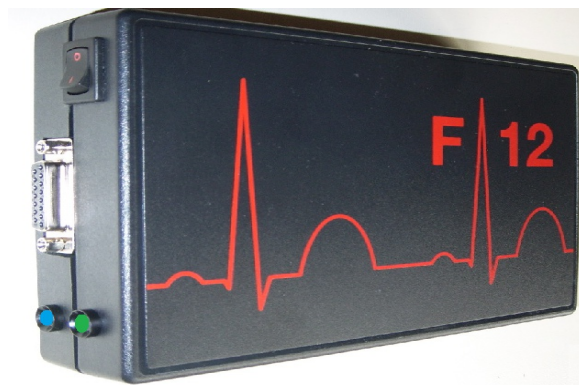


ECG device F12 BT: Manual



Edition for wireless ecg apparatus F12 with bluetooth connection

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Introduction

Using personal computers for registration and storage of medical signals like ECG gives enormous advantages :

- . Heavy duty, no mechanical parts inside.
- . Very easy to use.
- . Build-in database.
- . The PC filters and adjusts the signals .
- . High quality A4 output from trace and protocol, on various printers.
- . PDF output, protected by a password.
- . Possibility to send a trace with Email.
- . Saving and loading the signal.
- . Advanced automatic protocol with motivation.
- . Comparator engine,
protocol by means of comparing to previous recorded traces.
- . Build-in library of pathological traces.
- . Vector cardiograph
- . Possibility to add your personal conclusion.
- . Long term recording is possible with signal averaging.
- . Software for Windows 9x, mi, NT, 2000, XP,Vista,7, 8 and 10.
- . 32 and 64 bits software
- . Software for Android tablets and phones.
- . Integration with other software is possible.

The F12 BT has two connection possibilities, wireless and wired.

We sincerely hope that you will enjoy working with your ECG device F12 BT !

1- Technical specifications

1.1 Minimal Configuration for PC

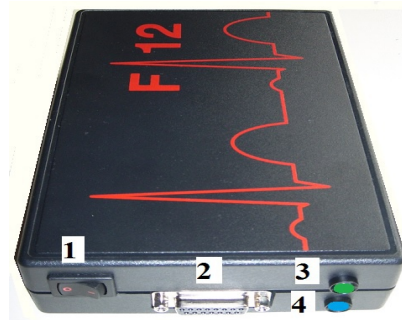
Your PC has to be equipped with Windows 98, 2000, Me, NT, XP, Vista, 7, 8 or 10. **32 bits and 64 bits** are both ok.

Processor speed has to be greater than 1200 MHz and have 1GB RAM. For the wired connection with the device a free USB connection is necessary.

2.1 Hardware

The external dimensions of the ecg apparatus F12 (1) are 18.5*12*4cm. On the outside of the device you can see:

- 1: On-Off switch.
- 2: Connector 15 pins female for connection with the patient cable.
- 3: LED. After turning ON, the LED is red for 1.5 seconds until recording becomes possible. The LED stays red when a new battery is necessary.
- 4: Blue LED flashes when the apparatus is not wired connected and is waiting for bluetooth recording. During recording the LED lits continuously.



Top and front view of F12 BT

Rear view of F12 BT :



- 1: Connector for wired connection to USB.
- 2: 9 Volt battery house. Left with thumbnail in the direction of the white arrow to eject the battery holder.
Observe the polarity + and – on replacement of the battery.
- 3: **Slide switch**. Default position is external in the direction of the white arrow. The other position may somewhat extend the bluetooth range, the same data are sent over twice. However not all PC's and Android Phones support this high data rate.

When to replace the 9 Volt battery ?

During recording the battery tension is displayed. The green LED on the frontpanel becomes red when the battery tension is less then 6.5 Volt. The apparatus functions normal until the battery tension is 5.5 Volt. A 9 volt battery is then completely exhausted.

Which 9 Volt batteries are ok ?

There are different possibilities:

- Not rechargeable lithium 9Volt batteries have the highest capacity, eg 1200 ma
- Leakproof alkaline batteries. Capacity is about 550 ma
- Rechargeable NiMh batteries. Capacity up to 250 ma
- Rechargeable Lithium batteries are ok, capacity eg 800 ma, but still expensif.

Please use only leakfree batteries.

Also NiCd rechargeables and Zinc Oxyde are not very good.

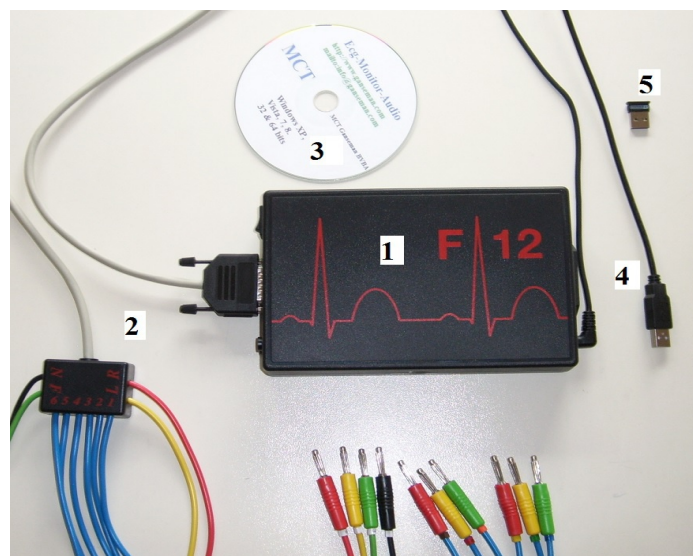
Transport and Storage

The device has to be transported and stored under the following conditions:

- . Temperature : -10 . tot +60 degrees Celsius.
- . Humidity : 20% tot 90% .
- . Air Pressure : until 8000m height
- . It is forbidden to use the device in the presence of explosive or corrosive gasses.

Default accessories of F12 BT (1)

- . Patient cable with ten leads. (2)
- . Software on CD-ROM.(3)
- . Cable 2.9 meters (4) for connection to PC or Android device. **This cable may not be connected during the wireless bluetooth connection.**
- . Mini bluetooth dongle(5).
- . Manual.



Options

USB **OTG** cable makes wired connection to Android with OTG host possibility



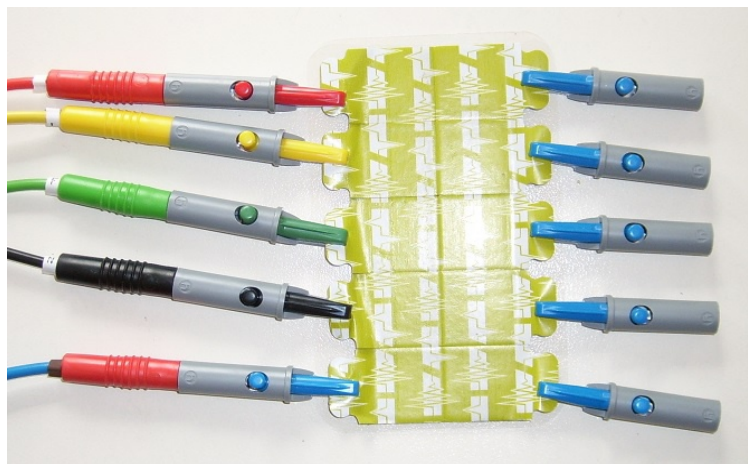
possible

Options - electrodes for ecg recording:

A A set with 4 clamp and 6 suction electrodes



B A set with 10 adapters 4 mm banana plug to croco clamp. It's possible to use inexpensive flat tab electrodes.



