In the "**Patient**" window that opens, find and select the patient's surname. Once selected, the patient information and patient archive will be displayed in the window, as shown in Figure 8.

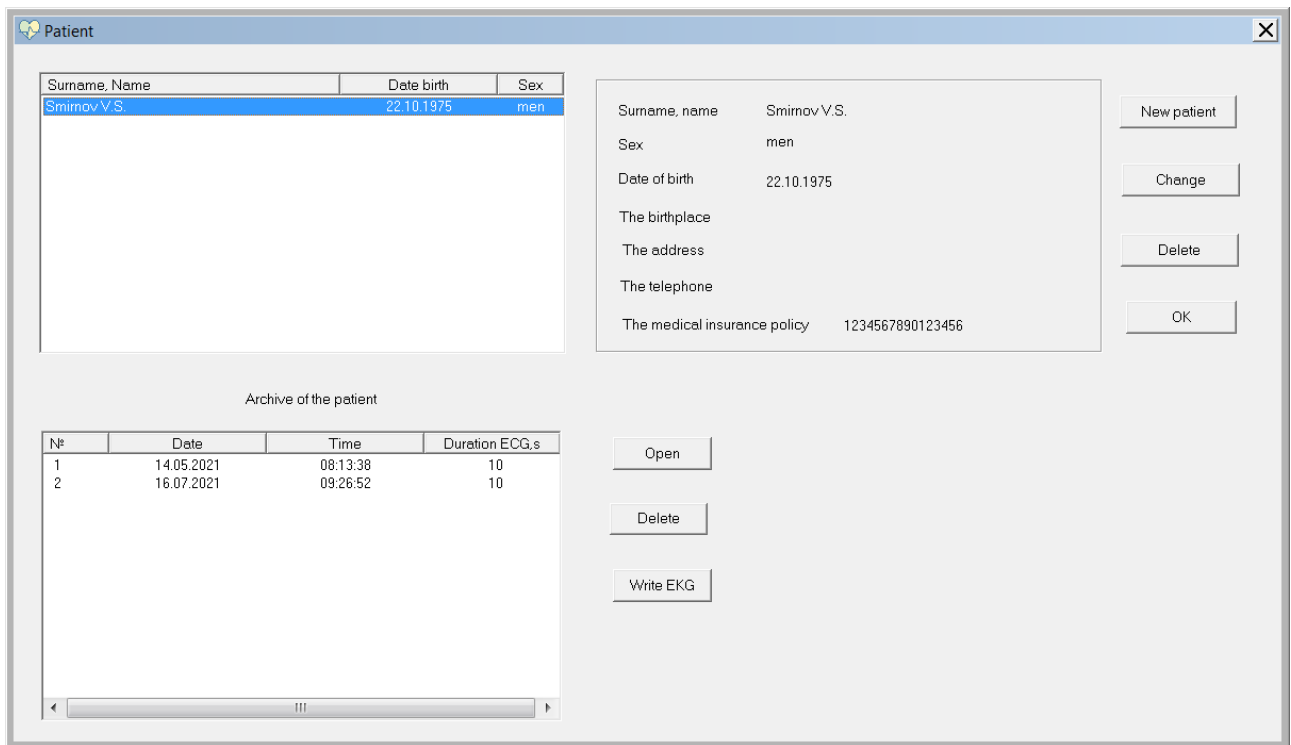


Figure 8 - The dialog box "Patient"

If it is necessary to change the patient information, press the **"Change"** button and enter the required data in the **"Change of Data on the Patient"** dialog box that opens (see Figure 9).

To delete patient data from the card index, you need to select the surname of this patient, press the **"Delete"** button and on the request **"To remove the patient and all his records?"** answer **"Yes"**.

To delete an unnecessary patient record from the archive, select the surname of this patient, highlight the number of the record of interest in the **"Archive of the patient"** window with the cursor, press the **"Delete"** button and on the query **"To remove record?"** answer **"Yes"**.

The image shows a standard Windows-style dialog box with a title bar that reads "Change of Data on the Patient". The dialog contains several input fields and two buttons. The fields are arranged vertically on the left side, each with a label and a corresponding input area. The "Surname, name" field contains the text "Smirnov V.S.". The "Sex" field is a dropdown menu currently showing "men". The "Date of birth" field is a date picker showing "22.10.1975". The "The birthplace", "The address", and "The telephone" fields are empty text boxes. The "The medical insurance policy" field contains the number "1234567890123456". On the right side of the dialog, there are two buttons: "OK" and "Cancel".

| Field Label | Value |
|------------------------------|------------------|
| Surname, name | Smirnov V.S. |
| Sex | men |
| Date of birth | 22.10.1975 |
| The birthplace | |
| The address | |
| The telephone | |
| The medical insurance policy | 1234567890123456 |

Figure 9 - The dialog box **"Change of Data on the Patient"**

3 Working with an defibrillator

3.1 Preparation for work

When working with a defibrillator, it is necessary to remove the micro SD memory card containing the defibrillator data files from the device and insert it into the PC connector.

