COMPLETE CARDIOLOGY SOLUTION

BTL CardioPoint®

DISCOVER EVOLUTION

BTL CardioPoint is an acquisition, archiving, data sharing and diagnostic platform which provides a complete solution for cardiology, internal medicine, pediatrics, general practice, sports medicine and more.

All in one solution

BTL CardioPoint is a versatile clinical system integrating ECG, Stress test, CPET, Holter, ABPM and Spirometry into one unified platform. All these modules use the same user interface style and the same controls logic. After using one module, getting used to another one is very easy.

Patient history at a glance

Patient information and examination results across all BTL CardioPoint applications are collected in a single patient database. Thanks to its clear arrangement, all common procedures (such as entering a new patient or starting a new examination) are very straightforward.

Costs reduction

BTL CardioPoint saves printing and archiving costs by managing data sharing and storage. The total savings can reach up to thousands of euros per year.

PATIENT & WORKFLOW MANAGEMENT

Improving the **quality** of care provided, increasing the **productivity** of medical staff and reducing the **costs** are the current trends in healthcare. BTL CardioPoint-NET positively influences all 3 at the same time.

The versatility of this product makes it ideal for small outpatient medical facilities as well as for larger clinics and hospitals that require a tool for a quick and **efficient patient and workflow management**.
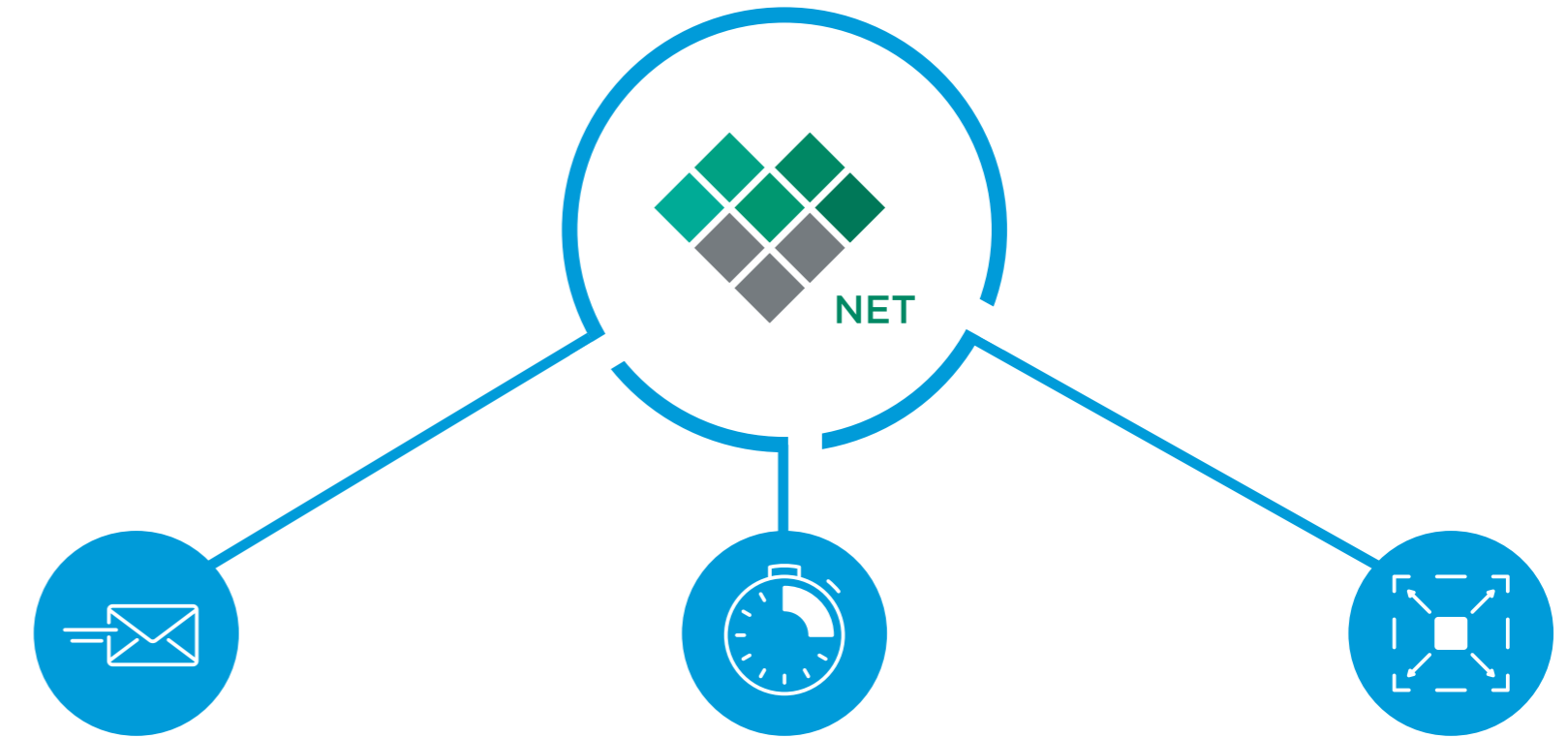
Instant information access