Technical information and security

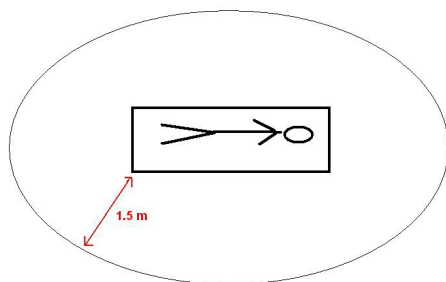
- . The apparatus is **CE and EMC** certificated.
 - . Floating patient circuit, isolation barrier between the patient and the PC of more than 10.000 Volt.
 - . Patient leakage current less then 10 micro ampere, less than 50 micro ampere under single fault condition.
 - . Input resistance more than 100 mega ohm.
 - . Frequency response : 0.05 Hertz at 105 Hertz -3 dB
 - . Time constant more then 3.2 seconds.
 - . 12 bits vertical resolution.
 - . Sampling rate: 600 samples / second.
 - . Power consumption is 35 ma wired and 60 ma wireless.
- A good alkaline battery provides power for up to 6 hours of wireless operation and up to 10 hours wired. The use of a high capacity rechargeable NiMH battery is allowed.

The device must not be used in direct cordial contact e.g. when a cardiac operation is being performed.

The apparatus is not internally protected against de-fibrillation. If necessary we can provide a patient cable with build in protection against de-fibrillation.

Safety precautions

The device has been certificated with the CE label. Your PC must also have a CE certification. The computer and other grounded electric devices have to be place at least 1.5 m from the patient. The doctor may not touch PC and patient at the same moment.



Safety distance between patient and PC

User requirements:

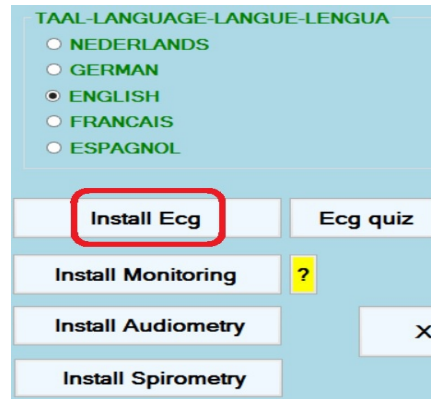
A minimal knowledge of the Ecg signal and PC or Android is already a good starting point.

2 Installation

2.1 Software installation

The software is delivered on a CD-ROM.

Installation works for **32 bits** and **64 bits** and even for a Mac with PC emulation. After insertion of the CD allow 'Install' to execute and select 'English'.



The proposed installation directory is C:\EcgF12. It is possible to install in another directory with 'Browse'. Then click always 'Next' for installation.

The pathological ECG traces are installed in C:\Ecgbibnew.

The configuration is in C:\EcgF12\EcgConfig.xml.

The configuration of the protocol in C:\EcgF12\EcgProtocol.xml.

If the installation program seems to stop, don't worry, wait a little bit and the installation will be ready anyway.

Keep the CDROM as backup in a safe place.

The software and the library of pathological Ecg traces can be distributed freely.

Visit from time to time <http://www.ganseman.com> to download the most recent version

Launch the software

By means of Start – EcgF12\Ecg.exe

From Windows explorer C:\EcgF12\Ecg.exe.

Copy a short cut to a desktop location.

Delete the software

By means of Start-EcgF12-Uninstall it is possible to uninstall the software.

It is not necessary to uninstall the program for installation of a newer version

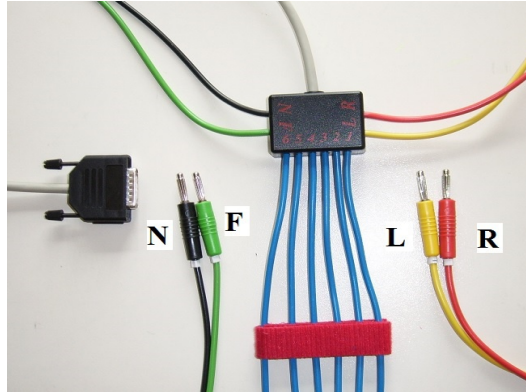
Backup C:\Ecgbibnew en C:\EcgF12 on a regular basis.

2.2 Hardware installation

It's not necessary to turn off the PC.

On the picture you see an example for storage of the patient cable.

Leave the electrodes on the patient cable.



Installation of the wired connection.

For the first time use, it is a good idea to do at first a wired recording without patient. The connection cable contains an usb serial converter.

The ecg software has to be installed first, the driver for the converter is then already installed.

Plug then the cable in a free USB port and wait.

Windows will give a message when the installation is ready. The first time this can take several minutes : Windows tries to find the most recent driver on the web.

With Start – Configuration - System - Hardware – Ports the comport number becomes visible. This is always a number higher then 2 and less then 255.

On page 13 you will find the explanation how to select the right comportnumber in the setup of ecg.exe

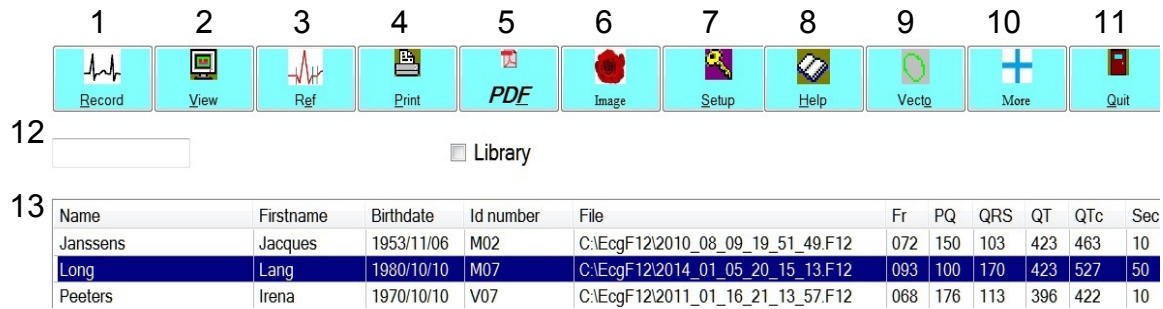
Should you ever use the wired connection ?

The cable can serve for the following purposes:

- . After a new installation.
- . When the battery is nearly exhausted. Without bluetooth, the apparatus consumes less power and it is likely that you can use it a few recordings more.
- . Errors during recording. You can detect whether or not these errors are due to the wireless connection.
- . In an environment where wireless 2.4 Ghz waves are prohibited.

3 Main menu

After launching C:\EcgF12\Ecg.exe the main menu appears:



Most options are easy to understand.

