

Approved  
MKS.KS040001-61-LU

**The computer system for heart  
screening**

# **Cardiovisor**

**User manual  
Internet service  
ECG4ME.COM  
MKS.KS040001-61**

***Familiarize before the operation beginning***

We are glad to welcome you as the user of Internet service ecg4me.com, the computer system for heart screening **CardioVisor** (hereinafter – Internet service) – the newest evaluation system of the heart functional state, which differs convenience, simplicity and efficiency of application.

The given manual is intended for users of Internet service ecg4me.com on the Internet portal <http://www.ecg4me.com>.

**Attention:** *Before operation with Internet service attentively familiarize with the given manual. Manual provides detailed information and instructions for proper use of the Internet service.*

Changes which are not worsening characteristics of Internet service, can be not reflected in this document.

If you encounter any errors or failures when using Internet service, please inform us about it.

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## Content

<b>Restrictions</b> .....	<b>5</b>
<b>Basic principles of using Internet service ecg4me.com</b> .....	<b>6</b>
<b>Hardware and communication system requirements</b> .....	<b>8</b>
<b>1. Quick Start</b> .....	<b>9</b>
<b>1.1 Getting Started</b> .....	<b>9</b>
1.1.1 How to register on the site .....	9
1.1.2 How to download software.....	11
1.1.3 How to install software .....	11
<b>1.2 Conducting Examination</b> .....	<b>20</b>
1.2.1 Authorization .....	20
1.2.2 Preparing for examination.....	20
1.2.3 Perform examination .....	23
1.2.4 Result evaluation .....	24
1.2.5 Specific analysis of children's results .....	27
<b>1.3 Shutdown</b> .....	<b>29</b>
<b>2. Interface description brief</b> .....	<b>30</b>
<b>3. Operations with Internet service</b> .....	<b>32</b>
<b>4. Analysis of conclusions</b> .....	<b>36</b>
4.1 Numerical values of dispersive indexes of a myocardium status .....	37
4.2 Heart portrait .....	40
4.3 The text conclusion with recommendations.....	42
4.4 Control of dynamics and gallery of portraits.....	45
4.5 Features of dispersive indexes at children.....	47
4.5.1 Features of the analysis children's results.....	47
4.5.2 Features of indexes of detailed elaboration G1-G9 at children .....	49
4.5.3 Features of a dispersive heart portrait at children.....	50
4.5.4 Features of the indicator of electric instability at children.....	52
<b>5. Personal data</b> .....	<b>53</b>
5.1 Section appointment.....	53
5.2 Change of the personal data .....	53
<b>6. Tariff Plan</b> .....	<b>56</b>
6.1 Section appointment.....	56
6.2 Management of the tariff plan .....	56
<b>7. My family</b> .....	<b>58</b>
7.1 Section appointment.....	58
7.2 Management of family members.....	58
<b>8. Patients</b> .....	<b>59</b>
8.1 Section appointment.....	59

- 8.2 Management of patients ..... 59
- 9. Reporting ..... 61
  - 9.1 Section appointment..... 61
  - 9.2 View history examinations ..... 61
- 10. Deposit Funds ..... 62
  - 10.1 Section appointment..... 62
  - 10.2 Deposit by credit card Visa, MasterCard..... 62
  - 10.3 Deposit by prepaid card ..... 64
  - 10.4 Deposit by Sberbank of Russia receipt..... 64
  - 10.5 Deposit by a payment terminals ..... 65
- 11. Typical problem situations when using the service ..... 66
  - 11.1 ECG input..... 66
  - 11.2 Conclusion analysis..... 68
- Annex 1: Basic concepts and terminology used. .... 72

## Restrictions

-  ***This service does not change the doctor and it is not the instrument for self-diagnostics, even if the user has any knowledge in the field of cardiology. It is a service independent periodic assessment of the functional state of the heart, measuring the average amplitude of the ECG microalternations and subsequent observation of dynamics of this amplitude in time.***
-  ***Significant amplitude of the ECG microalternations may be transient in nature and may be caused not changes in the myocardium, but other causes in certain cases, for example, periodic changes in hormonal levels. Only a doctor can establish the true cause of these changes. Therefore, if the first survey you get a steady increase in the value of the dispersion index, it is only evidence of the need to consult a doctor and not a cause for false self severe pathology.***
-  ***Internet service [ecg4me.com](http://ecg4me.com) DOES NOT REPLACE, other methods of research on clinical examination of the heart and CAN be used only when compared with other clinical data. Self-use appropriate for screening and monitoring.***
-  ***Internet service [ecg4me.com](http://ecg4me.com) does not make the DIAGNOSIS! Internet service appointment - identifying early dispersive deflections in the group of borderlines of heart and the prevention of presence of the expressed pathology.***
-  ***Medications can influence by sight a portrait of heart and character of the conclusion of the screening assessment. In the case of Internet service in the course of treatment with drug exposure required current matching portraits of the heart, and portraits, received prior to beginning or at the beginning of drug therapy.***

## **Basic principles of using Internet service *ecg4me.com***

⚠ Internet service ***ecg4me.com*** provides independent measurement ECG microalternations (dispersive indexes) characteristics and forms on the basis of their conclusion, the measurement for the client, containing one of four major recommendations:

- It is not revealed deviations: **NORM.**
- There are borderline deviations: you should control the dynamics of dispersive indexes. At revealing of slow negative dynamics of dispersive indexes - **examination is expedient.**
- There are deviations in excess of normal ranges: inspection is expedient. At revealing of negative dynamics of dispersive indexes in time - **examination is necessary.**
- There are expressed deviations: **examination is necessary.** At the expressed deviations and simultaneous detection of fast negative dynamics – **the emergency reference to the doctor is necessary.**

⚠ Periodically performing examination and monitoring the dynamics of dispersion indexes в разделах in sections **<Dynamic>** and **<Gallery of portraits>**, you are capable to solve effectively two main problems concern: in due time to see the fast and latent increase of the deviations, capable to cause heart attack, and it is reliable to supervise dynamics of the slow deviations associated with established heart disease.

⚠ At work with the given service, you can be guided by the simple analogy, that is familiar to everyone since childhood. This household measurement of body temperature by means of the thermometer. This procedure cannot provide statement of the medical diagnosis, but it allows you to record the fact that deviations from the norm, the severity of these abnormalities and the feasibility or the need to call the doctor.

⚠ **The main dispersive index "Myocardium" is analogue of temperature: the above value of this index, it is more deviations, the less functional reserves of a myocardium. Scale of this index, it is similar to the scale of the thermometer, also identifies three basic gradations of deviations: 1) the insignificant; 2) the border, when the help of the doctor is recommended; 3) expressed when the help of the doctor is necessary.**

⚠ The important factor of the analysis of dynamics are the first examination, which receive right after how you became the client of this service. Dispersive indexes and portraits of the first examination are standards (reading level) for control of subsequent dynamics. If you have established heart disease, the indices of the first examination to be large, and the portraits will be with red zone in the area of change. But this level, despite its considerable size, will Sampling in subsequent examinations. Even at the expressed pathological changes of the myocardium, but correctly selected medication, the

dispersion index and the portraits remain stable over time. This fact provides the ability to effectively use this service to control the disease and influence on this flow of various factors of an everyday life.

⚠ To improve the quality control procedures for the slow dynamics over long periods (months or years), it is advisable to carry out examinations in the most similar conditions, i.e. at the same time of day, at the same time before or after meals, etc.

⚠ When you are faced with an incomprehensible to you the dynamics of dispersion parameters (for example, periodic oscillations between improvement and deterioration), it is advisable resort to the help of doctor-consultant of this service.

- **This service can be used for periodic monitoring of heart disease at children, since 6 years. Thus it is necessary to remember that variability of ECG microalternations at children is much higher than at adults since reflects natural adapting reactions of the growing heart.**

## ***Hardware and communication system requirements***

For the stable operation of Internet service your hardware and communication system should be satisfy the following minimum requirements:

- Minimum configuration PC: Pentium-III/500, RAM 512 Mb, HDD 20 Gb.
- Operating system requirements for desktop computer: Windows 2000/XP/Vista/7 (32-х битная или 64-х битная ОС)
- Browser Requirements: Internet Explorer 6 and higher, Mozilla Firefox 3 and higher, Google Chrome 13.0 and higher. The browser should be a 32-bit. With 64-bit browser (for example, Internet Explorer browser that comes with a 64-bit operating system) the registration of examination is not working..
- Requirements for the communication channel: the speed of data transmission over the network to the subscriber / per subscriber must be at least 256 kbit / sec.



## 1. Quick Start

### 1.1 Getting Started

Preparing to work with Internet service in several steps:

1. Registration on a site <http://www.ecg4me.com>.
  2. Download the installer from the site (the installer is also on the disc, which comes in the sales package with cardio amplifier).
  3. Install supporting software MKS company.
  4. Driver installation of *cardioamplifier*.
  5. Install the software JAVA RUNTIME ENVIRONMENT.
- 3-5 stages are automated and run the installer.

#### 1.1.1 How to register on the site

To install the client software of internet service [www.ecg4me.com](http://www.ecg4me.com) you must register on the site. To get on the registration page to click on "Private site area" on the home page, and then the link "Registration" or by opening link <http://www.kardi.ru/ru/register/htmlRegister> . The registration page is presented in Figure (Fig. 1).

**Registration**

Obligatory fields are marked \*.

Individual person  
 Cabinet diagnosis

Last name	Alex
First name	John
Middle name	V.
E-mail *	alexblack@mks.ru
Login (for forum)	alexblack
Password, 8-32 characters in length * This password is necessary for using private site area and forum	••••••••
Password re-enter *	••••••••
Date of birth * (dd-mm-yyyy)	08-10-1970
Male *	male
Weight(kg.)	70
Height(sm.)	170
Country	RUSSIA
Town	Moscow
Contact mobile phone (Example: 9031234567) *	1897891233
PIN code	<input type="text"/> - <input type="text"/> - <input type="text"/> - <input type="text"/>
I agree with conditions of contract.*	<input type="checkbox"/>

**Fig. 1. Registration window on the site <http://www.ecg4me.com>.**

On this page you need to complete all elements of editing, marked with "\*". Edit fields that are not marked with an asterisk are filled according to your desire. **PIN code is entered from a card, which is included in the kit, which is transmitted by the acquisition unit.**

If you are a private person and plan to work independently at home, examining yourself and members of the family, that you set a mode **"Individual person"** when registering. If you have a medical degree and you are going to serve your patients CardioVisor examination, then you set a mode **"Cabinet diagnosis"** when registering. By operation in a mode **"Cabinet diagnosis"** is formed more complex conclusion, after examination, which may not

be obvious person without a medical education. Please contact technical support for the project can change the mode of operation already in operation in the future.

After registration on yours E-mail (which you specify in the field E-mail), the message with a link to confirm your registration should come. You must open this link in a letter and this action will confirm the registration. When you specify a PIN code from a prepaid card at registration, the system can automatically confirm your registration and not to request a registration confirmation via email.

### 1.1.2 How to download software

To download the installer software internet service, you need to open the section "**Prices**" on the site [www.ecg4me.com](http://www.ecg4me.com) and click "[Last version of Cardiovisor software here.](#)"

After opening the link browser is automatically saving the installer software on the computer. If download does not start automatically, click "[Last version of Cardiovisor software here](#)" right-click and choose from the drop down menu "Save as ...", or use the download manager. Do not forget to remember the location where the installer is saved.

On the site you can download the latest version of the distribution. Distributive software is also available on disk, which is included in the package. The disc can be not the latest version of the distribution, so installation is better to download the package from the server.

Distributive located in the archive. Before installation you need to extract it from the archive.

### 1.1.3 How to install software

**Attention:** *You need administrative access to PC for software installation.*

**Attention:** *No matter connected cardioamplifier to PC USB port or not when installing software.*

Necessary to unpack the installer from archive and run the file **start.bat** for software installation Internet service. After the start you must open the installation wizard (Fig. 2).

**Attention:** *The sequence of actions and appearance of windows may vary slightly for different versions of the Windows operating system.*

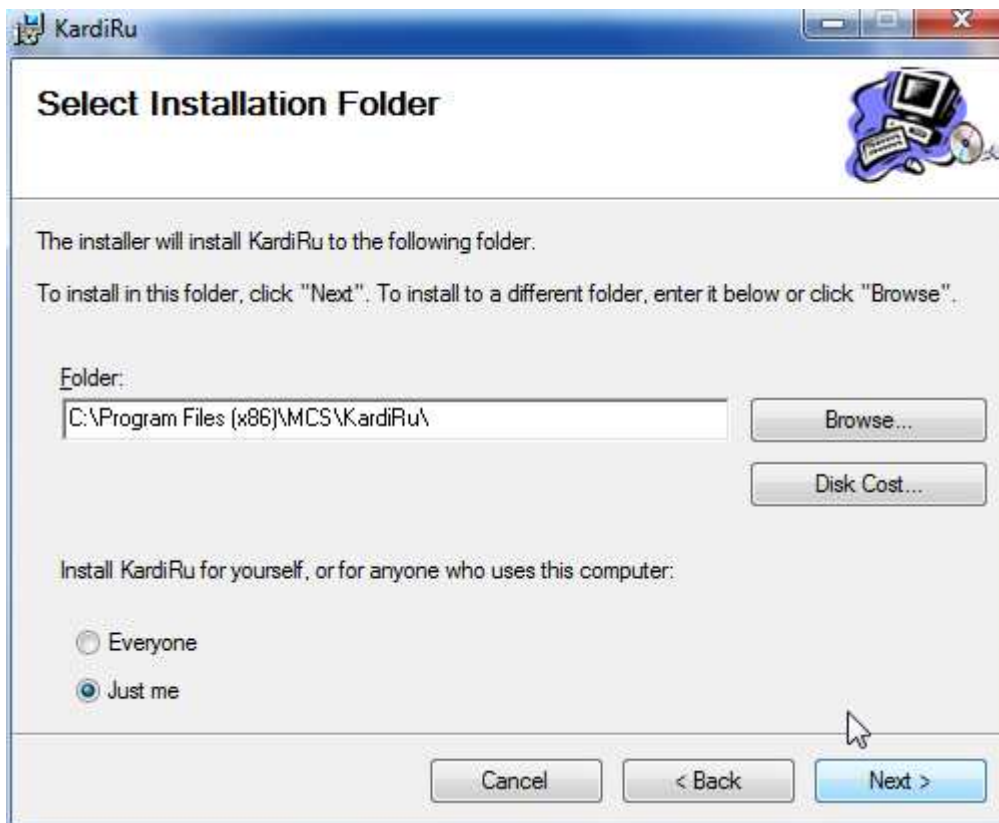


**Fig. 2. Setup Wizard Internet Service ecg4me.com.**

In this window, you need to press "Next" to continue the installation.

If you click "Cancel", you abort the installation.

After clicking the "Next" opens the following window (Fig. 3).