Access all patient records now or anytime in the future. BTL CardioPoint-NET connects all your departments and allows fast and easy data share.

Saving time

Having a central patient database available from anywhere saves time of the entire medical staff and minimizes duplicated patient files.

Scalable information system

BTL CardioPoint can run on a single computer at a doctor's practice, but it can also be spread all over the medical center serving hundreds of patients daily. Furthermore, integration into other information systems is possible at various levels. Quite simply, BTL CardioPoint will grow with you.

SOLUTION FOR MEDICAL OFFICE

The BTL CardioPoint-NEToffice supports **communication with commonly used medical practice management software**. By integrating the BTL CardioPoint into ambulatory software, **cardiovascular examinations** can become a natural **part of every outpatient practice.**
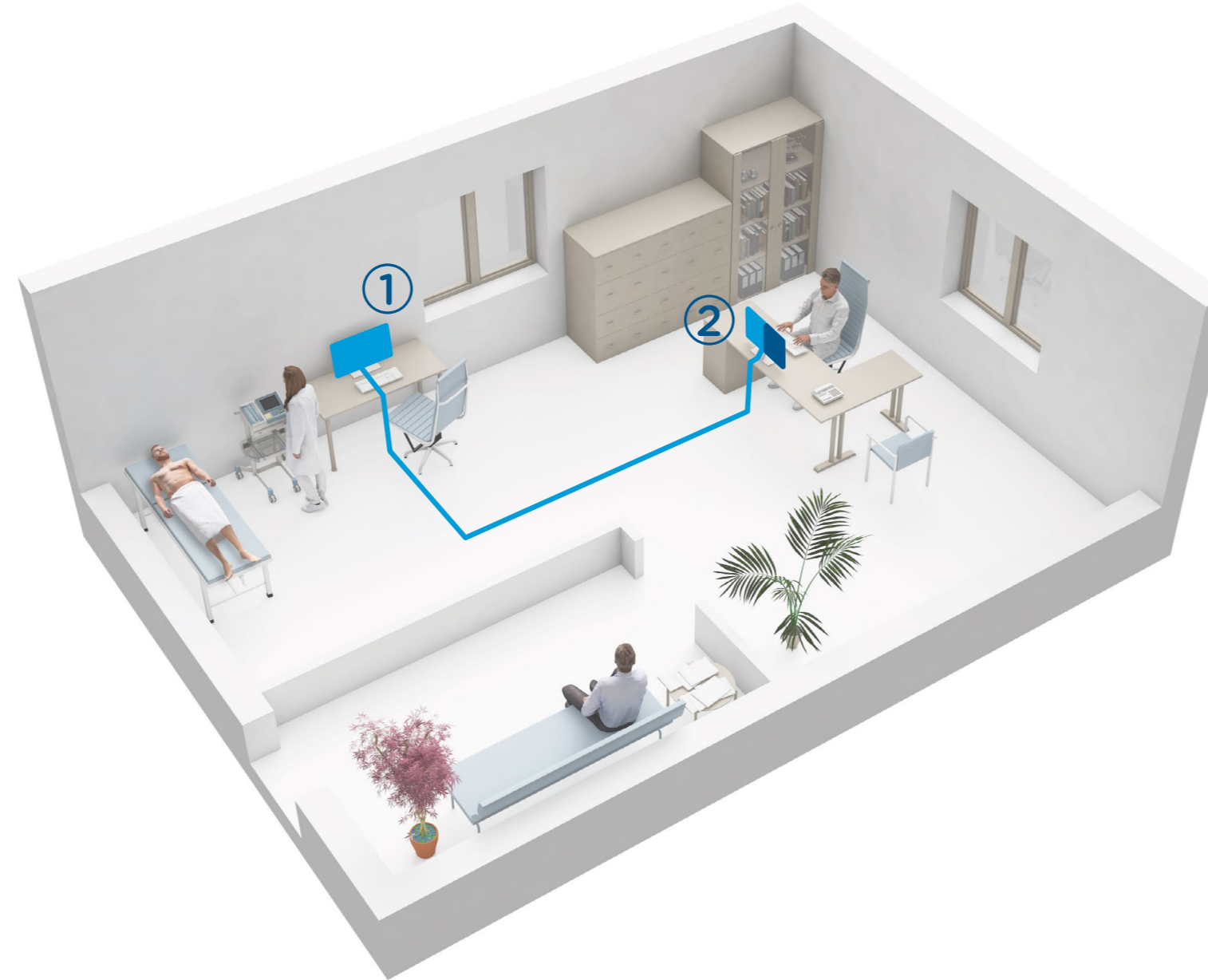
1st Step
The nurse inserts the patient's data and records an ECG.