New record. (1)

View of trace and protocol.(2)

Reference points.(3)

Print (4)

PDF (5)

Image (6)

Setup. (7) **Do this once before first recording !**

Help. (8)

Vectocardiography (9)

More (10) other options.

Quit (11)

Select 'Library' to view the traces in the library.

Grid (13) containing from left to right

- Name
- First name
- Date of birth. Birth year comes first so that the patients can be ranged by their age
- ID number
- Path name and file name
- Frequency
- PQ time
- QRS time
- QT time
- QTc time
- Sec : time in seconds of a recording. For ecg this is 10. For longtime recordings, a multiple of 10.

Important remark

All data in the grid can be sorted by simply clicking above them.

The first click sorts the data ascending. Clicking once more sorts them descending.

When the same patient has several recordings and the user clicks on 'File' the recordings become sorted by the time of the recording.

Select a patient

Just under the icons is an edit box. **(12)**

It serves to search a patient by means of his name or part of it.

Click in the box.

Enter at least three letters or digits of the name or first name or birth year or Id.

Press enter and the up or down arrow keys until the cursor is positioned on the right patient and record. Pressing enter once more shows the trace.

Also by double clicking on a selected ECG or the 'View' icon above, you can display it.

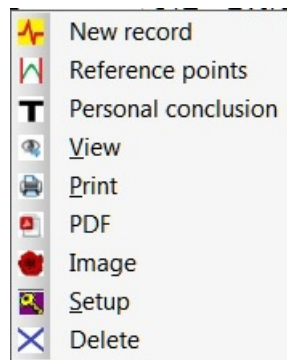
Delete a selected trace.

Press the 'Del' key.

Attention: Deleted is deleted !

Short cut menu.

By pressing the **right mouse button** on the grid you can select also the most important actions:



Remark for users of a previous version:

When some traces with the old *.ecg format are present in the selected directory, a menuitem 'Convert' becomes visible in the "More" submenu.

A click on 'Convert' converts the old *.ecg traces to the new *.F12 format.

After conversion, select to delete the old *.ecg files.

By doing this, there will not be multiple copies of the same records.

4 - Setup

Before starting a new record, execute 'Setup' . You see the following screen.



Please select the correct options

Language (1).

Serial port - Comport (2) !

Comport selection and wired USB connection :

Connect the USB-serial converter to the PC and turn the ecg apparatus **on**.
Wait until Windows has finished the installation of the usb-serial drivers.

You find the correct number if you click **twice** on the down-arrow, with and without the USB converter connected to the PC.

Without selection of the right comport number, recording is not possible !
If recording works properly, then don't change this setting, except if you have moved to another PC.

If you select the wrong port, recording will not be possible.
However this cannot damage your apparatus or PC.

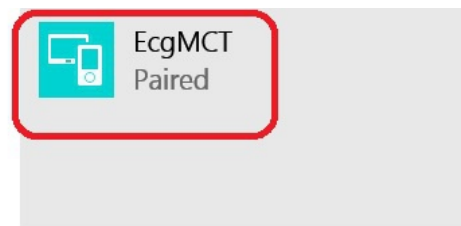
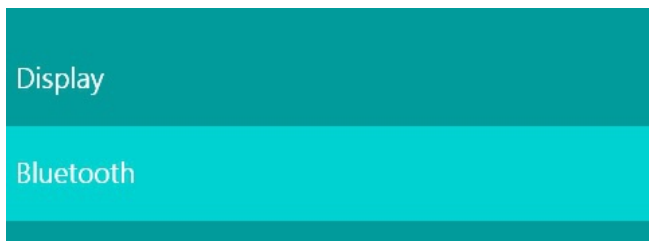
Please, write down the correct comportnumber, so that you will find this number if you need it.

Comport selection and wireless bluetooth connection :

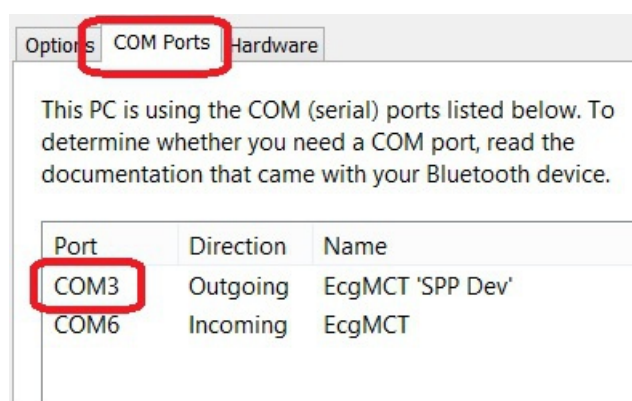
Below on taskbar you will find the bluetooth icon (red circle below)
If this icon is not visible, unplug and plug the usb bluetooth dongle.



Verify that ecg apparatus and usb dongle are located near each other and select then “Show Bluetooth Devices”



After waiting some time, “EcgMCT” will be displayed. Click it to pair. Windows 7, 8, 10 will sometimes ask the paircode (1234)
Click then again the bottom bluetooth icon - > Open settings and tab “Com ports”



In case above the outgoing comportnumber is Com3. In the setup of “Ecg.exe” select the same outgoing comportnumber.

Please, write down the correct outgoing comportnumber, so that you will find this number if you need it.

Setup - Dir. (4)

Work directory. This directory may differ from the installation directory. It is the directory where the program operates, stores and retrieves recordings. A shared directory on a server is also possible like e.g. `//Servername/Ecg2017` (/ instead of \ !)
At right a drop down-arrow and two buttons are visible.

With the '+' (5) button the user can add up to 12 directories to a list.
With the '-' (6) button the user can delete a directory from the list. The directory itself is not removed from the hard disk.
With the drop down-arrow switching between the different directories of the list is easy.

Setup – hints (7) Setup – Protocol (8) and Setup comparator (9)

Those three items are not intended for the beginning user.
An explication of them is located in the file `Addenda_EN_Ecg.pdf`.
Addenda_EN_Ecg.pdf is located on our site – software and in the CD-Rom in directory `\Manual\English Ecg`.

Setup – users (10)



Multi user

Up to ten different users can added.
When the ecg program is launched, the user has to click on his name.
Afterwards, when a new recording has been done, this name will be printed together with the record. Also the other users can see who performed a particular ecg.

Solo user

Replace only the first line by your name.
Leave 'User2' in place : the screen for selection of the user will not be shown when the ecg program is launched.

Setup – Screen (11)

Different PC's can have different screen resolutions.

When the grid on the screen is not a square but rather rectangular, it can be adjusted with this option. Adjust first the separation between trace and protocol.

With setup – Screen – Extra following options are shown.

Extra setup

- Display battery voltage during recording.(wireless apparatus)
- Message on quitting after new recording, when apparatus is still turned on
- Show the screen with the reference points after each ecg recording
- Statuslabel in the viewscreen visible

If you are a user that will not forget to turn the apparatus off, uncheck the second message “Message on quitting after new recording,.. “
By doing so, quitting the program takes about 2 seconds less..

Setup – Interface (12)

None means that the software is launched standalone.

The other three possibilities are for users that launch the ecg program from other software, so that there is no need to enter the name, firstname and birthdate in the ecg program again.