**Fig. 3. Choice of setup folder.**

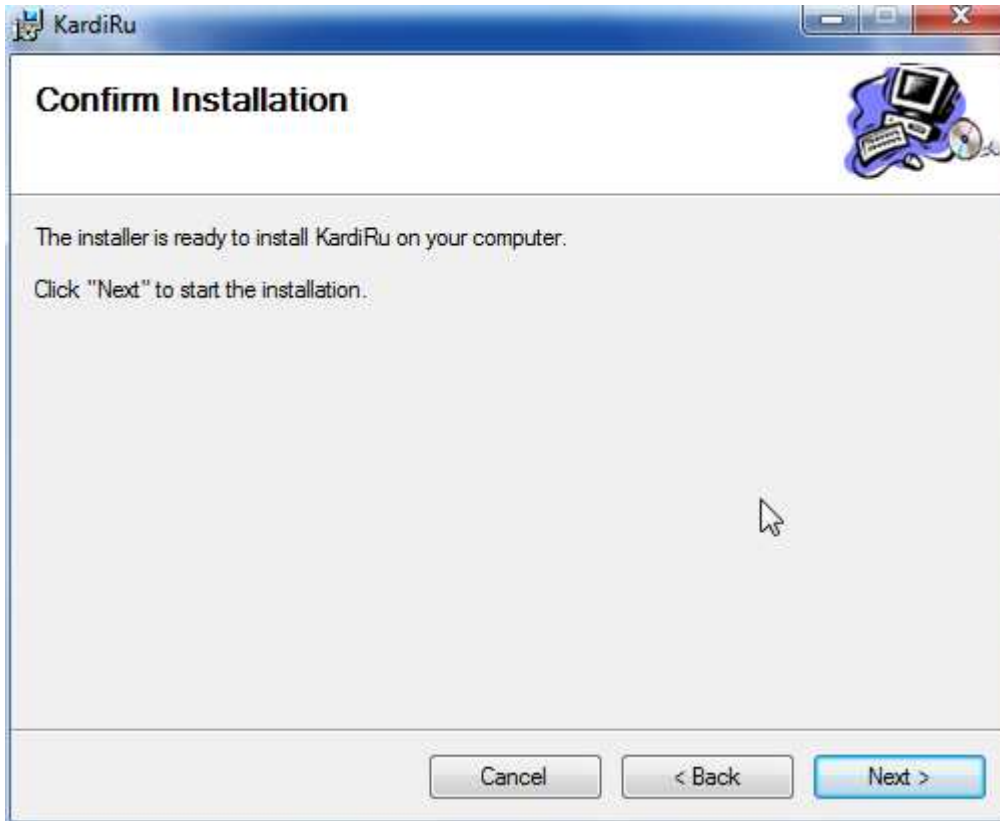
In this window, you must specify the file location where the installation will be done. The installation program will offer a folder to install automatically. You can enter the location manually in the edit window "Folder" or by clicking "Browse ..." to select the folder from the list of existing folders..

If you click "disk space", you can estimate the disk space (requires at least 20 MB).

If you click "Cancel", you abort the installation.

If you click "Back" you return to the previous window.

If you click "Next", the following window will open (Fig. 4).



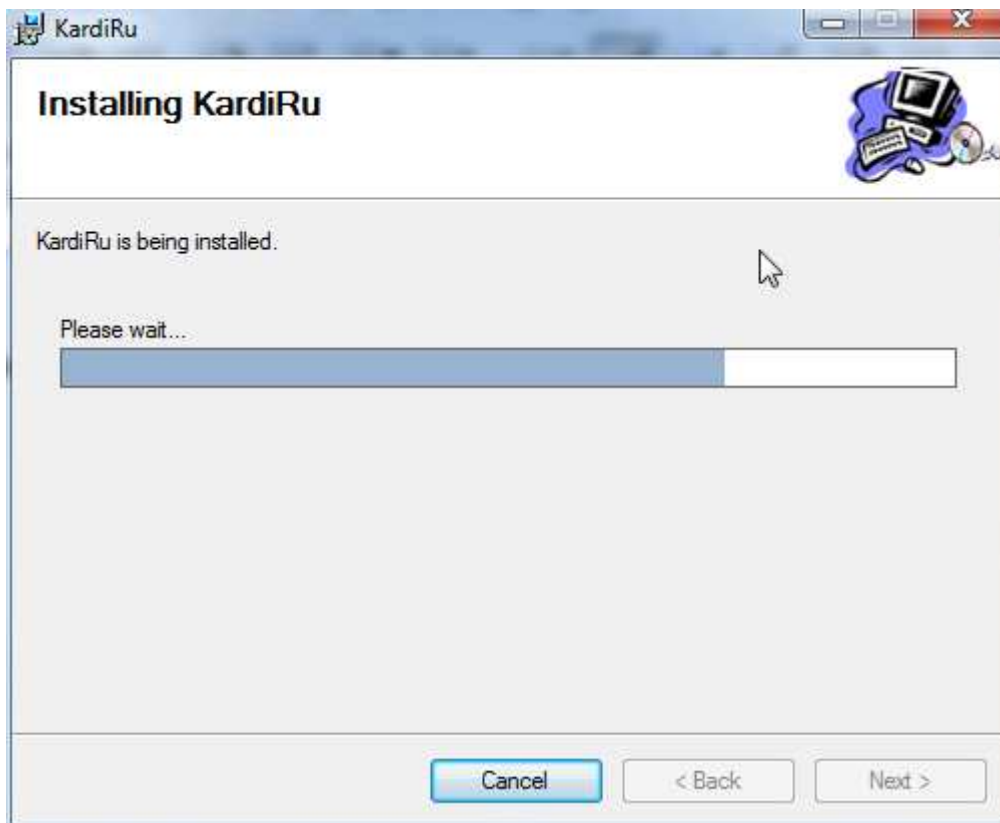
**Fig. 4. Confirm Installation.**

This window warns you that everything is ready for installation and asks you to confirm installation continuation.

If you click "Cancel" you abort the installation.

If you click "Back" you return to the previous window.

If you click "Next" to begin installation of the software and the following window will open (Fig. 5).

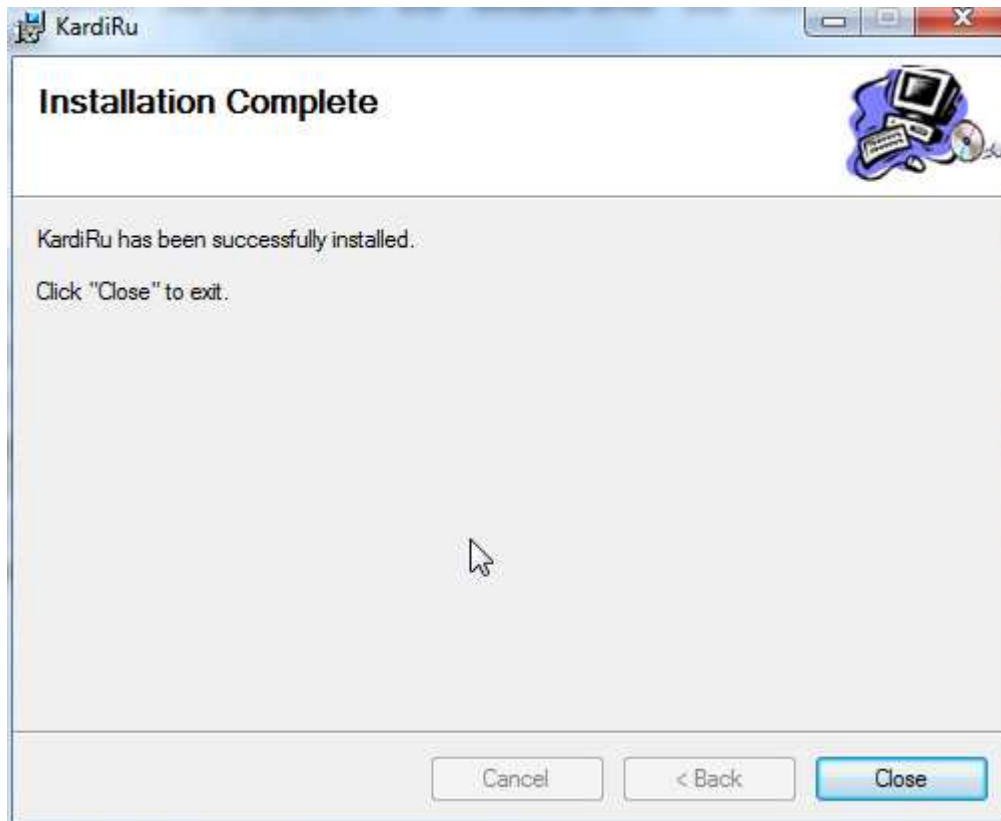


**Fig. 5. Window installation process.**

Progress bar displays in the window write the necessary files on your computer.

If you click "Cancel" you abort the installation.

Then you go to the next window (Fig. 6).



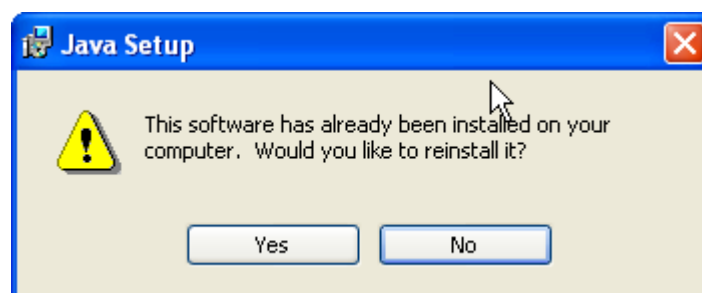
**Fig. 6. Installation Complete.**

This window shows that this stage the installation completed successfully.

If you click "Close", you will go to next stage of software installation.

The next stage will be installed JAVA RUNTIME ENVIRONMENT necessary packages. The installation program in English. The following window should open (Fig. 8).

This software can be installed on your computer before. You open another window in this case (Fig. 7).



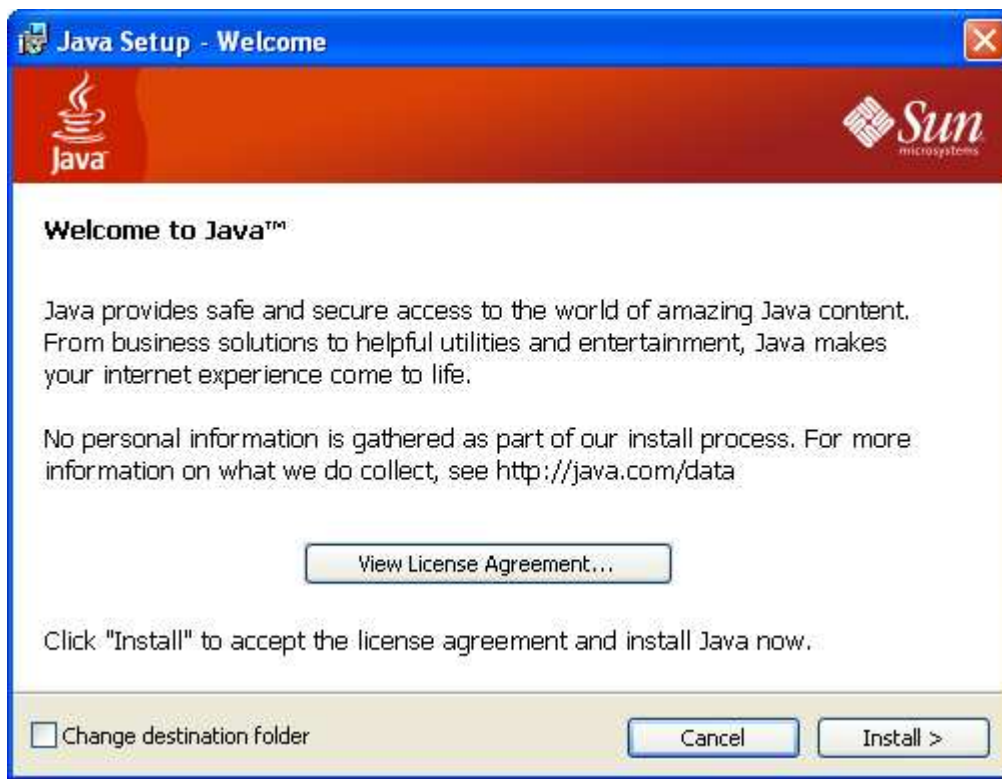
**Fig. 7. Confirm/cancel window to reinstall JAVA RUNTIME ENVIRONMENT package.**

In this case, you must click «No», so that JAVA RUNTIME ENVIRONMENT package does not produce again.

If JAVA RUNTIME ENVIRONMENT package was not installed earlier, then the following window will be opened (Fig. 8). Before the opening of the window can be



opened additional windows, which show that the installation program collects information. These tool windows do not require any participation from the user.



**Fig. 8. Initial screen of the JAVA RUNTIME ENVIRONMENT package.**

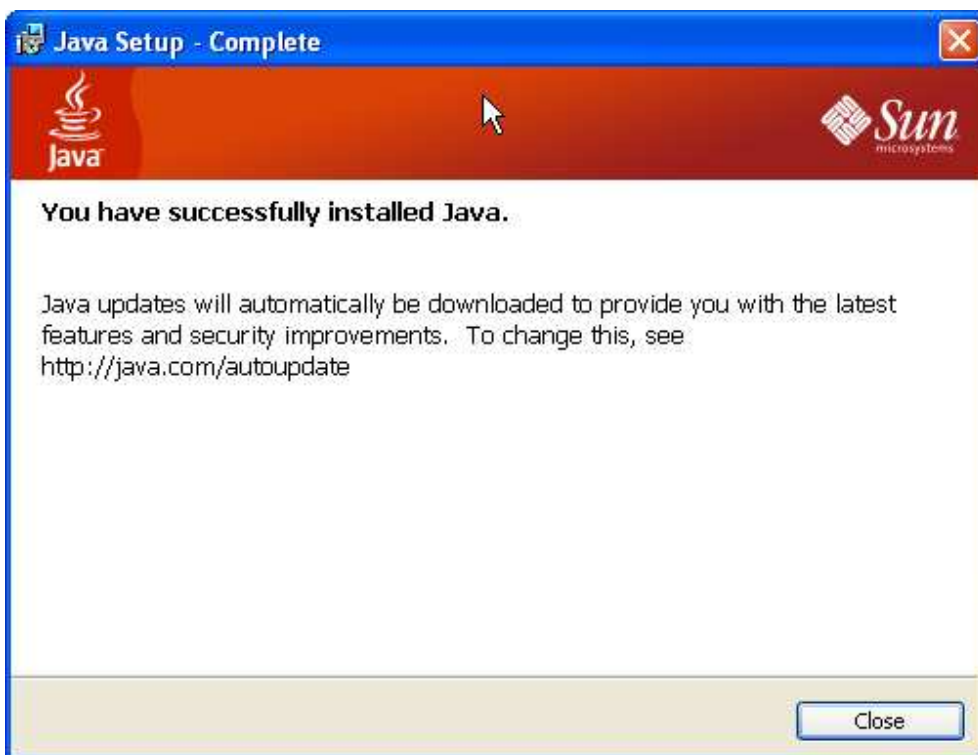
If you click "Cancel" you abort the installation of JAVA RUNTIME ENVIRONMENT package.

If you click "*Install*", the following window will open (Fig. 9).



**Fig. 9. Window of the installation JAVA RUNTIME ENVIRONMENT package.**

This window shows that the installation JAVA RUNTIME ENVIRONMENT package is running. Progress bar in the window indicates that necessary files for work are recorded. Once the necessary files will be written the following window will open (Fig. 10).