3.2 Viewing data when working with an external automatic defibrillator DA-N

To view the defibrillator data saved on the memory card on the PC monitor, select the "Patient / Import from file" command, select the file in the window that opens (Figure 10) and press the "Open" button.

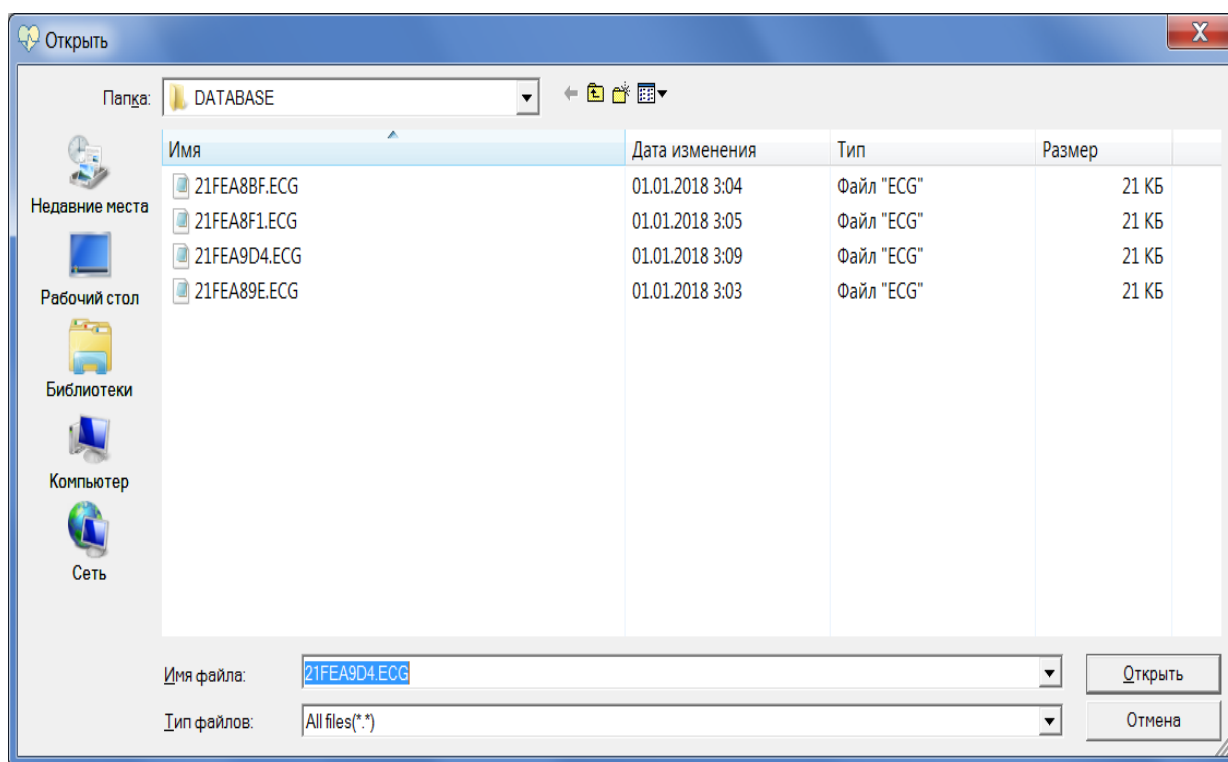


Figure 10 - The window "Open"

A window of the CardioPC Ltd program will appear on the PC monitor with an image of the waveform (ECG) before the discharge, at the moment of discharge and after the discharge (see Figure 11).