The file \Addenda_EN_Ecg.pdf contains the explication about integration.

Setup – Ok (13) or Setup – Cancel (14)

Quits the setup with or without saving of the settings in \EcgConfig.xml.

5 - Recording

Put the patient on a comfortable examination table. Apply gel or cream on the electrodes. Turn the apparatus ON. The LED should glow GREEN.

The screenshot shows a software window titled "Patient" with the following fields and controls:

- Previous
- Clear
- Name: Smith
- Firstname: John
- Birthdate: 20 08 1951 (mm dd yyyy)
- Id number: M123456
- Sexe (M or F): M F
- OK
- Cancel

Enter name, first name , birth date and ID number.

M (male) or F (female)

A four digit birth year is mandatory: it's possible to sort patients by age.

Previous:

Enters the data of the previous patient.

Is handy for successive recordings on the same patient.

Clear:

Clears all the data.

Verify that the patient cable is attached properly, that the ecg apparatus is ON and the correct comportnumber in the setup is still selected.

Click then on OK.

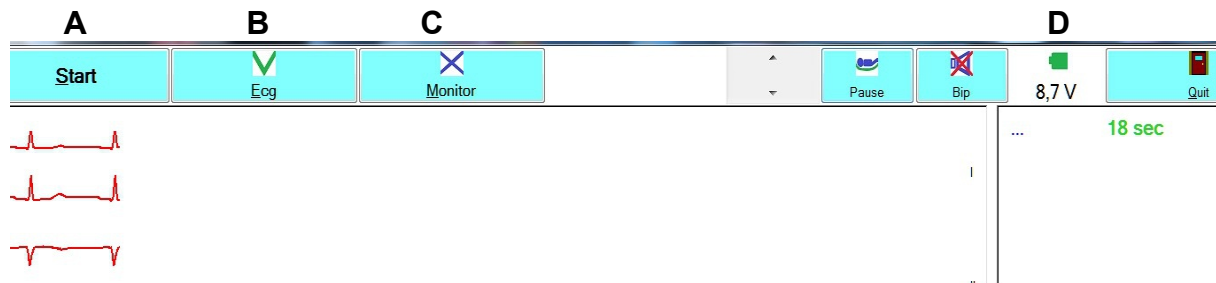
Ecg recording of 10 sec.

Ecg (button **B**) is selected by default.

A small part of the ECG is displayed on screen at left.

Wait until lead I,II and the 6 precordial leads are stable.

If a precordial lead is missing, attach the electrode again.



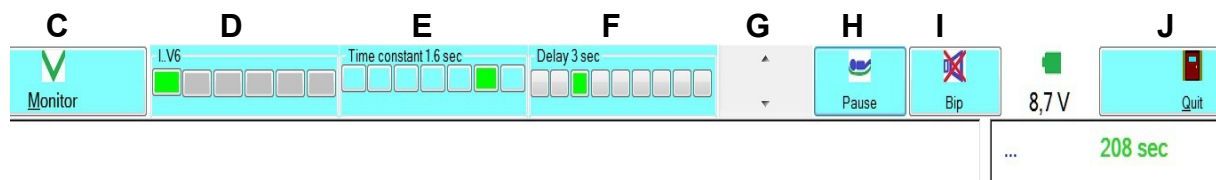
Click then button **A – Start** and the recording will be finished after 10 seconds.

Keep an eye on the average tension of the battery in **D**.

Monitoring – longtime recordings.

Click button **C “Monitor”** to activate the monitoring.

Some extra options become visible.



Selection of the leads that will be displayed is possible (**D**).

With (**E**) a shorter timeconstant then 3.2 seconds is possible.

The shorter the timeconstant, the quicker the signal returns to the baseline..

Selection of a shorter timeconstant then 3.2 seconds permits even stress test,

cfr file Addenda_EnEcg.pdf

F becomes only visible when a shorter timeconstant then 3.2 seconds is selected.

The recording is then displayed not only realtime but also with the selected time constant and delay.

G adjusts amplitude of signals

H pause permits reattachment of an electrode.

I Bip on or off

At right of the screen, the average signals, cardiac frequency and elapsed time in seconds are displayed.

Button (**J**) quits longtime recording.

Making a test record is always possible without patient !

Flat and disturbed horizontal lines are recorded. But, if the signal is recorded in exactly 10 seconds, the apparatus will work fine with a patient.

Quality losing after some time of using the ECG apparatus:

Oxidation of the electrodes and connectors. Clean them after each recording.

Important :

Don't forget to **turn off** your apparatus after recording.

Some hints for a quality recording

- . Move the examination table as far as possible away from electromagnetic disturbances like your PC, electric leads, TL lights.
- . Keep the examination room warm.
- . Make sure the examination table is comfortable and large enough.
- . Be calm and relax the patient. Stay also calm yourself.
Nervous doctors make bad recordings.
- . *If the patient his upper arms are small enough, put the electrodes clamps there.*
- . Dress the patient cable along his body.
- . Use conductive gel or spray.
- . Remove some hair from the chest if necessary.
- . Feel for fastening the screws of the pre cordial electrodes.
- . After putting the F12 ON and applying the cable, it takes about one minute to stabilize the resistance between electrodes and skin surface.
- . Ask the patient not to speak during recording.
- . Don't forget to clean your electrodes after each recording.

Location of the electrodes

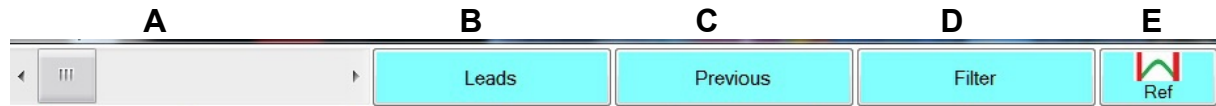
Red right upper arm
 Yellow left upper arm
 Green left leg
 Black right leg
 V1 fourth intercostal space right
 V2 fourth intercostal space left
 V3 between V2 and V4
 V4 middle clavicle line
 V5 first axillary line
 V6 middle axillary line

We use for the pre cordial leads red, yellow and green(like the peripheral leads).

V1 and V4:red ,
 V2 and V5: yellow,
 V3 and V6 green.

6 View trace and protocol.

Menu of the view screen – left part.



A Positioning on long or short time recordings. The position is displayed in the title bar.

B Leads shows a submenu

Leads	
I .. V6 I .. AVF V1 .. V6 <hr/> TEST <hr/> Average complexes ST segments	<p>5 seconds of all 12 leads.</p> <p>10 seconds of the 6 peripheral leads.</p> <p>10 seconds of the 6 precordial leads.</p> <p>Testsignal</p> <p>Average complexes: sum of 4 best complexes out of 10 sec</p> <p>ST segments from recordings up to 40 minutes.</p> <p>On a recording of 10 seconds, a single point is displayed.</p>

C Previous : the actual and the previous Ecg are displayed together.

D Filter: 4 possibilities. Off – 0.005 – 105 Hertz -3dB SRL

Off Low pass software filter Low pass and high pass Low pass and high pass	Filter
	Filter off 0.005-105 Hertz -3dB SRL 0.016-105 Hertz -3dB SRL 0.016-40 Hertz -3dB

The selected filter is displayed *left below* of the screen.