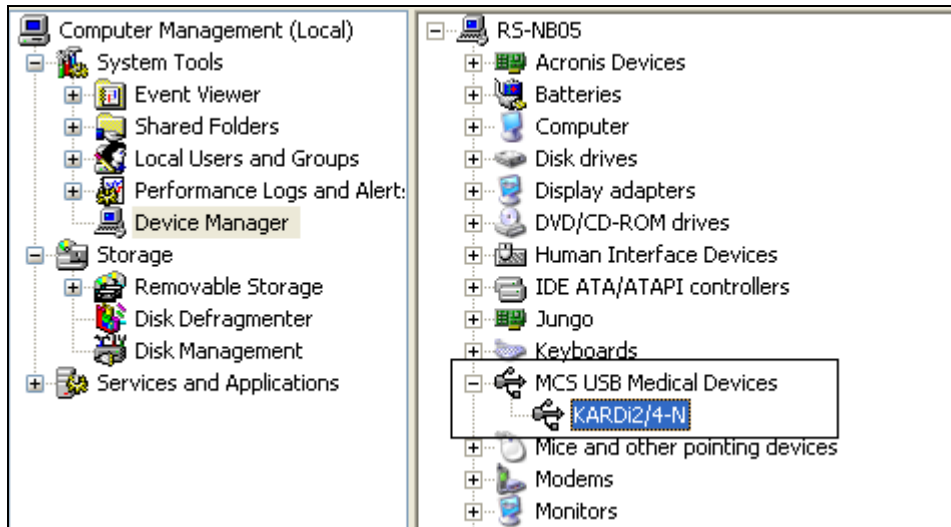
**Fig. 10. JAVA RUNTIME ENVIRONMENT package installed.**

This window displays that the installation completed successfully.

Click «Close», to exit the installation program.

In this installation is complete.

it is desirable to check whether correctly installed hardware driver cardioamplifier system Cardiovisor after installation. For this purpose connect cardioamplifier to USB port and open Windows Device Manager on your computer (Fig. 11).



**Fig. 11. Windows Device Manager.**

Should be a branch «MCS USB Medical Devices» in Device Manager. In this branch should be a device, such as *KARDi2/4-N*».

**Attention:** *Exclamation points should not be on the device. The exclamation point shows that the device does not work correctly.*

If the given branch is not present or the given device is not present, means, the hardware driver cardioamplifier system **Cardiovisor** is not installed.

If the hardware driver cardioamplifier systems **Cardiovisor** is not installed or the device works incorrectly install/reinstall the driver manually. Cardioamplifier driver when installing Internet service software, installed in default folder **C:\Program Files\MCS\KardiRu\Drv\**.

For driver installation manually to connect cardioamplifier to USB port it is necessary. There will be standard Windows dialog that the new device is founded. In this dialog, you specify that you will choose the driver path independently and set the path location of the driver **C:\Program Files\MCS\KardiRu\Drv\**.

If you can't install the device yourself, contact technical support. Technical support contacts and hotline phone listed on the site <http://www.ecg4me.com> in section "**Contacts**".


## 1.2 Conducting Examination

Examinations of the functional state of the heart produced produced in some stages by means of Internet service:

1. Authorisation on site <http://www.ecg4me.com>.
2. Preparing for examination.
3. Perform examination.
4. Result evaluation.

### 1.2.1 Authorization

To log on to the main page should click "**Private site area**" and specify on the authorization page **your E-Mail** and **password**, that you entered during registration and control numbers (**Рис. 12**).

Authorization / <a href="#">Registration</a>	
Email	<input type="text" value="alexblack@mks.ru"/>
Password	<input type="password" value="....."/>
Remember me	<input type="checkbox"/>
Enter digit from picture	<div style="display: flex; align-items: center;"><input style="margin-left: 10px;" type="text" value="6023"/></div> <div style="margin-top: 5px;"><a href="#">show other</a></div>
<input type="button" value="Enter"/> <input type="button" value="Forget password"/>	
If you are not registered and you want to see the private site area with examinations and conclusions <a href="#">you can see demo cabinet</a>	


**Рис. 12. Authorization window.**

You will be automatically logged into private site area after authorization.

### 1.2.2 Preparing for examination

Examinations done in the "Cardiovisor" personal account. This page opens automatically when you enter private site area, if you are registered as "Individual person". If you are registered as "Cabinet diagnosis", you should go to the section "Cardiovisor".

In the "Cardiovisor" there is a button **<Examine your heart>**.



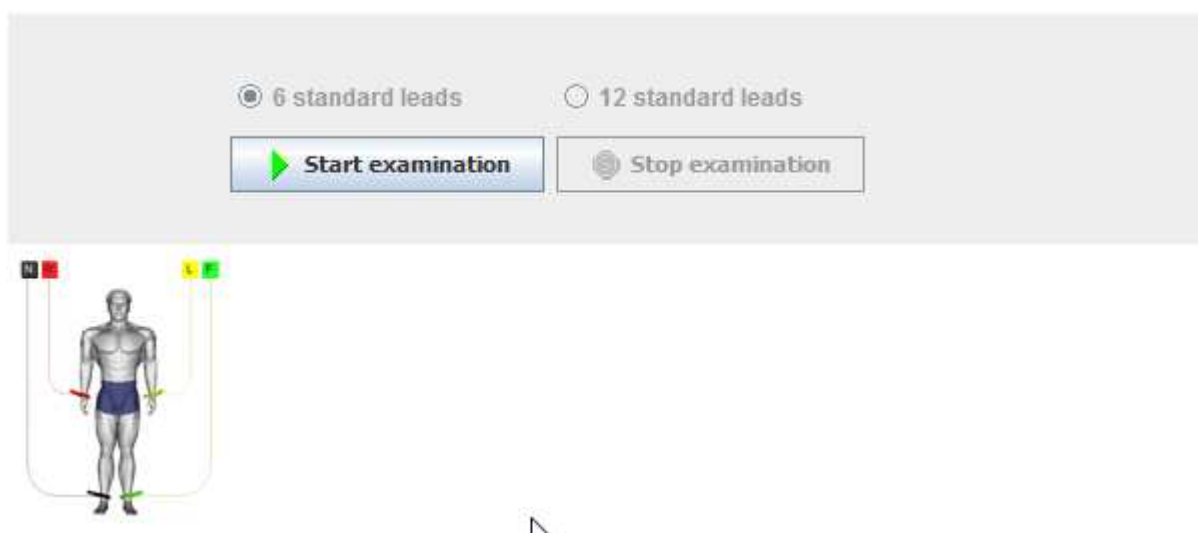
**Fig. 13. Button <Examine your heart>.**

From the graph "**Select**" at the top of page from the drop down list select a family member, if you are registered as "Individual person" (or patient if you are registered as "Cabinet diagnosis"), examination which will now be carried out. The owner of individual person is selected by default.

**Attention:** Examination that you conduct will be correlated only with the family member whom you have chosen before.

Connect cardioamplifier to USB port on your computer and click <**Examine your heart**>.

Next will be open a page for a new examination automatically (**Fig. 14**).



**Fig. 14. Page preparation for the new examination.**

Before being displayed this page will open a confirmation window of run the application Internet service [ecg4me.com](http://ecg4me.com) (**Fig. 15**).



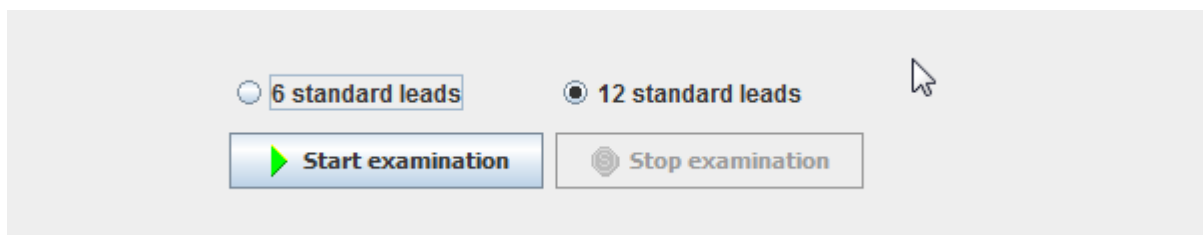
**Fig. 15. Confirmation window to run the application.**

You must set the flag «**Always trust content from this publisher**» and click «**Run**».

When you enter the private site area this window may not be displayed.

Follow the instructions on the page: Place electrodes on limbs and take a comfortable position. When you're ready, click <**Start examination**>.

Cardiovisor as standard equipment includes four electrodes clothespins. If you have extended completion CardioVisor with chest leads, you can choose to switch (Fig. 16) - work in standard mode (6-leads) or in advanced mode with chest electrodes (12 leads)..



**Fig. 16. Confirmation window start the service.**

If the above button the message "**Cardiovisor is not connected to USB port. Check whether the device.**" Verify whether the device is connected, check whether the USB port and whether the device driver is correctly installed. If everything is all right over the button there will be a message "**Cardiovisor detected and ready for use**".

If over the button there is a message «**Subsystem of operation with CardioVisor available. Make sure that necessary software installed ...** » it means that the software either is not installed absolutely, or installed incorrectly. If you have not installed the software (the software is on a disk or it can be downloaded from section of the site "**Price**"). Install it.

If the software is installed and up until that time all worked, try to quit from personal site area, restart your browser and come again to personal site area. If it does not work, try to reinstall CardioVisor software. If also it has not helped, please contact technical support.

### 1.2.3 Perform examination

After button click <**Start examination**> the page of Examination will open and cardiogram registration will begin. Adjustment of service within the first 5 seconds is led, in this time you should a comfortable position, relax and stop moving, and then within 30 seconds will be ECG registration.

**Внимание:** *Save a state of a relaxation and rest during all time of ECG registration.*

After 30 seconds the screen will be displayed window enter comments (**Fig. 17**):

**Fig. 17. Window enter comments.**

If you have any precise information about your current state (the feeling sick, drugs taken, etc.) type in the field and click <**Add comment**>.

**Attention:** *Added comment has no effect on automatic conclusion of examination and provides only to inform the doctor.*

You can go the conclusion without entering comments by clicking <**Do not add the a comment**>.

If you wish to measure pressure by tonometer and to specify also the pressure you can make it on this page.

Conclusion of *examination* to wait ~ 1 ... 60 seconds it depends on the characteristics of the line connection and computer performance.

If you have not received the conclusion or error information during this time, record the re-examination.

If, after registration re-examination you have not received conclusion, please contact technical support.

### 1.2.4 Result evaluation

Conclusion Window contains the following information (located top to bottom):

- Numerical values of main dispersion indexes «Myocardium» and «Rhythm»
- Heart portrait
- General conclusion.

#### 1.2.4.1 View main values of the dispersion indexes

Numerical values of main dispersion indexes are specified directly over heart portraits at the top window of conclusion.

Myocardium	Rhythm	Pulse	Detailing code
15%	3%	73 tick/min	S-0-S-S-0-0-S-S-7

**Fig. 18. Presentation of main values of the dispersion indexes.**

Estimate, in which zone main values of the dispersion indexes come «Myocardium» and «Rhythm» according to the table:

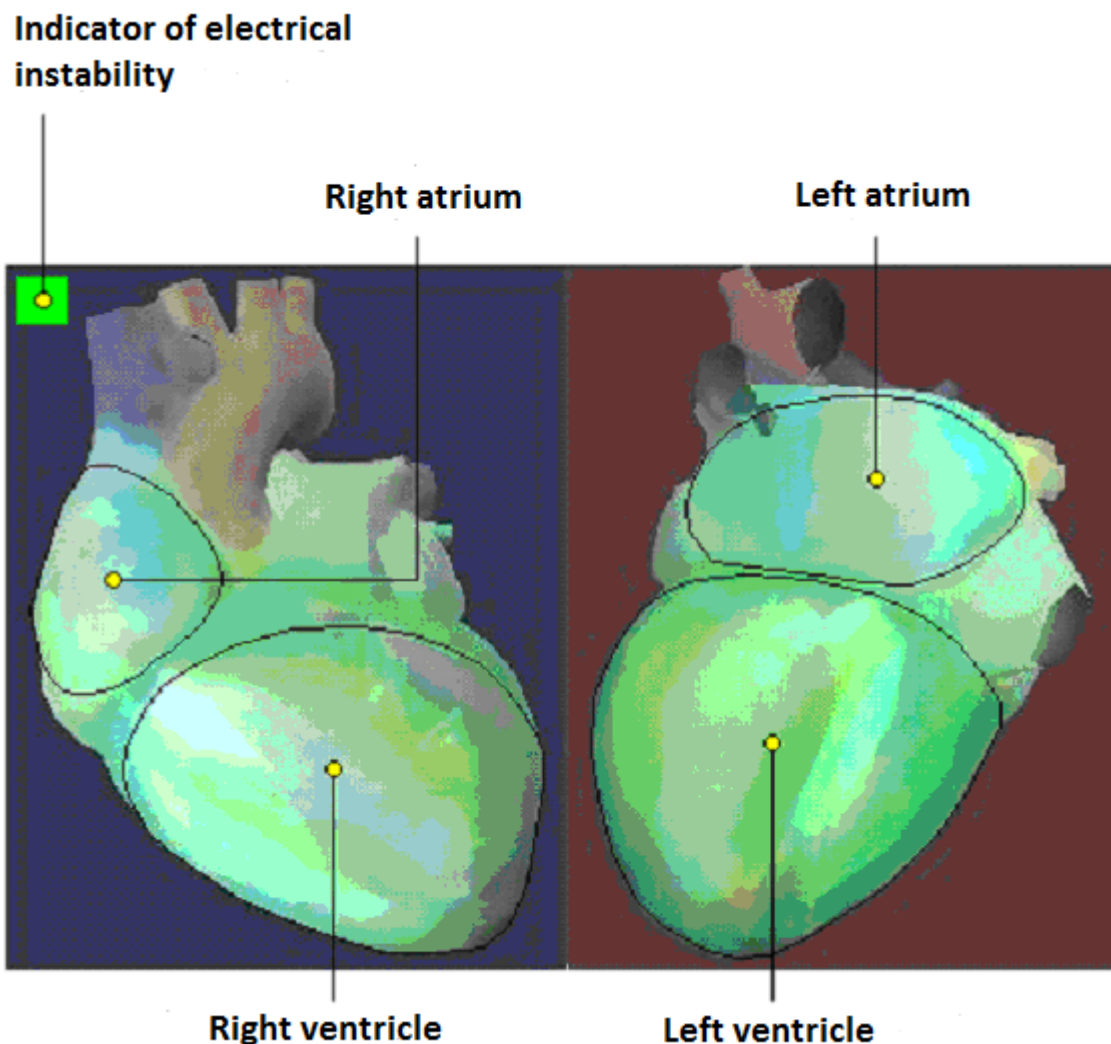
Dispersion index		Norm	Deviation	Evident deviation
Myocardium	%	<15	15-20	>20
Rhythm	%	<50	51-79	>79

«Pulse» and «Detailization code» indexes are optional and can be correctly analyzed only by a doctor (see *part 4*).

#### 1.2.4.2 Heart portrait

In the upper left part of a portrait field there is an indicator of myocardium electrical instability in the form of a square field with changing color (green - yellow - red) (Fig. 19).