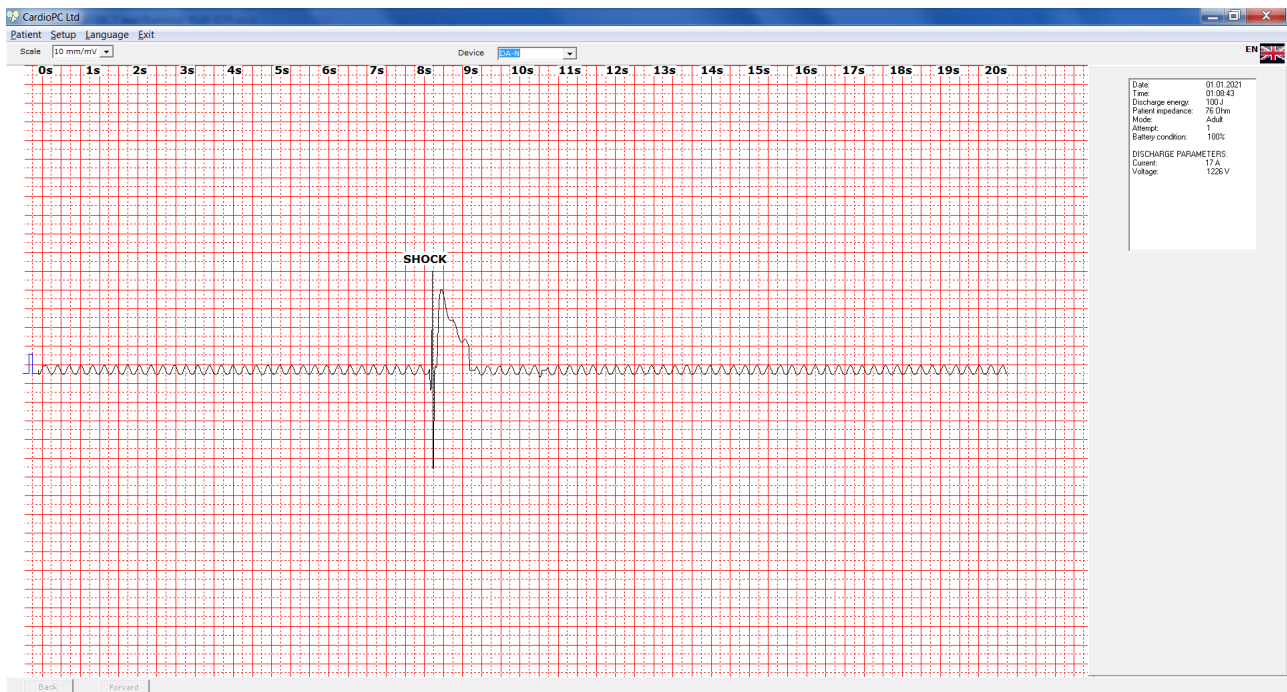


Figure 11– Window "Cardio PC Ltd"

In the right part of the window there is an information field containing the date and time of defibrillation, accumulated energy, patient impedance, selected operating mode (child or adult), attempt number and battery status. It also contains information about the parameters of the discharge - current and voltage.

3.3 Viewing data when working with the DKI-N-11 defibrillator-monitor

To view the defibrillator data saved on the memory card on the PC monitor, select the "Patient / Import from file" command, select the file in the window that opens (Figure 12) and press the "Open" button.