Only the 0.016 – 40 Hertz -3dB filter gives some attenuation of the QRS complexes.

More explication about the filters is in the file \Addenda_EN_Ecg.pdf

E Reference point – see next chapter.

Menu of the view screen – right part.

Move the separation line (*) between signals and text with the left mousebutton, so that the text at right is all readable.

B printing on A4 paper, **C** generates a Pdf file and **D** generates an image file. All three **B, C and D** make output of trace and protocol on A4 paper possible.

At left the 12 leads are displayed on startup:

Five seconds of every lead are displayed. *Pressing left mouse button on a lead results in a detailed view of that lead. Pressing right mouse button brings you again to the twelve leads view.*

At right are displayed name, firstname, birthdate and Idnumber

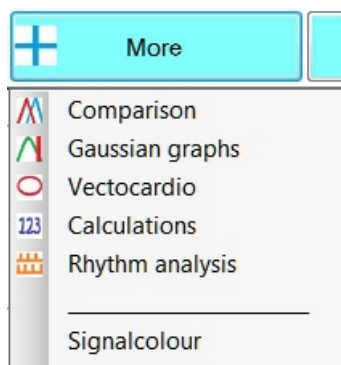
When there is an error on these data, secondary changes are here possible.

The important button **F Motive** is only visible when the tab **Conc** (conclusion) is selected. (red ellipsis above) . The “Motive” button will give you the motivation why or why not a particular diagnosis is proposed.

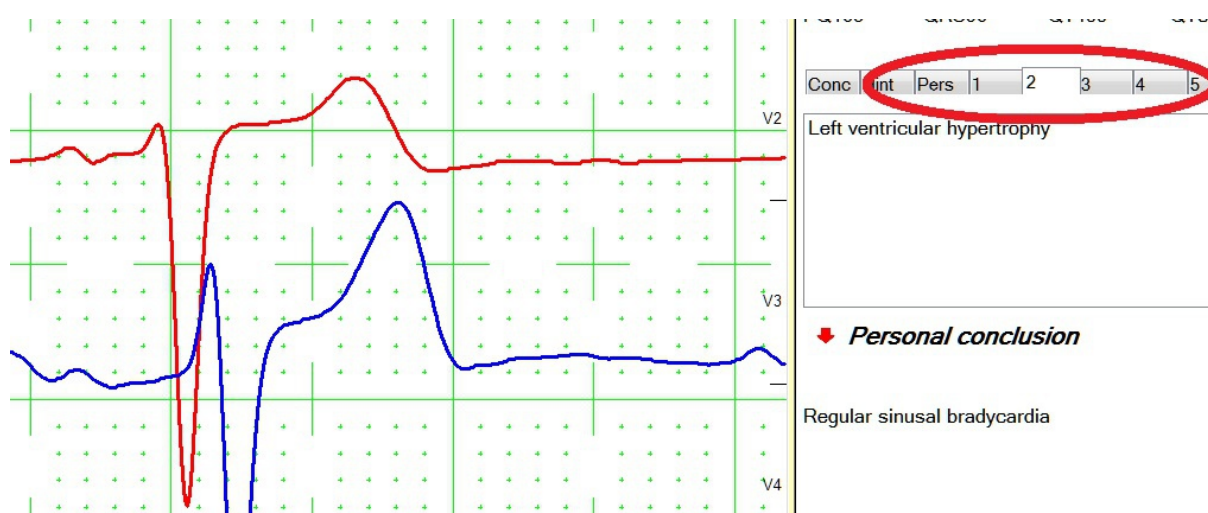
The red arrow left from “**Personal conclusion**” will add a proposed conclusion or hint to your personal conclusions.

“**G**” Cancel and “**H**” Save will quit this screen without or with saving of changes to personal conclusions or personal data.

Button E “More” of the view menu.



Comparison compares the actual recording to all recording in the library. The 10 most resembling one's are added to the tab in the red ellipsis below.



The red arrow left from 'Personal conclusion' makes adding of a conclusion to your personal conclusion possible.

Gaussian graphs : statistical analysis.

Vectocardiography

Calculations shows all the calculated values of PQRST in all leads.

Rhythm analysis

These are in dept explained in the file *\Addenda_EN_Ecg.pdf*

Other options of the button “More” are changes of colours of signal, grid and background.

Option “Extract” this is only visible on scrolling of a longtime recording.

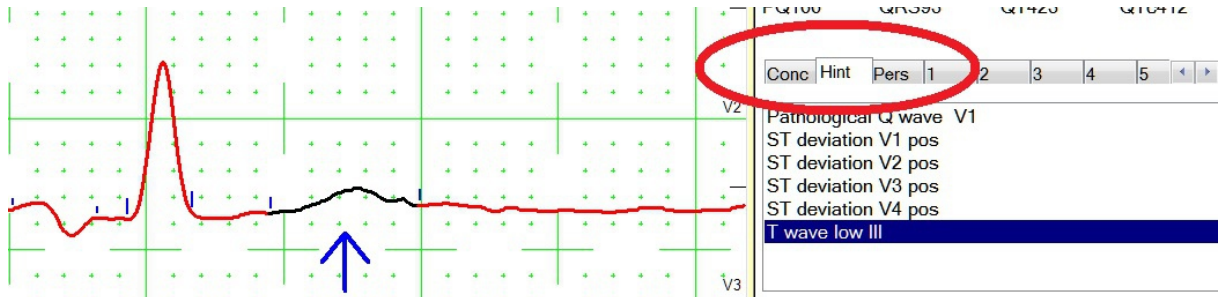
By means of it, you can extract one ore more relevant 10 sec recordings.

The original record occupies a lot of memory. (360kb / minute)

It's possible to delete it after the extraction of a number of 10 sec recordings.

Hints

Hints are suggestions of the PC. Everything that should be mentioned. Click on a hint: the corresponding lead is displayed at left. The concerned part is marked with an arrow.

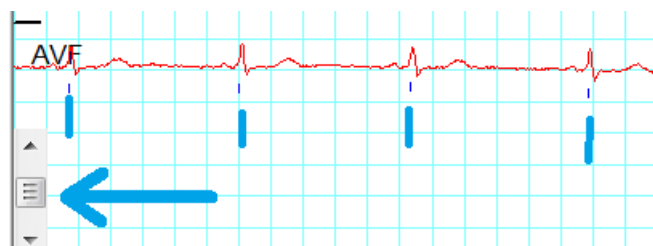


Pers contents of a file 'Personal.txt' .

This is an ASCII file that can be edited with a text writer to add your own desired personal conclusions in advance.

Remark – Automatic frequency calculation.

Below left is also a vertical scrollbar. It is shown only when the **full 10 seconds** are displayed. Every QRS complex is marked with a blue thin line. (and here also with a thicker blue line)



The frequency is only calculated exactly when every QRS complex is marked once. In exceptional case there will be to less or to much blue vertical lines. With the vertical scrollbar in the corner left below, it becomes possible to increase or decrease the blue lines, so that the calculation of the frequency will be ok. The advantage is that exact frequency determination is also possible on very high frequencies.