**Fig. 19. Heart portrait.**

**Attention:** *Constant presence of red indicator on the portrait of electrical instability on a heart portrait has a worse prognosis.*

If such sign appeared in the first time and is steadily saved - faster consultation of the cardiologist is necessary. If this sign is present already at the first examination already - you should consult a cardiologist, and to avoid physical or mental overloads.

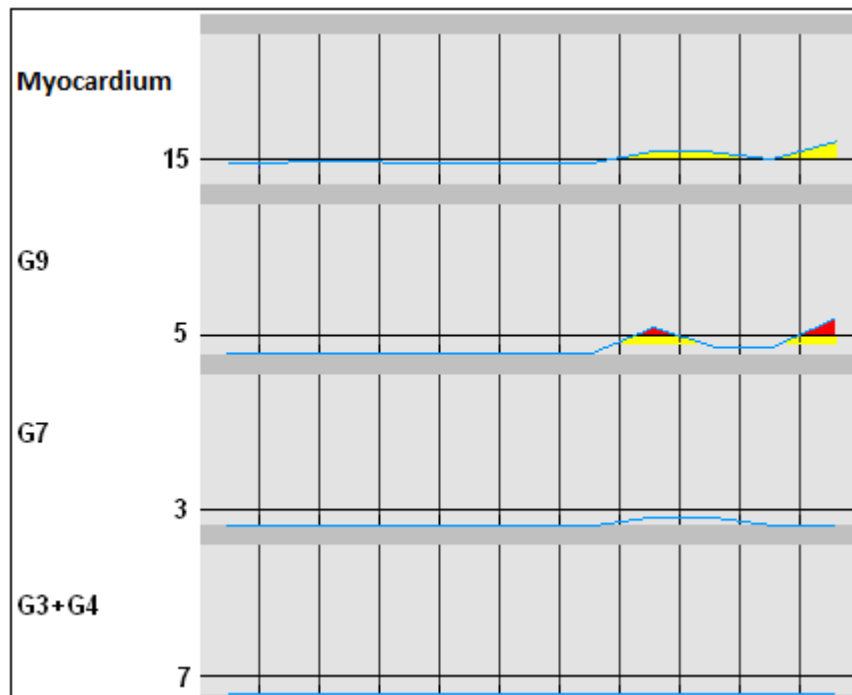
#### **1.2.4.3 View the recommendations of the "general conclusion"**

Read the "general conclusion". The analysis is completed, if there is no recommendation about expediency or necessity of consultation at the doctor. Please note: other information of the "general conclusion". **Estimate dynamics of changes if there are recommendations about medical consultation.**

#### **1.2.4.4 Dynamics review**

At the top of page push the button <Dynamic>. In opened window check the top graph of the dispersion index **MYOCARDIUM**.

**Attention:** Dynamics review is possible since the moment *when you have made at least 2 examinations.*



**Fig. 20. Graphics of dynamics of the dispersion index.**

Define, is or not tendencies of steady rise of value of the given index. Especially attentively should perform this evaluation, if the graph of the index **MYOCARDIUM** indicated by red color. In the case of the growth tendency this index, look at the other graphs in the window dynamics: G9, G7, G3 + G4.

If the observed G9 index advance, it is a sign of the transition process associated with the compensatory reactions of the myocardium. In this case, in subsequent examinations to find out is that transient process or not is necessary. I.e. need to find out, there was transition process recently, or it is observed long enough. If G9 index will start to be returned after a while to reference values it there was a transient episode of deterioration. If the G9 index does not decrease - it's a powerful argument for mandatory consultation with a doctor. Dynamics example in a picture illustrates the described singularity. On the last examinations are visible index fluctuations G9, which ultimately led to less pronounced fluctuations of the main index MYOCARDIUM.

#### 1.2.4.5 Final decision

Accept the final decision about the functional state of heart by comparing the recommendations of "general conclusion" and dynamics assessment according to the following logic:

- If there is an increase of deviations in the dynamics - must exactly follow the recommendations of "GENERAL CONCLUSION". This is a sign of the negative dynamics that can be associated with the approaching relapse of the disease.
- If there is no sustainable growth abnormalities - you can increase the frequency of examinations and continue specification of dynamics of changes on short intervals of time (hours or days). Especially attentively to carry out this clarification, if you take drugs during this period is necessary.


Dynamic is a critical indicator in the final choice of alternatives for further action:

- detailed dynamics without recourse to a doctor, or
- to plan visit to a doctor, or
- To achieve consultation of the doctor, without delay.


**However, if the dispersion indexes are significant variations, and you doubt the validity of self-assessment - do not delay reversal to the doctor.**

## 1.2.5 Specific analysis of children's results


### 1.2.5.1 View of value of an "MYOCARDIUM" index at children


 Natural processes of growth of the organism at children create the characteristic electrophysiological background reflecting complex personal processes of metabolic oscillations in the growing myocardium. In many cases these background oscillations increase the "MYOCARDIUM" index to values of 15-16 %, and at the end formed message about border changes of auricles and ventricles, although there is no pathological changes. Therefore, in spite of the fact that these boundary value concern an interval of small deviations, dynamics control is the principal indicator in such states at children.

**If the "Myocardium" index is in a range of 15-16 % within days or weeks does not increases or decreases within days or weeks it is certificate of "background" character of these boundary changes, i.e. this state of individual norm.**


 Values of main "myocardium" index in the range 18 ... 20% demand attentive relation to dynamics control at children. In this range the increase of the dispersion characteristics may be caused by transient metabolic causes unrelated to heart disease and early preclinical stages of pathological processes. Therefore, if the index "Myocardium" in this range of values does not return to the values 14 ... 16% for a long time, to consult a doctor is advisable.

### 1.2.5.2 View heart portrait at children


 Dispersion heart portraits in children's population, as well as detailed indexes, are more sensitive in comparison with the heart portraits at adults. Often, at small or boundary values of main index "Myocardium" within 12 ... 15 % local yellow or orange changes observed on heart portraits. These changes have individual character and reflect the increased variability of microalternations at children. **Therefore, if the main index of "infarction" is less than 15%, and there is a change on the portrait, it is age-related features, not deviations.** For more detailed information about the features children's portraits are given in paragraph 4.5

 Indicator of electrical instability on the heart portrait at children's population much more frequently than at adults, has a yellow color. In the age group under 15 years existence of the yellow indicator is often associated with functional not pathological conditions that reflect the natural stages of child's organism growth. In most cases, yellow indicator is reflectance of natural age variations, instead of the enlarged probability of a possible arrhythmia. Only frequent repeat of the red indicator demands the same attention, as at adults.

### 1.2.5.3 View "GENERAL CONCLUSION" at children

 In text messages of the "general conclusion" in children's population there are reports about the presence of borderline deviations, reports about truncated P-Q or extended Q-T more often. Such reports reflect personal age singularities and it is not associated with clinically significant changes in most cases. The most effective method of objective specification of such reports – it is periodic control of dynamics, for example once a week.

### 1.2.5.4 Singularities of detailing G3-G9 indexes at children while watching the dynamic

 Children tend to have significantly higher variability of G9 index. Normal background value of G9 index is 0...3, often 0 at adult patients in the absence of ventricular hypertrophy. By contrast, natural children's background can up to 5 ... 8 or even 10. Thus "Myocardium" remains the principal objective indicator of a state. If value of "Myocardium" index does not exceed 15-16 %, and on the G9 graph appear red indicator it is personal age singularities, instead of a significant deviation more often. In such cases watch closely dynamics.. However, if the G9 index has steadily high value and decreases as they grow up, it requires consultation with a doctor.

Increasing the value of any of the indexes G3 + G4 or G7 separately or in combination with G9 index are reliable sign of significant changes in the dispersion characteristics, as in adults.

### 1.3 Shutdown

To complete the work with Internet service, click<**Exit**> at the top of the menu page.

Disconnect cardioamplifier from the computer, remove remaining gel / spray from the electrodes by cotton cloth, collect and add all the accessories of the Cardiovisor system in custom packaging.

## 2. Interface description brief

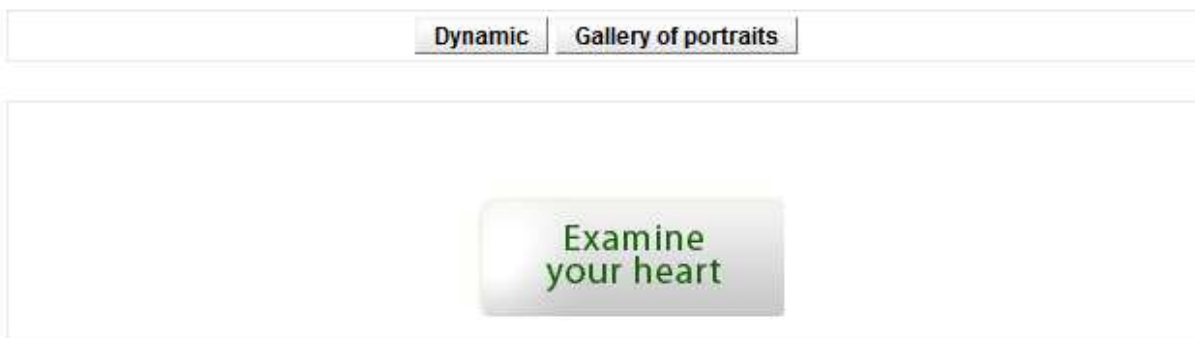
Name Button (Menu Item)	Function Description
<b>Main menu</b>	
<b>Home</b>	Main page, a brief project description and news feed.
<b>About Cardiovisor</b>	Information section about Cardiovisor. It describes the purpose of the device and short information about work technology.
<b>Prices</b>	Section of the site, which describes the service "Cardiovisor" and other services, tariff plans and other legal information about using the service.
<b>Doctors</b>	The project has the ability to work under the supervision of a doctor. This page lists the doctors who are working with the project already.
<b>For partners</b>	The affiliate program is specified in this section outlines.
<b>Contacts</b>	Site section contains information about technical support, distributor and manufacturer of Cardiovisor.
<b>Site functions: PRIVATE SITE AREA</b>	
<b>Personal data</b>	Section of the site which contained your personal data during registration.
<b>Tariff plan</b>	Site section, where you see the rates and change the tariff plan. You do not have this section if you are registered as "Cabinet diagnosis".
<b>My family</b>	Site section, which is an adjustment you have a list of family members who use the Internet service. You do not have this section if you are registered as "Cabinet diagnosis".
<b>Make deposit</b>	Site section where you can replenish your account in different ways. In this section you can replenish your account by credit card instantly.
<b>Cardiovisor</b>	Service function: estimation of the heart functional state.
<b>Patients</b>	This section is only available for "Cabinet diagnosis". This section is intended for patient management of Cabinet diagnosis.
<b>Reporting</b>	This section is only available for "Cabinet diagnosis". This section is intended to view a report about examinations that were conducted at your Cabinet diagnosis.
<b>Site functions: Cardiovisor</b>	

<b>Gallery of portraits</b>	View of dispersion portraits from of the active page table examinations. If you wish to view more short lists - change the number of records per page. In addition, viewed lists can be filtered by date via the function <Select Examination>, which is available in the "Table examinations".
<b>Dynamics</b>	View the chart changes over time the four most important dispersion indexes. List view identical with the list of portrait gallery. View graphs is the simplest and most effective procedure for the client-user. To simplify the analysis tendencies excess boundaries of normal is indicated on the graphs by yellow and red color.
<b>Print</b>	You can make a paper copy of the main examination results. This copy, called the examination form, can be used for archiving conclusions and as the preliminary information at medical survey.
<b>Examination table</b>	Database examinations of personal section. This section is the main service Cardiovisor window as from this window begins examination, and from this window you can view any record that is stored in the database examinations.
<b>All waves</b>	View of ECG signal for all six limb leads at the same time. With the help of scroll, you can view the 30 sec recording step by step. This review is only for a doctor in case of necessity ECG analysis, because requires special knowledge.
<b>I, II, III, aVR, aVL, aVF</b>	View the ECG signal on a selected lead. This view can be useful if the server returned the error message instead of the conclusion. One of the main reasons is the poor quality of the ECG signal in this situation (see more in section 5 - "Problem situations in the conclusion analysis"), which can detect when viewed leads I and III.
<b>To send discharged examination to the doctor</b>	This function allows to send your examination to the doctor. Your doctor will look a survey and will give their recommendations.

### 3. Operations with Internet service

**Attention:** Before you begin, make sure that you have completed the installation of required software (see section 1 of this guide), and that cardioamplifier connected to the USB-port of your computer.

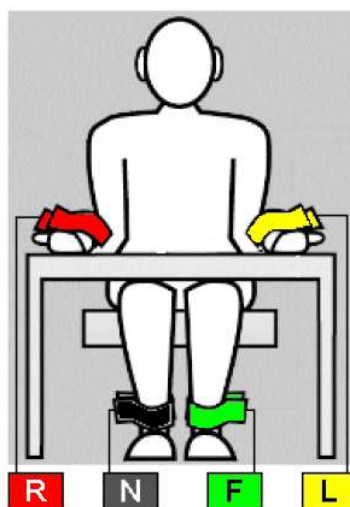
After logged into <Private site area> click <Cardiovisor>. In the opened window push the button <Examine your heart>.



**Fig. 21. Button <Examine your heart>.**

A window with the instruction, which determines the order of the input ECG. This procedure reduces to the following sequence of actions.

**STEP 1.** Place the electrodes on the standard template limb leads as shown in Figure, pre-moistened point overlap with a contact spray (in the absence of a contact spray is acceptable wetting contact of the electrode surface with clean water): red electrode (R) on the right hand, the yellow electrode (L) on the left hand, green electrode (F) on left lower leg, black electrode (N) on right lower leg. Make sure that the electrodes are imposed without an error at the specified color match. Pay special attention to the quality of contact between the electrode N, which determines the quality of the ECG in the other channels R, L, F. If the electrodes N and F are imposed on nylon stocking fabric, to ensure good contact points should be plentiful moisture superposition.





**Fig. 22. Scheme application of ECG electrodes.**

**Attention:** *Entanglement of the electrodes during the setting is unacceptable, because this will lead to completely misleading conclusions. **The most important factor to guarantee accuracy of the portrait, is a state of rest when you type ECG.** If the examination is performed in a sitting position, take a comfortable relaxed position, the most exclusive muscle tremors is necessary (hands on knees, body slightly tilted forward, lean back in his chair is not recommended, as in this case, the tremor increases usually). Breathing during input ECG should be normal, preferably without the deep breaths and exhalations. If you are in a state of nervous excitement, you can close your eyes. During ECG input talk or head turns are inadmissible.*

**STEP 2.** Click the left mouse button <**Examine your heart**>. There will be a window of ECG input on the screen.

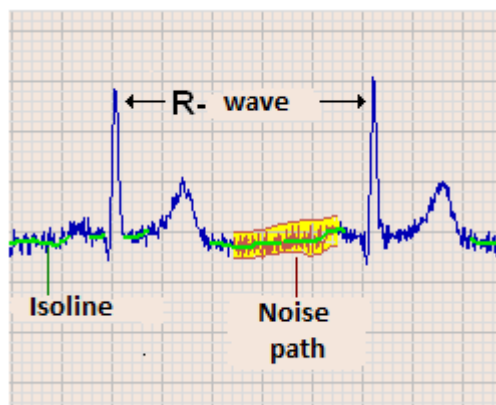
**Attention:** *If you have a problem situation, see section 5 "Typical problem situations when using the service – ECG input".*

The first 5 seconds the supporting procedures performed optimal adaptation of cardioamplifier to input signal. It is also assigned to take a comfortable position and relax. However, as noted above, the recommended position of the hands with fixed electrodes - on his knees. At this time, on the indicator of exposure time is the countdown: "5, -4, ..., 0". ECG display begins with counting "0".