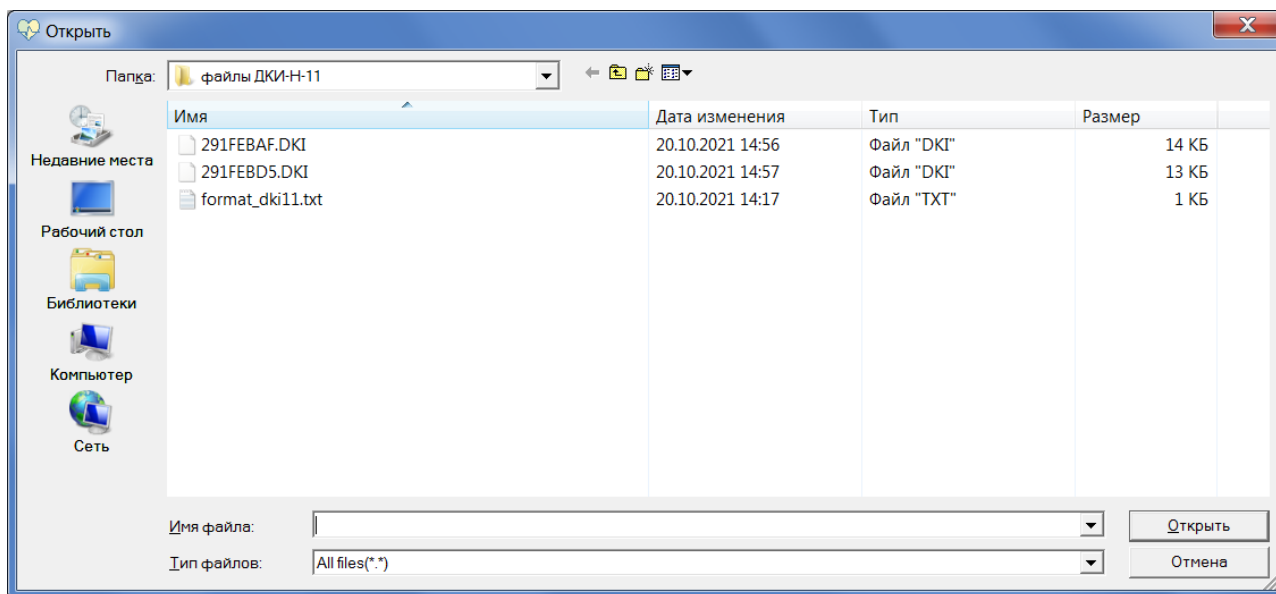


Figure 12 - The window "Open"

A window of the CardioPC Ltd program will appear on the PC monitor with an image of the waveform (ECG) before the discharge, at the moment of discharge and after the discharge (see Figure 13).

In the right part of the window there is an information field containing the date and time of defibrillation, heart rate (HR), pulse rate, defibrillation attempt number, discharge current, patient impedance, blood oxygen level (SpO2), blood pressure (systolic and diastolic), battery status, type of electrodes used (adults, children's), operation mode (monitoring, defibrillator, pacemaker), event recording (defibrillation, recording R-R intervals, on alarm, defibrillation on AED).

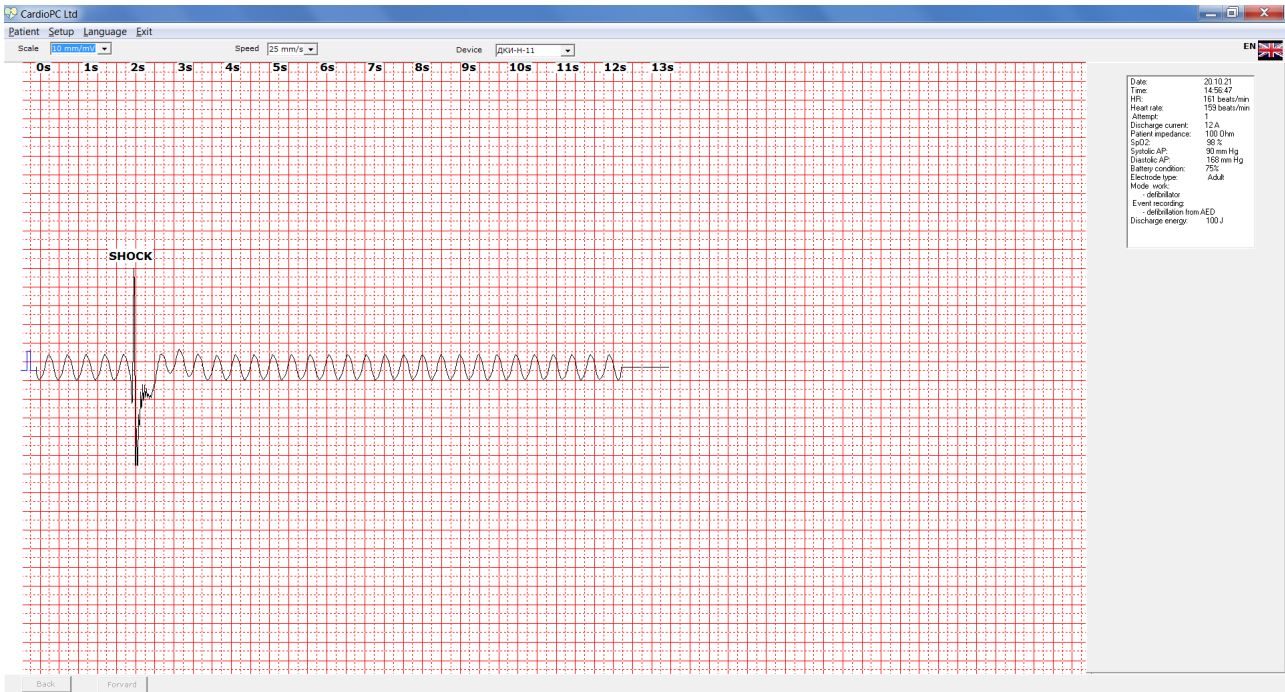


Figure 11– Window "Cardio PC Ltd"

3.4 Obtaining a printed document

For obtaining a printed document, select the "**Patient / Print**" command and press the "**OK**" button in the print window that appears. A document is printed with the image of the ECG signal before the discharge, at the moment of discharge and after the discharge.