7 Reference points

Beginning and end of P wave (if present) , QRS complex and T wave are the so called reference points.

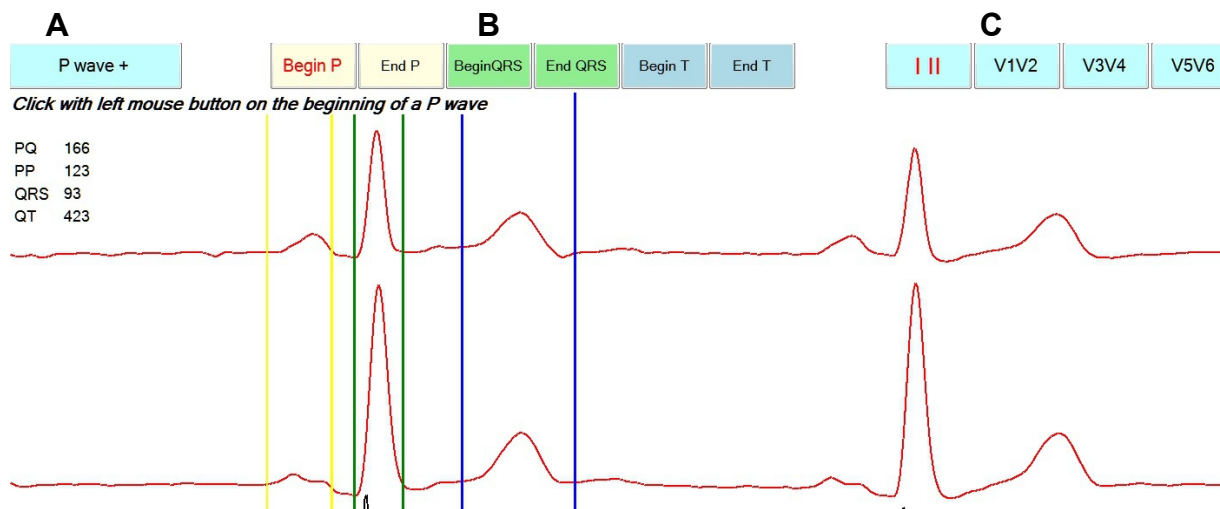
The software tries to calculate those points correctly. Failure of automatic interpretation software is largely due to incorrect placement of the reference points. All calculations in that case are wrong and the user does not even know why. Sometimes, this happens with our software too. However, in that case, manual placing of the reference points is possible.

If you agree with the automatic placing select then “Cancel”, right above.

If you don't agree, changing of the reference points is easy :

1. If a **P wave is present**: no action on button **A** is necessary.
2. Selection of the leads for adjustment (**C**). A P-wave can be more apparent in V1. Mostly lead I and II are ok for adjustment and no action on buttons **C** is necessary.
3. With the scrollbar below of the screen, scrolling to another PQRST complex is possible.

Mostly 1. 2. and 3. require no user action.

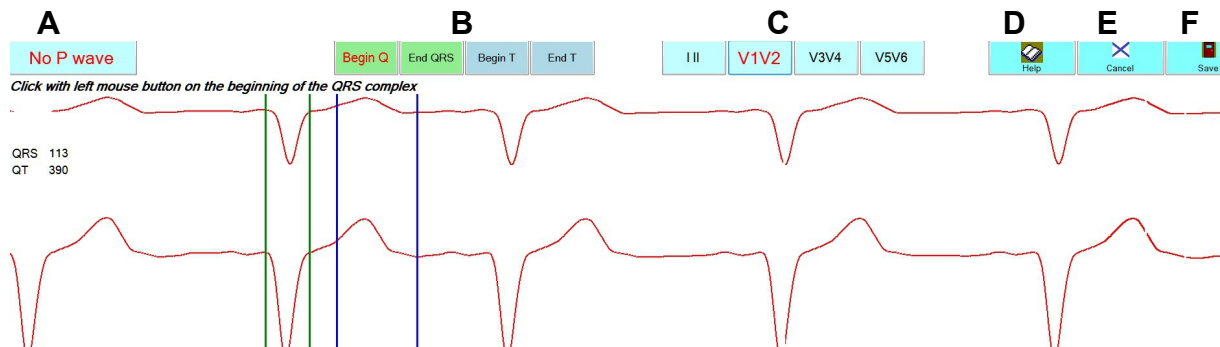


4. With the left mousebutton move in these order to the beginning and end of P wave, QRS complex and T wave and click once on them. Ready Select then at right above “Quit”

If you made an error during adjustment, with the aid of button **B**, it's possible to replace a single point.

In case of a **retrograde P wave**, start as usual by indication of the beginning of the P wave. The PQ time will then be calculated negative.

If no P wave is present, click once button **A**.
The placing of only 4 reference points is then necessary.



If you forget the explanation click button **D** "Help".

Below of screen the "Differential curv" is displayed.

This signal is made from all 12 leads and has no drift.
Be aware however that rather the flanks than the beginning of an inclination should be used.

Left below, selection of a different time of differentiation is possible.

If you take a large time, eg 45 ms, then the borders of a non enlarged QRS complex fall together with the tops of the differential curve.

For a T wave, even 100 ms differential could be used the same way.

However, for the P wave, a large differential time is not useful. Only a small one like eg 15 ms is practical.



In the left trace a differential value of 45 msec is used.

Beginning and end of QRS complex coincidence with the peaks of QRS complex.

8 Automatic protocol

Introduction

Some pathologies and even a normal ecg are not easy to describe in standard formulas. This is due to large individual variation of the ECG.
For rhythmic disturbances the situation is even worse.

For fully understanding an automatic protocol it is necessary to have a basic knowledge of the signal. Only then will the automatic protocol help you to arrive at the right conclusion.

The main advantages of the PC assisted protocol are:

Reference points.

Example: a retrograde P wave. The eyes of the physician are better than the most sophisticated algorithm for seeing something that they want to see.
The PC is better in calculating the correct distances.

Precision All distances are calculated with a precision up to 1 million.

Hints

Quite a lot of ecg's are borderline. They contain some possible abnormalities. These are displayed in a hint list. Clicking on them shows the corresponding pathology on screen.

User

The list on possible conclusions is limited. The user can always agree or not before placing a conclusion in it's own protocol.

Comparator engine

The PC gives the unique possibility to select the most resembling traces.
The user can take over their protocol.

CONC: Possible conclusions of the PC.

In the multi view screen: Click the CONC tab.

The most important diagnosis dependent of the content of the file EcgProtocol.xml in the installation. A limited listing is for the moment :

- . Right and left auricular hypertrophy.
- . Right and left ventricular hypertrophy.
- . Bundle Branch Block : incomplete and complete right bundle branch bloc, complete left bundle branch block, left anterior and left posterior hemi bloc.
- . Pre excitation: WPW type I and II
- . Anterior infarction: Pathological Q waves in 2 precordial leads.
- . Lateral infarction: Pathological Q waves in I and AVL.
- . Inferior infarction: Pathological Q waves in II or III and AVF.
- . Irregular or irregular rhythm
- . Auricular fibrillation
- . Regular tachycardia
- . Ventricular tachycardia

- . AV nodal tachycardia
- . Various:
 - . AV block degree I (PQ > 200 milliseconds)
 - . Peripheral microvoltage . No peripheral R wave > 5 mm
 - . Precordial microvoltage. No precordial R wave > 10 mm.
 - . Global microvoltage: Both of the above conditions are true.
 - . QTc prolonged - hypocalcemia ? QTc > 420 milliseconds.
 - . QT shortened - hypercalcemia ? QT < 320 milliseconds.