**Fig. 23. ECG input box.**

Lead signals I and II are displayed in the input box for visual inspection of the input process. These signals can be quite different in different people. It is important that periodically appear narrow pulses (R-teeth) with a frequency of heart beats. R-wave can take the form of stretched pulses in the presence of pathology, but in any case it is waves of the electrocardiogram with the highest rate of increase. R-wave can be directed both upwards and downwards. If the noise exceeds the path of 4 mm in mm substrate, or contour undergoes sharp variations across the field of graph paper - you need to press the mouse button **<Stop examination>**. Possible reasons for this situation, see Section 5 *“Typical problem situations when using the service – ECG input”*.



**Fig. 24. Typical appearance of the ECG signal.**

Enter resumed by pressing the button **<Start examination>**. Input ECG data is completed within 35 seconds from the time pressing the button **<Start examination>** (5 sec Preset + 30 sec exposure). At the end of input ECG window for adding a comment with instructions how to write a comment will appear automatically at the top of the window.

**Attention:** *Until you enter a comment or refuse it, processing will not continue. I.e. service at this stage necessarily expect from a user clicking a button.*

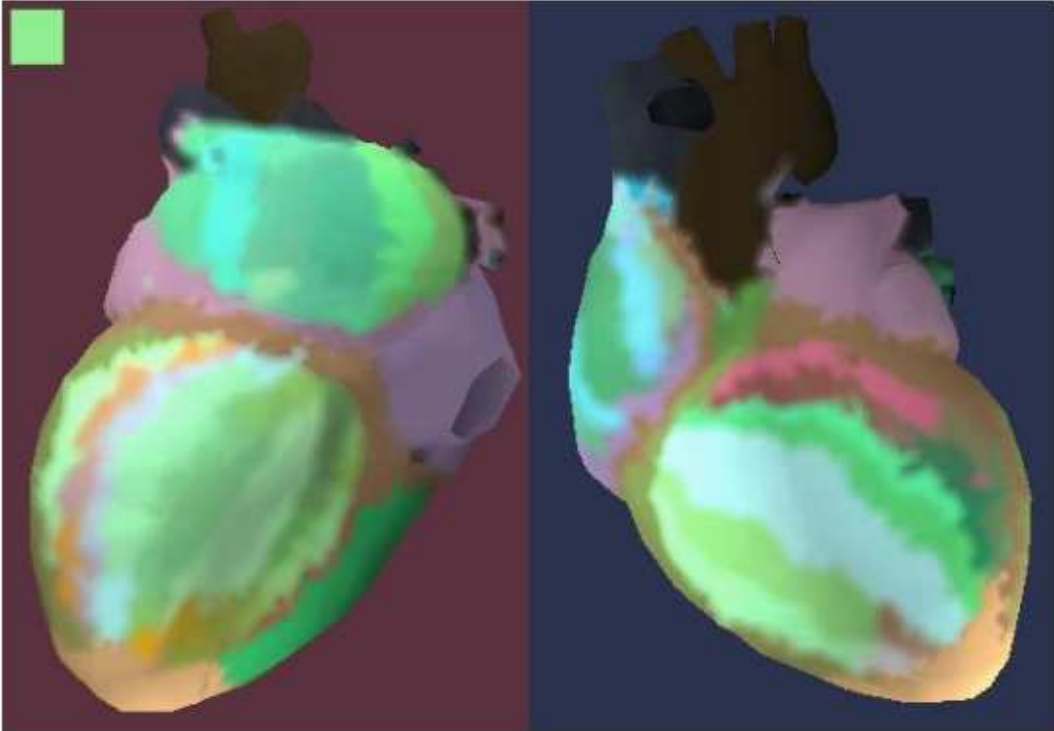
After entering the comment or withdrawal service to send data entered to the server for processing. After ~ 1 minute (depending on PC performance, speed and load on the server) the process will be completed by output to the display screen **<Results window>** which includes **heart portrait** and conclusion with recommendations. If you have any transient noise in the process of input ECG, which caused abrupt changes in contour ECG examination appropriate to repeat (substandard examination in this case must be removed from the "Examinations table").

**Attention:** *If at the first portrait detect deviations from the norm, to prevent accidental influence of artifacts on examination, get another one or two portraits without removing the electrodes, it is expedient.*

#### 4. Analysis of conclusions

Results Window section <Cardiovisor> looks like:

Gallery of portraits		Dynamic		Print	Examinations table			
View ECG		All waves	I	II	III	aVR	aVL	aVF
<b>Myocardium</b>	<b>Rhythm</b>	<b>Pulse</b>			<b>Detailing code</b>			
15%	40%	98 tick/min			3-L-S-S-1-1-S-S-5			

**DIFFICULT** variant of low-amplitude alternations. The **CONCLUSION** may have decreased reliability.

**GENERAL CONCLUSION**

15%: If these deviations are repeated on sequential heart portraits, you should control the dynamics of examinations. Negative dynamic is eventual. Moderate **CHANGES** of ventricles myocardium.

**Fig. 25. Appearance of the section <Cardiovisor>.**

It is located on the left keypad section of the main functions of personal section <My Account> (the description of buttons in section 2 of this guide). It is the main options for viewing reports in the upper part. The main field of the window is the current block of the examination results.

Block of the examination consists of three sections:

- **numerical values of the dispersion indexes of state**
- **heart portrait**
- **textual conclusion with recommendations.**

## 4.1 Numerical values of dispersive indexes of a myocardium status

At the top of the block contains the results of four main status indicators: the index "Myocardium", index "Rhythm", the average pulse rate and index "Detailization code".

Myocardium	Rhythm	Pulse	Detailing code
15%	40%	98 tick/min	3-L-S-S-1-1-S-S-5

**Fig. 26. Presentation of main dispersion indexes.**

Dispersion indexes "Myocardium" and "Rhythm" are relative characteristics that characterize the total value of the deviations dispersion from the norm and changed in the range 0% ... 100%. The more value of index - the is more deviation from the norm. Physically, the meaning of "infarction" = 100% corresponds to the pathological complex *that is associated with significant deviations from the norm practically in all chambers of the heart*. Value "Myocardium" = 0% corresponds to complete absence of any significant deviations from the dispersion model of the ideal heart. Similarly, the rate of "Rhythm" = 100% corresponds to the most expressed changes in the regulation of heart rhythm peculiar to expressed arrhythmias or strong stress (details of these deviations contained in the text comments of section "Rhythm" in conclusion).

The "Detailization code" includes 9 additional indexes. The number of each additional index detail code begins with the letter G: G1, G2, ..., G9. Indexes of detail G1-G9 are the rank: the higher value, the is more deviation from the norm.

Medical titles of the dispersion indexes are not important for the user. These titles are saved only for uniform terminology as in sections of the site ecg4me.com for the user and it is in fuller sections for the doctor. In text reports, meaning major indexes have a color in accordance with Table 1 (green, yellow, red). Indexes of code detail G1-G9 are always displayed only in black:

Average pulse rate is always displayed in addition to the dispersion indices. Pulse is not a dispersion index, but it is necessary for the doctor decision-making as an important system parameter.

The value of each dispersion index belongs to one of the three bands "standard - deviation - expressed deviation" in the following table:

**Table 1**

**Quantitative limits of the dispersion index for the separation of state standard-deviation**

Dispersion index	Norm	Deviation	Evident deviation
<b>Main (integral) indexes</b>			
1. Myocardium %	<15	15-20	>20
2. Rhythm %	<50	51-79	>79
3. T-alternation, mkV	<12	12-20	>20
4. Index of electrical instability (цвет индекса отображается в верхней части портрета сердца)	1	2 or 4	3 or 5
<b>Detailization code</b>			
((0 – norm, S-small deviation, L-norm border/deviation, greater then 0 - evident deviation. Small values greater than 0 may be a variant of the norm for indexes of detalization 1 and 2)			
G1. Depolarization of right atrium	0,S,L,1-5	6-11	>11
G2. Depolarization of left atrium	0,S,L,1-3	4-6	>6
G3. Depolarization of right ventricle	0,S,L	1-6	>6
G4. Depolarization of left ventricle	0,S,L	1-6	>6
G5. Repolarization of right venticle	0,S,L	1	>1
G6. Repolarization of left venticle	0,S,L	1-6	>6
G7. Electrical symmetry of ventricles	0,S,L	1-3	>3
G8. Intraventricular blocking	0,S,L	-	>0
G9. Compensatory reaction of ventricules	0,S,L,1-3	4-6	>6

In direct comparison with each examination the current values of indexes and boundary values of Table 1 is not necessary. The main indexes have a color that matches following table and text evaluation values of detalization code, which is optional (optional for the user) is given in the additional text messages (see below). Emphasize once more that the client is required to view only the major indexes "Myocardium" and "Rhythm". *Other indexes, the user can view when gain experience of working with this service.*

--

**The index "Myocardium" is the main marker of the myocardium state.**

*less than 15% – no significant deviations. This indicates that at the moment myocardial function is normal. If this conclusion is obtained by the intake of drugs, it is advisable to consult a doctor because more detailed information the doctor can be obtained only after examination by a medical device CardioVisor with a load.*

*15% ... 19% – it is borderline state, control of dynamics is expedient. At negative dynamics, i.e. at slow rise of value of the indicator, mandatory consultation of the doctor is necessary. The borderline state can result from weariness because of a physical or mental overload, an irrational delivery, alcohol influence, and also the metabolic changes caused by a pathology of other organs. Therefore, the sustainable preservation of this state requires consult a doctor. If the borderline state due to transitory factors, the indicator should decrease gradually, reflecting the functional normalization myocardium.*

*20% ... 22% – pathology is probable. If this deviation is detected for the first time - need to control the dynamics (increased frequency of surveys) and medical examination is expedient. If the indicator steady rise in this range - a medical examination is necessary.*

*23% ... 27% – pathology is probable. If this deviation is detected for the first time - control of dynamics and **mandatory examinations** is necessary.*

*More than 27% – pathology or the expressed pathology. If this deviation is detected for the first time, steadily repeated and has no tendency to increase in successive examinations - should be examined at the first opportunity. If in this same situation has steadily rapid growth of the deviations of time measured by minutes or other minute intervals – the emergency consultation of the doctor is necessary.*

**Similarly, the index of "Rhythm" is a marker of the adaptive capacity of the organism, or arrhythmia:**

*less than 15% – no significant deviations.*

*15%...50% - slight deviations (may be a variant of the norm in the natural daily oscillations).*

*51%...80% - it is borderline state.*

*More than 80% - expressed deviation from the norm. This is a sign of exhaustion of compensatory allowance (asthenia) in the regulatory system of the heart rhythm. Medical examination is necessary. If there are signs of arrhythmia in an additional section of text messages, "Rhythm" (Table 2) is formed by a message on the probable arrhythmia.*

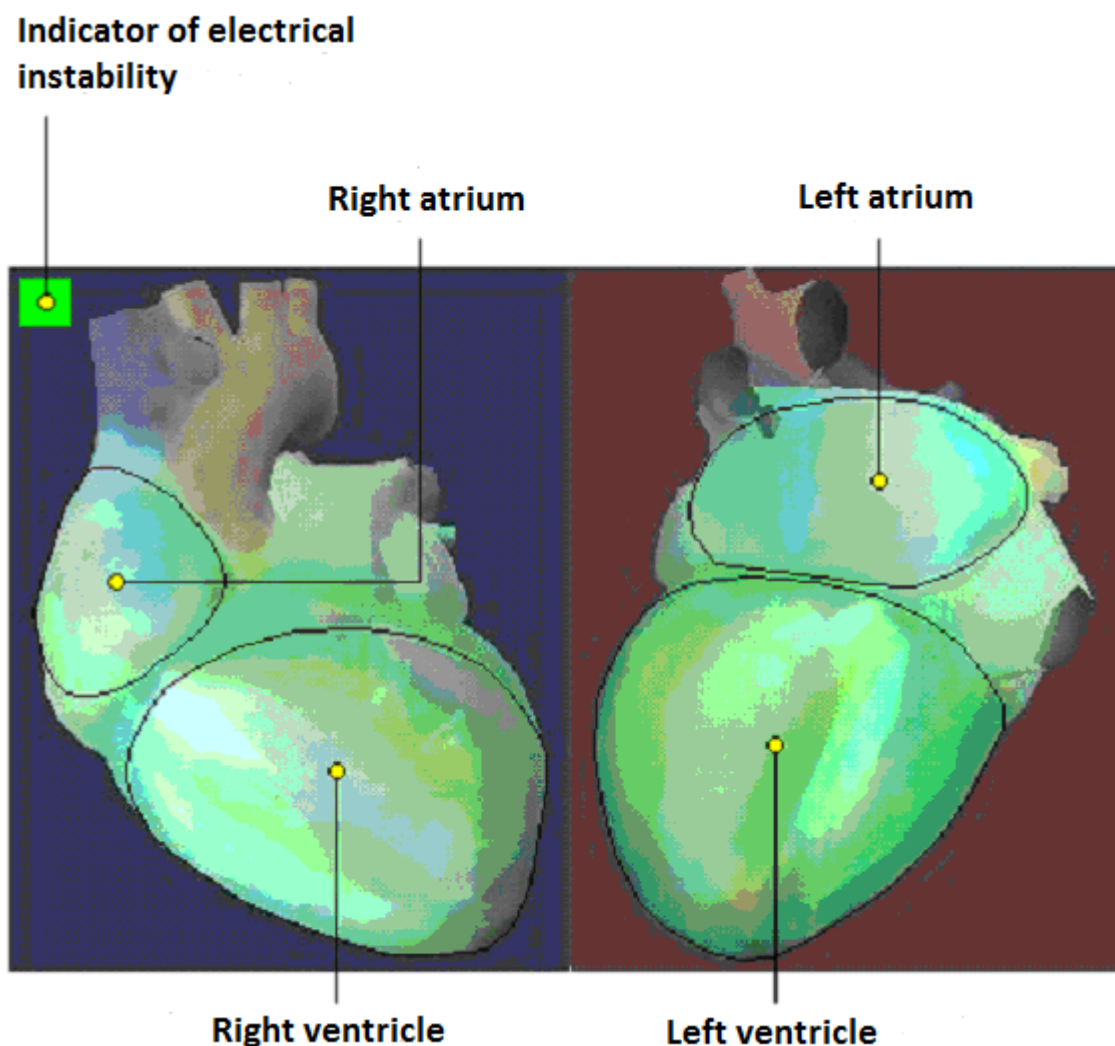
Indicator "Rhythm" is enough dynamical value. If you are healthy, and rhythm control system optimally balanced, the indicator "Rhythm" steadily in the range 0% ... 20%. At high stress or expressed arrhythmia indicator will be in the range of > 70%. A

healthy urban dweller this index fluctuates in a range of 20 % ... 60 %, as a rule, increases in the evening. When the "Rhythm" is consistently over 50% at any time of day - is evidence of probable presence in the organism a constant source of increased tension of regulatory systems (nervous tension, dysfunction of internal organs, inflammation, etc.). In this case, in the conclusion of text heading "RHYTHM" (below the portrait of the heart) there is a warning about high levels of stress or probable arrhythmia.

## 4.2 Heart portrait

All cameras on a heart portrait have green color in a state of physiological norm, as is shown in a figure 27.



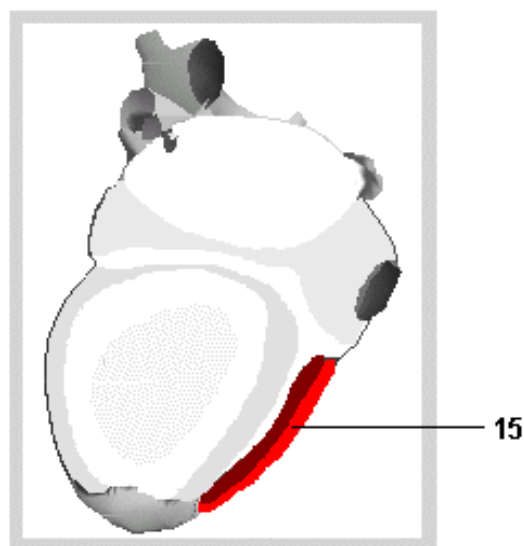


**Fig. 27. Heart portrait.**

Color of the appropriate areas of a myocardium changes towards red color at appearance of deviations, and rich red color is a sign of the maximum expression of pathological deviations. The slightest change of the dispersion characteristics of the electric excitation are visible on the portrait. The color pattern of color changes has characteristic individual signs in the presence of deviations, so the portrait of the heart keeps such individual features for a long time (like an individual face featured a portrait of the individual). These individual variations are quite significant, but all of them submit to a uniform principle:

*The more expression of red color, and the more area on which there was a change of green color towards red there is more deviation. The most significant pathological changes include the left ventricle or both of the ventricle, as well as area 15 in the left angle of the heart portrait (see. Fig. 28). Particular attention should be paid to bright red band in the area of 15 even if all the other areas of the portrait are green standards. In the case of a stable frequency of this sign should consult a cardiologist.*

The high degree of richness of red color in different areas of the portrait is not always clearly associated with poor prognosis. For example, in some slowly varying states of postinfarction cardiosclerosis, red is more pronounced than for certain types of acute ischemia (infarction), although probability of relapse in case of deterioration cardiosclerosis, usually less than in myocardial infarction. **Therefore, after portrait review you should be required familiarize with text conclusions and recommendations, allocated under a portrait.**



**Fig. 28. Display of pathological changes to a heart portrait.**

In the upper left part of a portrait field there is an indicator of electrical instability of a myocardium in the form of a square field with changed colour (see fig. 28). Expressed signs of electrical instability corresponds to the color red, normal - green. The yellow color corresponds to the border of electrical instability. **The constant presence of red indicator of electric instability has a poor prognosis.** If such sign has arisen for the first time and is steadily saved - faster consultation of the cardiologist is necessary. If this sign is present already at the first examination by service KARDi.ru - you should definitely consult a cardiologist and avoid physical or mental overloads.

### 4.3 The text conclusion with recommendations

In a window results of section <Cardiovisor> under a heart portrait the text information containing results of the analysis of measuring the amplitude of ECG microalternations. This information contains recommendations for the customer service and some general information about electrophysiological nature of identified

deviations in addition to numeric values of dispersion indexes. The text of conclusion grouped by 6 headings presented in Table 2.

**The client should read the first heading: "GENERAL CONCLUSION" is necessary.** The remaining headings are optional (gray or black text message) and provide additional details aggregative deviations which can be useful when consulting a doctor. The client is not required to read these additional messages, but can use the latest if you want more profoundly to observe the dynamics deviations from the norm. Messages excreted with red color, read in all headings expediently since it is reports on significant deviations.

Sometimes, before the main text of the conclusions may be reports of lower reliability of conclusions, such as: "Advanced variant of low-amplitude alternations. Conclusion may have reduced reliability". This means that the existence deviations in the examination is reliable, but the absolute values of dispersion indexes have increased uncertainty. This increase of error in measuring the dispersion indexes - a relatively rare event. It is associated with features of ECG microalternations that occur at the boundary of technical capabilities of the device "Cardiovisor".

**Table 2**

**Characteristics of text's conclusion headings by section <Cardiovisor>**

	The heading name	The heading content
<b>Main heading (reading for client is mandatory)</b>		
1	<b>GENERAL CONCLUSION</b>	This message displayed value of the index "Myocardium" in % again and makes recommendations regarding the medical examination. The most significant of the identified deviations are listed.
<b>Additional headings (optional to the client)</b>		
2	<b>RHYTHM</b>	Deviations in the regulation of heart rate. Information about the high level of stress or probable arrhythmia.
3	<b>AURICLES</b>	Deviations in the function of the auricles. The dispersion characteristics of the auricles are characterized by high sensitivity therefore to focus attention only on red or orange by color messages it is necessary.
4	<b>VENTRICLES</b>	Deviations in the ventricular function. In the presence of deviations assessed the adequacy of myocardial oxygen supply (the probability of myocardial hypoxia), primarily. Red color of this heading messages are indicating about probable problem situation.
5	<b>COMPENSATORY REACTION of myocardium</b>	Deviations in the electrical excitation synchronicity of the left and right ventricles. These deviations are associated with transient (temporary) or persistent causes of overloading one of the ventricles (usually the left) always. This overload is due to the increase in the activity one of the ventricles for compensating insufficiency of blood supply. If the messages in this heading have stable red color - this is evidence of pathological changes.
6	<b>OTHER CHANGES</b>	Signs of exhaustion (asthenia), the regulatory reserves of the organism as a whole. May be associated with high levels of stress, even in the absence of significant deviations in myocardium. Prolonged stay in a state of "regulatory asthenia" is associated with high risk, but not necessarily cardiac.

## 4.4 Control of dynamics and gallery of portraits

The most basic and important information for the client contains in graphics to control of dynamics of dispersion indexes on time, and also in the gallery of portraits is synchronized with graphics. This information is formed on the corresponding button **<Dynamic>** and **<Gallery of portrait>** at the top. Graphs of the function **<Dynamic>** formed from the time when made 2 examinations at least. If deviations are not present, the graph of tendencies looks like a line allocated in the field of admissible value of indexes. **If there are deviations in the field of the value exceeding admissible value, there is a filling of yellow or red color** (yellow - excess of boundary of norm, red - the expressed deviation from norm). **The main sign of adversity is a tendency of gradual increase of indicators.** If such tendency is not present, even at the increased indicators it is a sign of the functional stability of myocardium. In such cases, fulfill examination with increased frequency appropriate timely to see the start of the negative dynamics.

Four graphs are supervised:

- MYOCARDIUM
- G9
- G7
- G3+G4.

Graphic structure of the field output is shown in Figure.

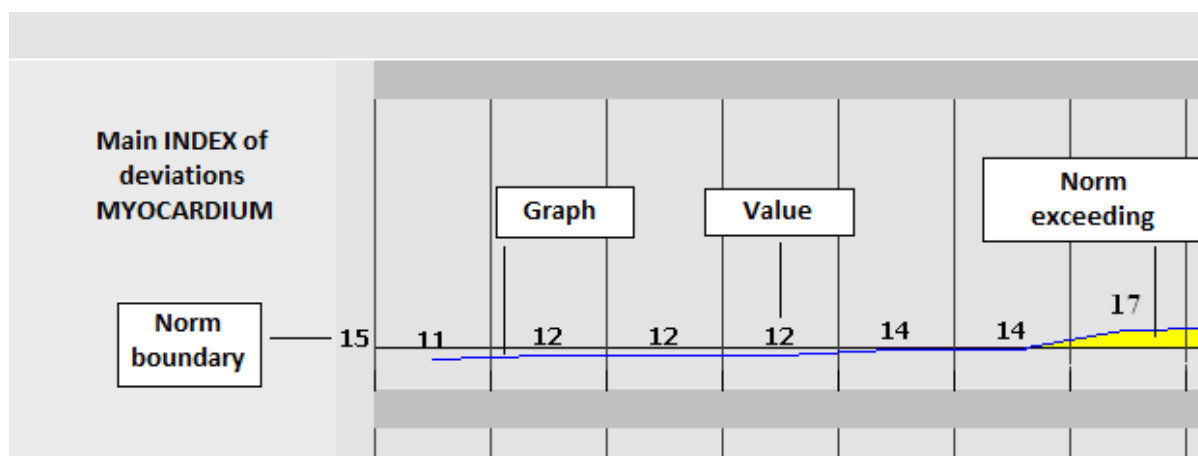


Рис. 29. Graph structure <Dynamic>.

If graphics exceed norm boundary, there is an indicator filling by yellow colour. If the boundary of the expressed deviations is exceeded - filling by red colour is formed.

General information about electrophysiological detail of these graphs are presented in Table 3.

**Таблица 3**

**Description of <Dynamic> graphs**

	<b>The graph name</b>	<b>The graph description</b> (electrophysiological detailing)
1	<b>Main INDEX deviations MYOCARDIUM</b>	This index is the sum (integral) of all the other dispersion indexes. This is an index with very slow dynamics, as it is influenced by all the indexes.
2	<b>G9 – Index of myocardial compensatory reaction in the early depolarization</b>	Index G9 the most dynamical of all. It reflects the processes in myocardium associated with the fast compensatory reactions of the myocardium. If average value G9 steadily exceeds value «6» is a sign of the functional changes in a myocardium when transient compensator response was fixed and became a constant. It is observed at the left ventricle hypertrophy (less often right) though this sign can accompany and other pathologies of heart more often.
3	<b>G7 – Index of ventricular symmetry in the middle of depolarization</b>	Index G7 is less dynamical, than G9. It reflects processes in peak of electrical excitation of a myocardium and is very sensitive to a myocardium hypoxia (oxygen insufficiency). The increased value of this index are associated with credible pathological changes in most cases.
4	<b>G3+G4 – Index of ventricular symmetry in the end of depolarization</b>	Index G3+G4 "slow" also. Reflects the processes at the end of the electrical excitation of the myocardium. If this index has significant deviation it is almost faultless indicator of pathological changes in ventricular myocardium.

It is advisable to remember two basic rules:

- *If there is a significant increase of indexes G7 and G3+G4, it is a sign of changes which have pathological character with high probability.*
- *If oscillations of index G9 that on magnification on reduction - it is evidence of transient. Such a process may not necessarily be caused by progressive pathology. Often it is transient and is caused by overloads (physical and psychological), transient hormonal changes, defective rest, meals, etc. factors.*

If index G9 steadily increased also matters 7 and more –to consult the cardiologist is expediently. In many cases it can be a forerunner of developing or already available hypertrophy of one of ventricles. Similarly, if the symmetry indices of ventricular G7 and G3 + G4 steadily increased are a sign of possible pathological changes.

Indexes G1, G2, G5, G6 and G8, which are not commented upon in this manual are intended only for the doctor. Client who wants to see these indexes and detail of the code needs to know only the following general information: Indexes G1, G2

characterize atrial myocardium. Increased attention to these indexes may be appropriate in the presence of arrhythmias, or pronounced changes in the index of electrical instability. Indexes G5, G6 concern ventricles and can show complex dynamics of changes that are dependent on many factors, which can handle only a doctor. These indexes increase with significant pathological changes practically always. However, there may be transient changes caused by, for example, dehydration, high salt intake in the diet, etc. factors. Therefore, in itself indexes G5, G6, without indexes G3, G4, G7, G9 have no for the client of any independent significance. This is a level of medical expertise as noted. Index G8 gives a rough estimate of average excitation rate of the ventricles, and also is intended for the doctor.

**Additional overview information** about the structure and intensity changes can be obtained by clicking **<Gallery of Portrait>**. The gallery shows dynamics of changes for all map of dispersing changes of a myocardium, taking into account localisation of changes on four heart cameras. It is also advisable to focus on the empirical rule:

- *On localisation most significantly intensive "reddening" of ventricles. If it is visible the tendency to deterioration of the ventricles in the gallery - consulting cardiologist is required.*


Do not forget: **the continued availability of red indicator electrical instability in the gallery of portraits** (in the form of colored squares on the top left on each portrait) **has a poor prognosis.**

If you use this internet service all the time, you will always have time to make the right decisions, since electric ECG microalternations are the earliest markers of approaching functional failures of a myocardium. In this case, the rare but possible cases of abrupt changes in the dispersion indicators follow these basic rule:

- ***If there was a sharp magnification of numerical indicators and intensity of red color on a heart portrait, these changes steadily repeat in several successively the fulfilled examinations, and the system recommends immediate examination - without postponing, you should contact a doctor. If this indicator and electrical instability sharply changed color from green to red - a sure sign of a high probability of acute myocardial ischemia (infarct is possible), further evaluation should be performed by a doctor.***

## 4.5 Features of dispersive indexes at children

### 4.5.1 Features of the analysis children's results

 As noted above, the natural processes of organism growth at children produce characteristic electrophysiological background, reflecting the complex processes of metabolic oscillations in the growing myocardium. In many cases, these background

fluctuations occur in the range of index values, "Myocardium" at least 15%. However there are enough cases when such "background" not expressed deviations of deviation of the dispersion characteristics from of norm increase the index "Myocardium" to values of 15-16%, and in the conclusion reports are formed about boundary changes of auricles and ventricles. This conclusion has the following standard form:

**GENERAL CONCLUSION**

**15%: If these deviations are repeated on sequential heart portraits, you should control the dynamics of examinations. Negative dynamic is eventual. Moderate nonspecific myocardium CHANGES of ventricles.**

Indications of hypoxia. CHANGES in ventricular myocardium are similar to ISCHEMIC changes.

Moderate deviations in atriums.

**RYTHM**

**NORM – sinoatrial rate.**

Rhythm variability is normal.

**ELECTRICAL AXIS**

**NORMAL position of heart electrical axis.**

**ATRIUMS**

Moderate deviations in atriums.

**VENTRICLES**

Moderate CHANGES of ventricles depolarization process: indications of temporary functional instability of myocardium.

Border-line changes similar to myocardium hypoxia.

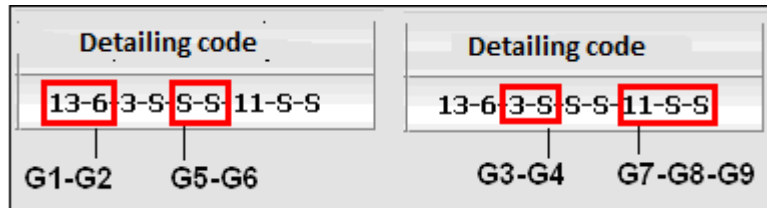
**COMPENSATORY REACTION of myocardium.**

Small asymmetry of left ventricle depolarization in comparison with norm. Overexertion indications or initial indications of left ventricle hypertrophy are possible.

**Рис. 30. Вид заключения для детей.**


In these cases in the conclusion the recommendation about control of dynamics is formed during certain time. **If the index "Myocardium" in long-term dynamics within days or weeks does not increase or decreases it is evidence of "background" character of these boundary changes. If in dynamics of the main index "Myocardium" and on portraits is observed a negative trend for gradual increase - consultation of the doctor is necessary.** The value of main index "Myocardium" and related indexes of detail G1-G9 may experience transient episodes in children with a temporary increase followed by a return to original values.