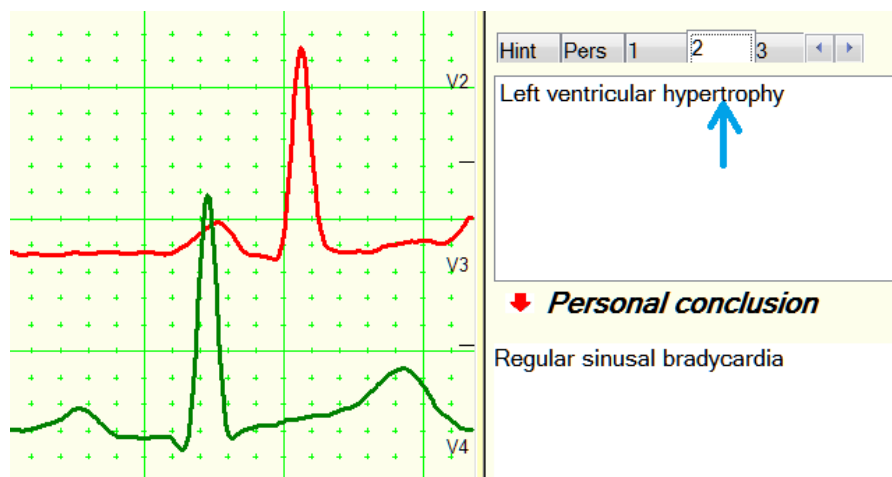
Every time you look at a protocol, the contents of it are written to the files Protocol.txt and Protocol.xml. This file can be captured and stored in other software.

HINTS – Suggestions of the PC.

In the multiview screen: Click the HINT tab.

Possible abnormalities are displayed. By clicking on a hint, the corresponding signal is displayed on the left side of the screen. It is also possible to add a hint to your own personal conclusion with the red arrow.

Comparison.



With the red arrow left from 'Personal conclusion' it is also possible to place a part of the conclusion in your personal conclusion when you agree with it.

Button “Motivation”

A	B	C	D	E	F
Click - select a pathology					
WPW type I	Frequency	Min	Max	Patient	Result
WPW type II	40	150	69	OK	
Complete left bundle branch block	P°	-180	360	45°	OK
Complete right bundle branch block	QRS°	-180	360	32°	OK
Incomplete right bundle branch block	T°	-180	360	49°	OK
Left anterior hemiblock	PP	0	120	90	OK
Left posterior hemiblock	PQ	10	119	220	NOT OK
AV Block first order	QRS	0	130	116	OK
Left atrial hypertrophy	QT	180	720	343	OK
Right atrial hypertrophy	QTc	180	720	367	OK
Left ventricular hypertrophy	% Ayrthmia	0	99	8	OK
Left ventricular hypertrophy	(R in V1-S in V1>0)				NOT OK
Right ventricular hypertrophy					
Hypocalcemie					
Hypercalcemie					
Hypopotassemia ? (low T waves)					
Acut anterior infarct					
Acut inferior infarctus					
Acut lateral infarctus					
Acut subendocardial infarctus					
Infarctus					

A: selection of a pathology.

B: properties and formulas

C and D : default minimum and maximum of the properties

E: values of the patient.

F: result of the patient. OK if between **C** and **D**.

More explication about button “Motive” and how to edit the different parameters is in the file “AddendaEcgEn.pdf”

Summary

For your own personal conclusion the software helps you in various ways:

- Proposal of one or different conclusions. The button “Motivation” will give you the reasons why or why not a particular diagnosis is proposed.
- The hints.
- Compare and possibility to take over the conclusion of the most resembling (P)QRST record.
- Possibility for adjustment of the reference points.

These possibilities results most often in a very good result.

When it comes to automatic rhythm analysis the results are not always ok. All automatic programs have the same weakness.

When it comes to retrograde P waves, oneven relation between P waves and QRS complexes, all automatic analysis fails.

With Button **More – Rhythm analysis** the advanced rhythm analysis is showed.

Advanced rhythm analysis.

The screenshot displays a software interface for advanced rhythm analysis, organized into five labeled sections (A-E):

- A**: Patient information (Pat 212, Freq 83, QRS 3%).
- B**: Selection criteria for Freq (>100, <60, All), QRS (<120, >120, All), and RR (Reg, Irreg, All). A dropdown menu is highlighted with a red circle, showing the text "P waves are located retrograde after the QRS complex".
- C**: Search results, currently showing "Antidromic atrioventricular reentry tachycardia AVRT". A "Show all" button is present.
- D**: A blue arrow button (=>) for transferring results.
- E**: Personal conclusion field, currently containing "AV nodal reentry tachycardy".

Below the interface, a red ECG trace is visible, showing a regular rhythm with narrow QRS complexes and retrograde P waves.

A Frequency beats/ minut. QRS width in ms and % of irregularity.
This are data obtained from the patient record

B 4 possibilities.

Frequency >100/minut <60/minut and all

Width of QRS complex in ms <120 ms >120 ms and all

RR distances: regular irregular and all

These 3 possibilities are selected as in **A**, but the user may change them.

Below is a combobox with all the possibilities for the P wave.

The user has to select one out of 11 possibilities for the P wave.

C All the possibilities as limited by **B** as shown.

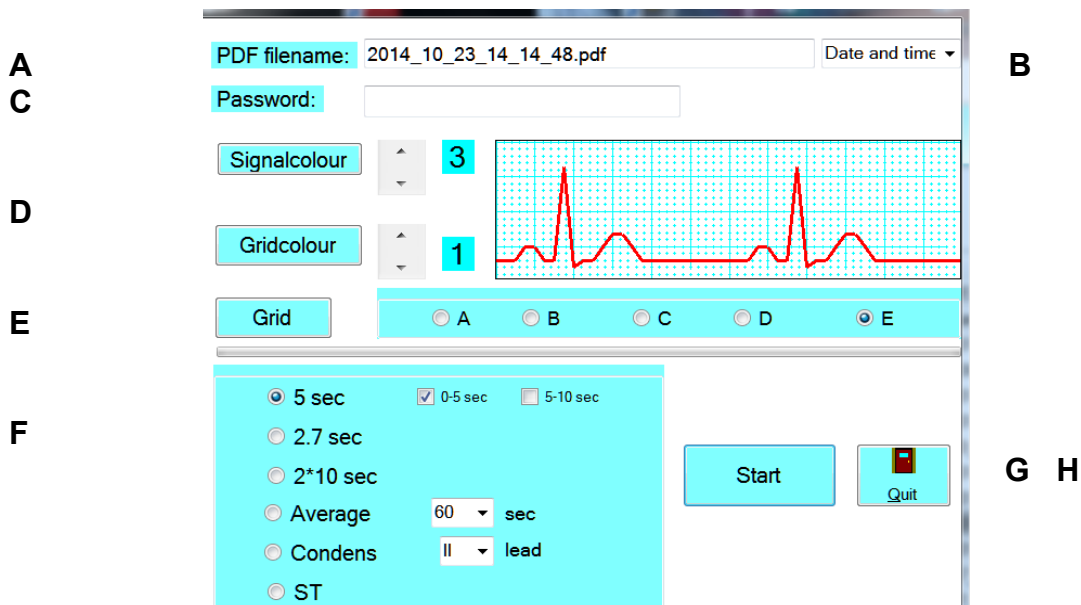
The button "Show all" shows again all 31 possibilities

D The result selected in **C** will be transferred to your personal conclusion in **E**

9 PDF

PDF format is a standard for data exchange that contain text and graphics. Free download of Acrobat Reader is available on www.adobe.com.