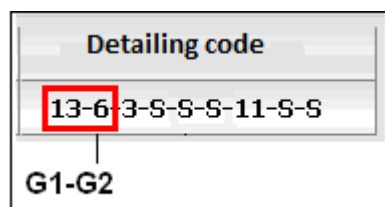
**Fig. 31. G1-G9 at children.**

Such episodes may be associated with the residual process in the myocardium after previous inflammatory or infectious diseases.

 The values of main index "myocardium" in the range 18 ... 20% demand extremely attentive relation to dynamics control at children. In this range the increase of the dispersion characteristics can be caused by transient metabolic reasons unrelated to heart disease and early preclinical stages of pathological processes. Therefore, if the index "Myocardium" in the range of values does not return to the values 14 ... 16% for a long time, consultation of the doctor is expedient.


#### 4.5.2 Features of indexes of detailed elaboration G1-G9 at children

Higher variability of indexes G1 and G2 is observed at children, especially in the age group of 6-12 years.



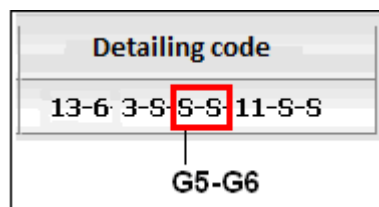
**Fig. 32. Variability of G1,G2 at children.**

The index values in these groups in size 5-7 indicate the presence of deviations from the physiological norm at adults, but such increased values reflect only natural individual processes of age adaptation of the growing heart at children in most cases. Therefore, the index values less than 7...10 and text reports about boundary changes in auricles are generally among the natural physiological background, and it is not significant change. Conclusion specification is possible only at repeated examination, i.e. at dynamics control. Only in the presence of a tendency to increase of these indexes in process of a growing it is expedient to address to the doctor to determine the cause of such negative dynamics.

 Much higher variability of index G9 is observed at children. In the absence of ventricular hypertrophy normal background value of index G9 is 0 ... 3, more often 0 at adult patients. By contrast, natural background at children can reach 5 ... 8, and even 10. In this case, the smaller child have the higher background value of this


indicator. This feature is caused by natural prevalence at children's age of the right departments of heart. For this reason, children may have increased the value of a single index G9 at simultaneously low value of the main index a myocardium within 14-15 %. I.e. it is not a sign of significant deviations unless the age exceeds it 16 years. However, if index G9 has steadily high value and does not decrease as they grow older, it requires special attention of the doctor.


 Much higher variability of indexes G5, G6 is observed at children.



**Fig. 33. Variability of G5,G6 at children.**

These indexes also are not specific signs of pathological changes at adults since can be caused transient metabolic changes. The increased value of G5, G6 are is more often caused by natural age metabolic fluctuations, instead of the pathological reasons at children. Some variants of cardiomyopathies can represent an exception, therefore anyway great values of these indexes demand attention of the doctor. In case of simultaneous joint augmentation other indexes (G3, G4, G7, G9) too, the increased value of G5, G6 substantiating clinically significant deviations.

 Reliable sign of significant changes in the dispersion characteristics are increasing the value of any indexes G3, G4, G7 separately or in combination with other indexes, as well as at adults.

 In text reports of "Conclusion" in children's population more frequent occurrence of reports about truncated P-Q or extended Q-T is probably. Automatic classifier device "Cardiovisor" takes into account the age norms for the given intervals, therefore appearance of such reports can be an indication of the individual characteristics of the myocardium, or the presence of deviations. In any case, the most effective way of objective specification is a control of dynamics.

### 4.5.3 Features of a dispersive heart portrait at children

Dispersion portraits of the heart in children population, as well as detalization indexes, are more sensitive in comparison with portraits of heart at adults. Therefore, the basic features of children's portraits are shown mainly in the field of norm or small deviations. Often, at low or borderline values of the main index "Myocardium" within 12 ... 15 % on heart portraits are observed local yellow or orange changes. These changes have individual character and reflect the increased variability of microalternations at children. Therefore, if the main index

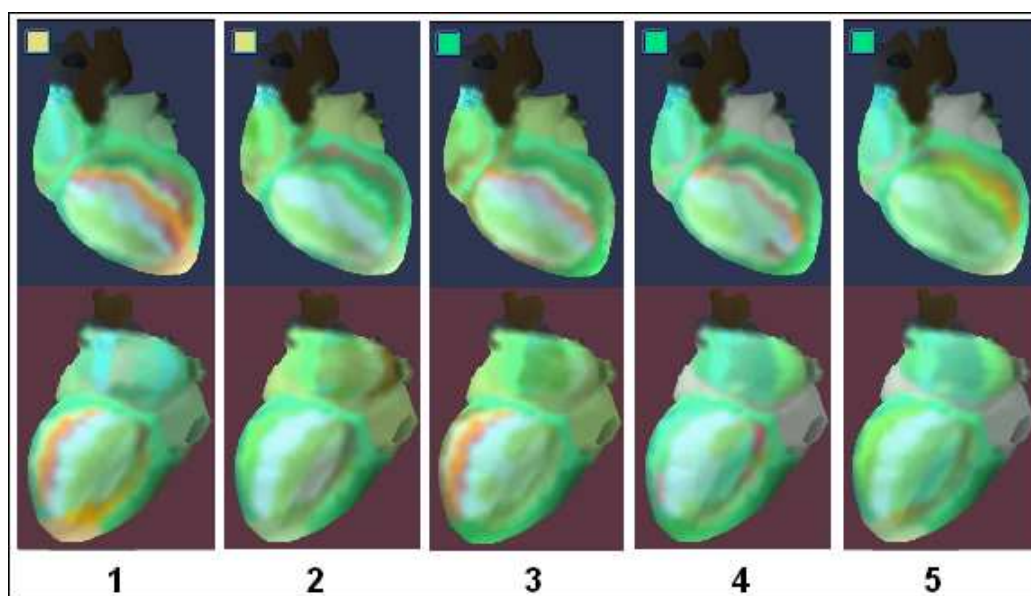
"Myocardium" is less than 15 %, and on a portrait there are changes it is age-related features, instead of deviations. Portrait features at children are characteristic for two areas: the area of auricles and area of ventricular repolarization:



**Fig. 34. Portrait features at children.**

1 – Auricles  
2 - Ventricular repolarization.

Some sample variants of portraits with such features are resulted in a following drawing.



**Fig. 35. Heart portraits at children.**

- 1 – 10 лет, "Myocardium" 14%
- 2 – 10 лет, "Myocardium" 13%
- 3 – 15 лет, "Myocardium" 15%, changes in the right auricle
- 4 – 13 лет, "Myocardium" 14%
- 5 – 17 лет, "Myocardium" 14%.

#### 4.5.4 Features of the indicator of electric instability at children

The indicator of electrical instability in children's population also is characterised by the enlarged variability directly associated with increased variability of a rhythm at children. The most common expression of this feature - this is the frequent appearance of yellow color on this indicator. In age group till 15 years existence of the yellow indicator is often associated with functional, instead of pathological states which reflect natural stages of a children's organism growth. However, persistent signs of instability in the form of red indicator requires the attention of a doctor to determine the probable cause of the identified arrhythmia.


## 5. Personal data

### 5.1 Section appointment

The section "**Personal data**" is designed to view and change personal data provided during registration. In this section you can also change the password to enter the private site area.

### 5.2 Change of the personal data


In order to open the section "**Personal data**" should click on "**Personal data**" in your account Kardi.Ru.

Personal data	
 <a href="#">Add photo</a>	
Last name	Black
First name	Alex
Middle name	V.
E-mail *	alexblack@mks.ru
Login (for forum)	alexblack
Date of birth *	14-12-1967
Male *	male
Weight(kg.)	70
Height(sm.)	170
Region	New York
Contact mobile phone (Example: 9031234567) *	9981234567
Account number	4550
Money	870.0
<input type="button" value="Modify person data"/> <input type="button" value="Change password"/>	

**Fig. 36. Personal data.**

To change the personal data press the button «**Modify personal data**» it is necessary. The system passes into edit mode after button pressing.

### Personal data



Add photo

Last name	Black
First name	Alex
Middle name	V.
E-mail *	alexblack@mks.ru
Login (for forum)	alexblack
Date of birth *	14-12-1967
Male *	male
Weight(kg.)	70
Height(sm.)	170
Region	New York
Contact mobile phone (Example: 9031234567) *	9981234567
Account number	4550
Money	870.0

Modify person data
Change password

**Fig. 37. Kind of the conclusion for children.**

The symbol "\*" marked fields are required. After data input for the changes to take effect you must click **"Save"**.

You must click **"Change password"** to change your password login into your personal account. At password change to enter the old password it is necessary, then enter your new password twice. After password input to press the button **"Change"** it is necessary.

#### Modify password

Old password	●●●●●●●●
New password	●●●●●●●●
New password re-enter	●●●●●●●●

Change
Back

**Fig. 38. Change password.**

After password change at a following entrance in private site area you will need to specify the new password.

If to press the button “**Add photo**” you can download the photo on the server.

In the same section are displayed **account number** and **the sum on the personal account**. You should supervise the sum on the personal account that possibility to carry examinations has not been blocked.

## 6. Tariff Plan

### 6.1 Section appointment

Examinations in the project CardioVisor ecg4me.com - are paid. Each examination is charged according to your tariff plan. After the examination, a fixed amount is deducted from your account in the system ecg4me.com.

### 6.2 Management of the tariff plan

Section "**Tariff Plan**" is designed for review of tariff plan and choose another tariff plan.

**Attention:** *Under the same examination refers to one to five examinations made during the hours of one family member or patient which are not interrupted examinations of another family member or patient.*

*In other words, **from one to five examinations** performed consistently for over an hour by one family member will be charged as one examination.*

**Your tariff plan defines the Kardi.ru services price. You can change tariff plan on this page.**

---

**Your tariff plan: Simple**

Last date of tariff plan modifying **01.01.2009**

Service CARDIOVISOR		
Monthly payment		0 rub.
Cost of one examination		65 rub.
Restriction of tariff plan modifying		no restriction

---

**Change tariff plan**

Select tariff Unlimited ▼

Service CARDIOVISOR		
Monthly payment		4500 rub.
Cost of one examination		0 rub.
Restriction of tariff plan modifying		30 days

**Fig. 39. Tariff plan.**

Attributes of the following tariff plan. "**Monthly payment**" - this is the amount that each month will be charged to your account. "**Cost of one examination**" - this



is the amount to be debited each time from the account after the examination immediately. **“Restriction of tariff plan modifying”** - the amount of days during which will be forbidden to variate the tariff plan after passage to it.

Your plan and your rates are indicated at the top of the page. Tariff plans for which you can go in the bottom of the page. In order to change the tariff plan, you need to choose a new tariff plan at the bottom of the page and click **"Change"**.

## 7. My family

### 7.1 Section appointment

Section **"My Family"** is available if you are registered as "individual person". In the "cabinet diagnosis" this section is not available. You can examine except yourself other members of your family or friends in your private site area. For each examinee the separate history of surveys is conducted and dynamics is formed. In this section you can add, change or delete the attributes of your relatives which you will examine.

### 7.2 Management of family members

Section **"My Family"** looks like this.

The screenshot shows a web interface for managing family members. At the top, there is a button labeled "Add member of family". Below it is a search section titled "Search by lastname" with a text input field "Enter lastname or first letters of lastname" and a "Find" button. The main content area is titled "My family [2]" and contains a table with the following data:

First name	Age		
Black Ann V.	46	View details	Delete
Black John V.	27	View details	Delete

Navigation elements include "Pages: [ 1 ]" and a mouse cursor pointing to the bottom right of the table.

**Fig. 40. Settings of family members.**

**Attention:** *It is impossible under one login account, under one name to examine different people as the history and dynamics of examinations will be distorted. If you want to examine other people you have to define them as "family members", and then you can examine these people.*

By clicking the **"Add member of family"** you can add a new family member. To see the new family member, you must click **"View"**. Turning to the view mode, you can change the family member attributes. By clicking the **"Delete"** button you can remove a family member. If a family member have been examined already, then the system will prevent removal.

## 8. Patients

### 8.1 Section appointment

Section **"Patients"** is available if you are registered as "cabinet diagnosis". In the "individual person" this section is not available. This section is intended to introduce or making their patients here. The separate history of examinations is conducted and formed dynamics for each examinee. In this section you can add, delete or modify the attributes of your patients that you will examine. This page appears at the entrance to the private site area in the "cabinet diagnosis".

### 8.2 Management of patients

Section **"Patients"** looks as follows.

<a href="#">Add patient</a>	
<b>Search by lastname</b>	
Enter lastname or first letters of lastname	
<a href="#">Find</a>	
<b>Patients [2]</b>	
<b>First name</b>	<b>Age</b>
Pages: [ 1 ]	
Black Ann V.	46
Black John V.	27
Pages: [ 1 ]	

**Fig. 41. Settings of patients.**

**Attention:** *You can't examine different people under one account, under the same name as the history and dynamics of the examinations will be distorted. If you want to examine other people you should define everyone inspected as separate "patient", and already then to conduct examination of these people.*

By clicking the **"Add Patient"** you can add a new patient. To see the new family member, you must click **"View"**. If you go to view mode, you can change the attributes of the patient. If many patients, the patients are displayed on several pages. The patient can be found by surname or by the first letters of surname if to use search. To do this, enter the first letters of the name and click **"Search"**. By clicking **"Cardiovisor"** may switch to the selected patient examination.

**Black Ann V.**

Select Black Ann V. ▼

Examine  
your heart

**Examination filter**

From  (dd-mm-yyyy) To  (dd-mm-yyyy)
 Record count on page

**Examinations [0]**

Examination date	Myocardium, %	Rhythm, %	Pulse, tick/min	Pressure	Comment

**Fig. 42. Examination of selected patient.**

If you make examination of the patient be convinced that in the top of the page that person whom you examine is specified.

## 9. Reporting

### 9.1 Section appointment

Section "Reporting" is designed to view the history of examinations in your cabinet of diagnostics. Section "Reporting" is available if you are registered as "cabinet diagnosis". In the "individual person" this section is not available.

### 9.2 View history examinations

To view the history of examinations in the cabinet diagnosis to select a date range for which you request the history of the examinations. After you click "**Generate reports**" you will see a report on examinations that have been produced in your cabinet of diagnostics for specified time period.

## 10. Deposit Funds

### 10.1 Section appointment

You can fund your account in ecg4me.com various methods. The section "Make deposit" is designed to recharge your account ecg4me.com.

### 10.2 Deposit by credit card Visa, MasterCard

To recharge your account in the system ecg4me.com with a credit card to perform the following tasks:

1. Open section "Make deposit".
2. Enter the amount of deposit in the field "Pay".
3. Choose a payment type "Payment system (Visa, MasterCard and others)".

Add money to your account	
Pay	1000
Payment type	<input type="radio"/> Payment terminals <input type="radio"/> Bank receipt <input type="radio"/> Prepaid card <input checked="" type="radio"/> Payment system (Visa, Mastercard, Webmoney and others)
<b>Create bill</b>	

Fig. 43. Deposit by the payment system

4. Press the "Create bill". After clicking this button you will be redirected to the payment system with a secure interface to make a payment.
5. Select a payment method "bank card" and enter your e-mail and click "Continue".

Payment from credit card  
You should pay

1000.00 rubles



alinnik@mks.ru



NEXT

Fig. 44. Selecting payment method.

6. Enter the card number, card expiry date, cardholder's name in Latin letters, the code CVV2/CVC2 and click "Pay".

**Enter credit card data**  

Card number:

Date of expire:

Owner:

CVV2/CVC2:

Рис. 45. Enter your credit card information.

7. The payment system will process the transfer of money, and you will be redirected to his private site area of ecg4me.com after a while.

### 10.3 Deposit by prepaid card

The card for primary activation of the account is in a sale set ecg4me.com. Card data for subsequent deposit can be acquired at partners of distributors of cards and at office of sales ecg4me.com.

To recharge your account in the system ecg4me.com by prepaid card to perform the following tasks:

1. Open section "**Make deposit**".
2. Choose a payment type "**Prepaid card**".
3. Your PIN code card, which is located at your blanket. The protective layer should erase it, to see the PIN code.

Add money to your account				
PIN code	12234	- 35544	- 23432	- 12662
Payment type	<input type="radio"/> Payment terminals <input type="radio"/> Bank receipt <input checked="" type="radio"/> Prepaid card <input type="radio"/> Payment system (Visa, Mastercard, Webmoney and others)			
<b>Activate card</b>				

**Fig. 46. Deposit by prepaid card.**

4. Click "Activate card".
5. Money from a card will be will be automatically transferred to your account in system ecg4me.com.

### 10.4 Deposit by Sberbank of Russia receipt

This scheme allows us to write ourselves receipt and to pay this receipt in the bank. Bank payment usually occurs during the one to five days.

To recharge your account in the system ecg4me.com by bank receipt to perform the following tasks:

1. Open section "**Make deposit**".
2. Enter the amount of deposit in the field "**Pay**".
3. Choose a payment type "**Bank receipt**".
4. Click "Create bill".



Add money to your account	
Pay	1000
Payment type	<input type="radio"/> Payment terminals <input checked="" type="radio"/> Bank receipt <input type="radio"/> Prepaid card <input type="radio"/> Payment system (Visa, Mastercard, Webmoney and others)
<a href="#">Create bill</a>	

**Fig. 47. Deposit by bank receipt.**

- You will be redirected to the next page.

Bill information	
<b>Bill is successfully created!</b>	
Account Number	194
Create date	04.10.2011
Pay, rub.	1000
Method of payment	квитанция Сбербанка
<a href="#">Download receipt</a>	
If you don't pay the bill during 15 days, the bill will be annuled.	

- Click the link "download receipt". Receipt opens.
- Print receipt on a printer.
- You should enter your address in the receipt and deliver the signature.
- Cash receipt at the nearest branch of Sberbank of Russia.


### 10.5 Deposit by a payment terminals

To replenish the account in system ecg4me.com it is possible through terminals of payment system QIWI. Several thousands of terminals located throughout Russia. To replenish your account through the terminals, you must first set ourselves an account in the ecg4me.com, then find the nearest terminal, and entering your phone number, which is specified in your account to make ecg4me.com deposit.

## 11. Typical problem situations when using the service


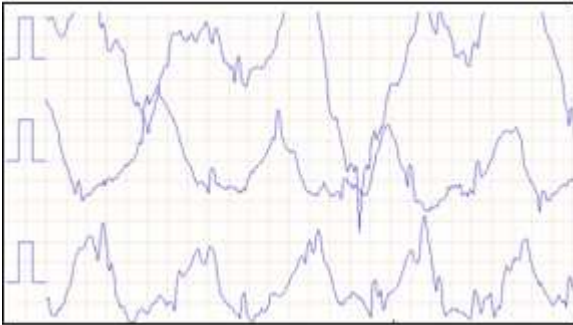
### 11.1 ECG input

№	Problem description	Recommendations
1	<p>By button pressing <b>&lt;Examine your heart&gt;</b> at the top of the input window there is a report that "Cardiovisor" is not connected to USB-port.</p>	<p>The possible reasons:</p> <ul style="list-style-type: none"> <li>• Cardioamplifier is not connected to the USB-port.</li> <li>• USB-connection is made, but the connection done the wrong jack, which carried out the first initialization the cardioamplifier on this computer. On some computer models, it is possible that the operating system can not automatically apply to the driver of cardioamplifier with this USB-port. You have not paid attention to a systemic window with a sentence to install the driver probably. In this situation, or return to the original USB-port, or, once again pulling out and inserting the USB-connector, initialize the cardioamplifier for the new USB-port, following the request of the Hardware Wizard.</li> </ul> <p>If the defect does not disappear - you can contact support by reference phone presented on the home page.</p>
2	<p>Input does not start by button pressing <b>&lt;Examine your heart&gt;</b>, and at the top of the input window there is a report stating that the electrodes are not connected or not wetted by the spray / gel for ECG or by water.</p>	<p>Must again:</p> <ul style="list-style-type: none"> <li>• check the correctness electrode application on the finiteness.</li> <li>• make sure that all 4 leads from cardioamplifier connected with the right electrode, and all the terminals on connectors of the electrodes are twisted all the way.</li> <li>• moisten the contact surfaces of all electrodes.</li> </ul> <p>If the defect does not disappear - you can contact support by reference phone presented on the home page.</p>

№	Problem description	Recommendations
3	<p>The noise track in the input field is more than 4 mm in millimetric substrate, or isoline has sharp oscillation on all field of a squared paper</p> 	<p>The main reason for these phenomena may be:</p> <ul style="list-style-type: none"> <li>• Poor contact of one or more electrodes.</li> <li>• Network electrical interference, caused by a wire passing near ~ 220 V, or uninterruptible power supply computer, close allocated to the cardioamplifier or a body of the client, or the proximity of any other household device, a source of electromagnetic interference.</li> <li>• Unsuccessful pose or nervous tension at input of ECG which causes a reflex tremor of muscles.</li> </ul> <p>The first reason is eliminated moistening the electrodes and twisting until it stops the contact terminals of the electrodes.</p> <p>To eliminate the second reason, take all measures for the location of the cardioamplifier from potential interference sources on distance not less than 1.5 m.</p> <p>If it is impossible to eliminate large oscillation of isolines by pose changing pose, try to input ECG from a prone position (and there must be an assistant, who clicks start button procedure). <i>In the latter case, remember that any subsequent examination of the client also should be performed only in this position, because ECG may be dependent on body position. This mark about the specified singularity it is expedient to import in the field "Comment" in data processing.</i></p>

### 11.2 Conclusion analysis

№	Problem description	Recommendations
1	<p>In the serial surveys executable successively, the increased oscillations of main index "MYOCARDIUM" are watched (additional increase in the index more than 4% but less than 15%), for example:</p> <ul style="list-style-type: none"> <li>• 1-e examination – 15%,</li> <li>• 2-e examination - 20% ,</li> <li>• 3-e examination – 17%,</li> <li>• 4-e examination – 15%.</li> </ul>	<p>This is a sign of increased instability in the electrophysiological parameters of myocardium. The main index "Myocardium" in a state of physiological norm may naturally oscillate in the range of 1 ... 3%. Similarly, the main index may have a large value in the presence of pathology, but to be stable under these boundaries 1 ... 3% in properly selected drug therapy.</p> <p>If the oscillations of the main index increased, namely the increase in the index make additional 5 ... 14%, this indicates the presence of causes leading to the heterogeneity of the myocardium electrical excitation process in successive cycles. These oscillations may not have clinical significance, for example, may be transient, or may be due to abnormalities of the skin at points electrode application. In other cases, such oscillations can accompany processes of negative dynamics of a myocardium, for example at slow rise of average value of main index "Myocardium". Presence of such enlarged oscillations always is the additional factor of presence of deviations. If, in the "peak" of oscillations absolute numbers main index higher than 24% - useful to consult a doctor advisor.</p>

№	Problem description	Recommendations
2	<p>The server returns the report: <b>“Error at conclusion formation”</b>. In the "Examinations table", there is a new record that does not include conclusions, i.e. the positions <b>"Myocardium"</b>, <b>"Rhythm"</b> and <b>"Pulse"</b> - empty.</p>	<p>The possible reasons:</p> <ul style="list-style-type: none"> <li>• Contact has worsened or was completely disturbed on one of electrodes in the course of input. This situation can be detected through viewing the ECG by buttons <b>&lt;I&gt;</b> and <b>&lt;III&gt;</b>. Others ECG lead can not view. An example of disconnecting the electrode during removal is shown in the following figure:</li> </ul>  <ul style="list-style-type: none"> <li>• isoline experience significant oscillations, for example, as shown in Figure:</li> </ul>  <ul style="list-style-type: none"> <li>• During ECG input there was an electromagnetic noise in the form of impulse of the big amplitude (for example, at performance near to repair work with electric welding usage).</li> </ul> <p>In all these cases, the reason can be identified by viewing of lead <b>&lt;I&gt;</b> or <b>&lt;III&gt;</b> in an appropriate row of the examinations table. If explicit defects of ECG it is not identified, and the server returns an error message - you should contact support service.</p>

№	Problem description	Recommendations
3	<p>In the beginning of the text inference before a heading "GENERAL CONCLUSION" of low-amplitude alternations or difficult situation of electrical axis of heart is formed. The user is informed that <b>the conclusion may have reduced reliability.</b></p>	<p>This report is <b>the standard information</b> that in the course of microalternations registration device "Cardiovisor" worked to limit the technical possibilities. In this situation the error of measurement of microalternations amplitude is increased, and accordingly, and therefore decreases the reliability of conclusions.</p> <p>At appearance of this report it is necessary to remember that value of main index a myocardium can be uprated on 7 ... 10 %. In the case of the stable repetition of this situation and the high values of main index "Myocardium" (more than 25 ... 30%) consult a doctor-advisor is advisable.</p>
4	<p>In serial examinations which are fulfilled successively, the larger oscillations of the main index "MYOCARDIUM" are occasionally observed (In addition more than 15 %), for example:</p> <ul style="list-style-type: none"> <li>• 1-e examination – 43%,</li> <li>• 2-e examination - 16%,</li> <li>• 3-e examination – 19%,</li> <li>• 4-e examination – 17%.</li> </ul> <p>In the first survey the saltus over a stable background 16 ... 19 % is explicitly observed.</p>	<p>If the oscillations of the main index "Myocardium" in examinations which are fulfilled successively, have "saltuses" value 15 ... 20 % and more, this is evidence that technical possibilities of the device "Cardiovisor" are exceeded. This situation is relatively rare and may occur at the expressed position of the heart features in the chest (for example, with a significant deviation apex back). By repeating such a situation, in examinations,</p> <ul style="list-style-type: none"> <li>• first, it is expedient to receive consultation of the doctor since it anyway a situation of deviations, and is necessary to estimate their clinical significance.</li> <li>• second, you can try to eliminate this factor by clicking on the ECG input in the prone position (and you need an assistant).</li> </ul> <p>In rare instances, if you do not manage to eliminate this problem, you can refuse the given service, or to use it only for monitoring of slow tendencies, which described saltuses influence slightly.</p>

№	Problem description	Recommendations
5	<p>In serial examinations which are fulfilled successively, the larger oscillations of the index G9 (The second graph on top in &lt;Dynamic&gt; section). For example,</p> <ul style="list-style-type: none"> <li>• 1-e examination - G9=3,</li> <li>• 2-e examination - G9=14,</li> <li>• 3-e examination - G9=16,</li> <li>• 4-e examination - G9=0.</li> </ul>	<p>If oscillations of index G9 are observed, it is a sign of particular transient processes in a myocardium, caused by compensatory responses. First of all, you need to pay attention to the value of the index G3, G4, G7.</p> <ul style="list-style-type: none"> <li>• In case of presence of deviations in these groups, oscillations of index G9 is a sign of possible early stages of pathological changes. This case demands mandatory consultation from the cardiologist.</li> <li>• In case there are no deviations in G3, G4, G7, or they are insignificant, it is appropriate follow the dynamics of the oscillations (provided the main index "Myocardium" is not in the "red zone" above 23 %). If the amplitude oscillations of G9 on the graph &lt;Dynamic&gt; decreases in due course it's evidence of transient changes. It is possible to try to analyze, what events of last time could lead to such compensatory response of a myocardium. If the tendency on decrease of oscillations G9 is not present, especially, if these oscillations are accompanied by slow augmentation of main index "Myocardium" - it is necessary to consult a cardiologist. It is necessary to consider that in the absence of significant deviations in groups G3, G4, G7, oscillations G9 can trace changes in hormonal background. In such situation the doctor-advisor can make the decision on necessity of examination at the endocrinologist.</li> </ul>

## Annex 1: Basic concepts and terminology used.

- **Doctor** – it is registered expert cardiologist performing medical support for the online service [ecg4me.com](http://ecg4me.com).
- **Gallery of portraits** – it is the sequence of the dispersion portraits in time, presented in one window for monitoring of rate and expression of changes.
- **Dispersion indexes** – these are total numerical estimations of ECG microalternations which are formed in a window of results for the user.
- **Dynamics** – it is the graphs of the variation 4 main dispersion indexes in time to observe the rate of growth abnormalities.
- **Dispersion heart portrait** – Computer model of dispersing characteristics of the heart, showing expression and locating of deviations of these characteristics from of norm on 2nd auricles and 2nd ventricles of man's heart. Color of appropriate areas of a portrait also correspond to a traditional scale "traffic light": green - NORM, yellow and its shades - the DEVIATION, red - the EXPRESSED DEVIATION.
- **Conclusion** – it is the text information which contains results of measuring the amplitude of ECG microalternations. This information contains recommendations for the client service and some general information about the electrophysiological nature of deviations, in addition to numeric values of the dispersion index.
- **CardioVisor** – it is device for fast measurement of ECG microalternations amplitude (so the button for a call of the given service in section <**Private site area**> is called). The device consists from cardioamplifier and the specialized software.
- **Cardioamplifier** – USB-prefix for the personal computer. Is it the hardware system "**CardioVisor**" and is designed for digital ECG input into the computer.
- **Client** – the registered user who has concluded the contract for provision of given service.
- **ECG microalternations** – microscopic oscillations of the ECG (electrocardiogram) signal. Simplistically, it is possible to present these microoscillations as "jitter" of line of ECG records. To see it by eyes, and, especially, visually to analyze line "jitter" it is impossible because of very small amplitude of microoscillations. To do this applies special processing of weak signals.
- **Personal site area** – personal section of general information about the site [ecg4me.com](http://ecg4me.com) client. This section also includes the start button for all basic functions of service.
- **Examination** – Procedure of ECG input for measurement of microalternations which includes applying of 4 electrodes and the subsequent ECG input during 30 sec.



- **Heart portrait** – same as “Dispersion heart portrait”.
- **Таблица обследований** – the main window of section <Cardiovisor> which contains ECG input and the automatic conclusion of all completed examinations.
- **Cabinet diagnosis** – It is a method of registering the client in system which allows to receive the complete medical conclusion by results of examination. The client - this is the doctor usually who examines his patients.
- **Individual person** – It is a method of registering the client in system which allows to receive the short simple conclusion after examination. The client - this is a person without medical education and examines himself and his family members independently.