- A** File name: Date_time.pdf are proposed. The user can give another name.
- B** Selection of the PDF filename. This will aid in finding of the pdf file.
- Date_time.pdf
 - Name_firstname.pdf
 - Name_firstname_date_time.pdf
- C** If you enter a password here, the PDF file will be protected with that password. It is possible to send a PDF file protected with a password by means of Email.



- D** Colours and thickness of signal and grid.
- E** Type of grid. (A is no grid for printing on A4 mm paper)
- 5 sec output is selected by default. This is for most Ecg recordings ok.
- 0-5 sec (default) or 5-10 sec will select the corresponding part of the 10 sec.
- 2.7 sec is only necessary with large QRS complexes, with PDF 5 sec overlapping could occur.
- 2*10 sec. For full 10 sec output of all leads. 2 A4 pages are necessary.

The last 3 possibilities are for longtime recordings.

Average. For long time recordings. Sec average interval selection is possible.

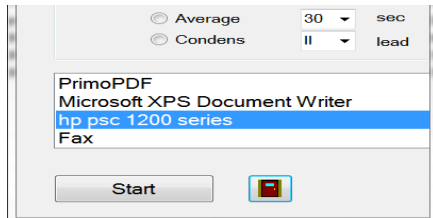
Condensed output. Selection of lead is possible.

ST: for stress test, graphs with STT segments during up to 40 minutes

G Starts the PDF output and **H** quits screen.

10 Print

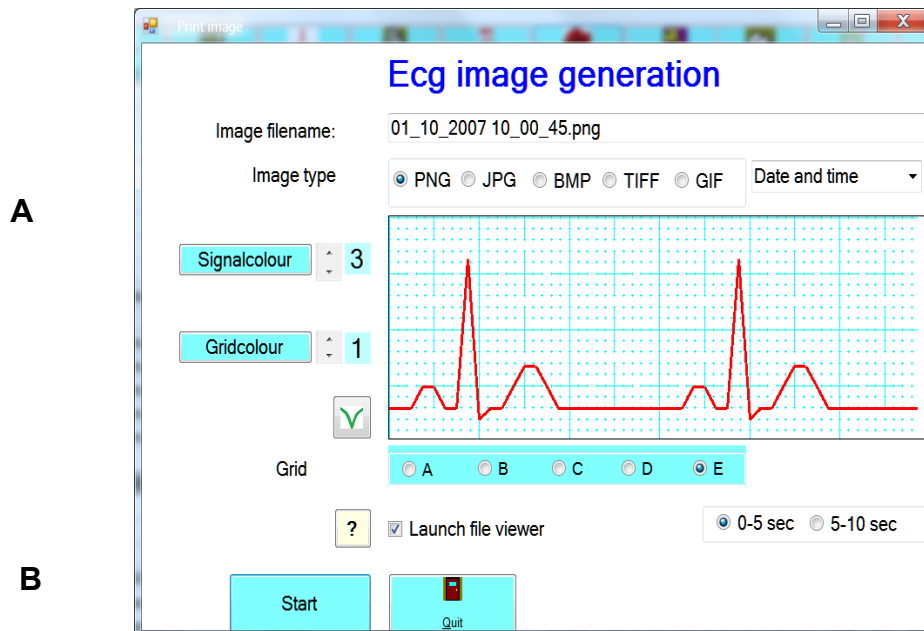
For direct printing on A4 paper, the options are the same as on PDF generation. If different printers are attached to the PC, selection of the preferred printer is necessary:



11 Image

Most options are the same as on PDF output.

- A:** Type. All five possibilities work very good without loss of quality. Your choice will depend on the size of the generated file and available viewers. As ecg is made from line pieces **PNG and TIFF** are the most compact.
- B** Associated viewer will be launched or not. Tap "?" to associate another viewer. Size of generated file will be displayed, next to the quit button.



Example of PNG image in Windows Photo Viewer.



Printing of this image on A4 paper is possible. However uncheck to print it all the way up to the borders.

11 - FAQ

Recording seems not possible.

Do not panic ! There are no mechanical parts inside the apparatus. A hardware failure is very unlikely.

Consider the following.

- Apparatus is not turned ON.
- Battery is low.

- Comport:

A/

bad choice. Wrong choice can't delete your PC but recording is not possible. See the setup section.

B/

Comport is blocked by other software.

When after installation of other new software Ecg recording seems not possible :
The new software occupies your serial port even when the software is not in use.

- A PALM-PC is connected to your PC. Change the set up of the PALM, make HotSync active only when using the Palm software itself.

- A PDA – Pocket PC: eliminate the occupation of the serial port, even when the apparatus is connected to USB.

After a new installation, always test the apparatus first once without a patient.

Of course you see only disturbed signals. However if the Ecg recording is finished in exactly 10 seconds, it will be also ok with a patient.

How make a backup?

To every other location: CD-R or RW, external hard disk, other PC of a network.

Copy C:\EcgF12 and content to have a complete backup.

New PC – How can I move my *.F12 files to a new PC?

There are several possibilities:

A/ Install the program again from CD-ROM and copy the old *.F12 files to the installation directory on the new PC.

Execute the setup and comportnumber selection, page 14.

B/ Download SetupEcg.zip on our site www.ganseman.com Unzip and execute SetupEcg.exe. Copy the old *.F12 files to the installation directory on the new PC.

C/ Copy the directories C:\Ecgbibnew en C:\EcgF12 and their content to the new PC.

A+B: With setup – users Replace User1 with your name !

Wired connection

Option C/ demands **sometimes** installation of the driver for the USB-serial converter. The driver is located on the CD in the file CDMUSB.exe and on our website in CDMUSB.zip. Download, unzip. Execute 'CDMxxx.exe' once. This seems to do nothing. Afterwards plug the converter in the pc and wait some minuts.

A+B+C: Correct **comport choice**: see Setup page 13 and 14.

Wireless Bluetooth connection

Plug the mini dongle in a free USB port and wait some time.

Windows 8, 10 will assign an outgoing Comportnumber to it.

Select this number in the setup of ecg.exe. See page 14.

For other versions of Windows, our dedicated manual BluetoothEn.pdf will assist you.