2nd Step
The doctor evaluates the ECG and the results are saved in the patient's medical record.

① ②

Simplifying medical agenda

The BTL CardioPoint-NEToffice facilitates full BTL CardioPoint software integration into ambulatory software, thereby enabling it to be extended by cardiology applications. The NEToffice solution eliminates the time spent in copying patient data and results from one software to another.

Complete examination history

The examination results including the attached report are automatically transferred to the to patient's medical record in the ambulatory software, where they will remain available at any time in the future.

Modern workplace

BTL CardioPoint is installed in a network of two computers – the nurse's and the doctor's computer. Such a solution brings higher medical practice efficiency.

■ BTL CardioPoint

■ Ambulatory software

NET

SOLUTION FOR CLINIC

The BTL CardioPoint-NETclinic is a solution that brings easy **interconnection of individual computers with the BTL CardioPoint**. The **network** enables sharing of complete cardiology records including patient data within the medical facility.

The BTL CardioPoint-NETclinic finds its place in **specialised cardiology clinics**, as well as in clinical facilities providing **complex medical care**.
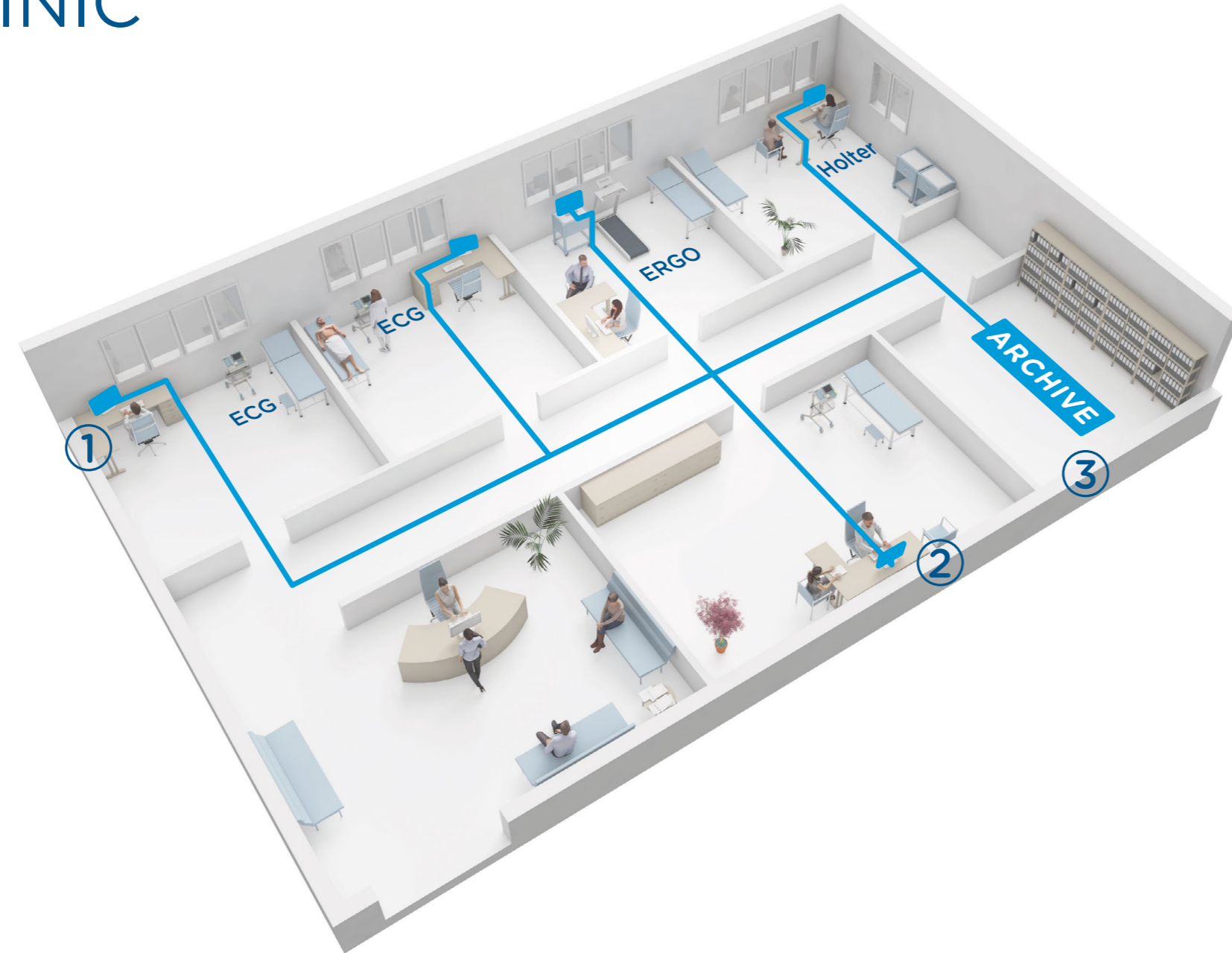
1st Step
The nurse inserts the patient's data and records an ECG.

2nd Step
The doctor evaluates the ECG.

3rd Step
Electronic archive of examination results.

ECG
ECG
ERGO
Holter
ARCHIVE
① ② ③

Paperless solution

BTL CardioPoint can be installed on any number of computers that can be used to create a network. All diagnostic data is saved in electronic format, so is not necessary to print it or archive it physically. Patient and examination information simply remains accessible at anytime in the future.

Clinical processes optimisation

BTL CardioPoint-NETclinic makes the cardiovascular examination process quicker and automated. From inserting patient data through uploading the record to evaluation by another doctor anywhere within the clinic.

Archiving medical records

All your medical data is safely stored in BTL CardioPoint and can be instantly reviewed anytime later.

■ BTL CardioPoint

— BTL CardioPoint-NETclinic

NET

SOLUTION FOR HOSPITAL

The BTL CardioPoint-NEThospital ensures **easy access to cardiovascular examinations** in large medical facilities providing healthcare for several hundreds of patients every day.

It facilitates **communication between the BTL CardioPoint system and the hospital information system (HIS)** using the world most broadly available **HL7 communication standard**.

This way of communication enables **patient logistics to be more efficient** and makes cardiovascular examination **results** available to the medical team **across the hospital**.
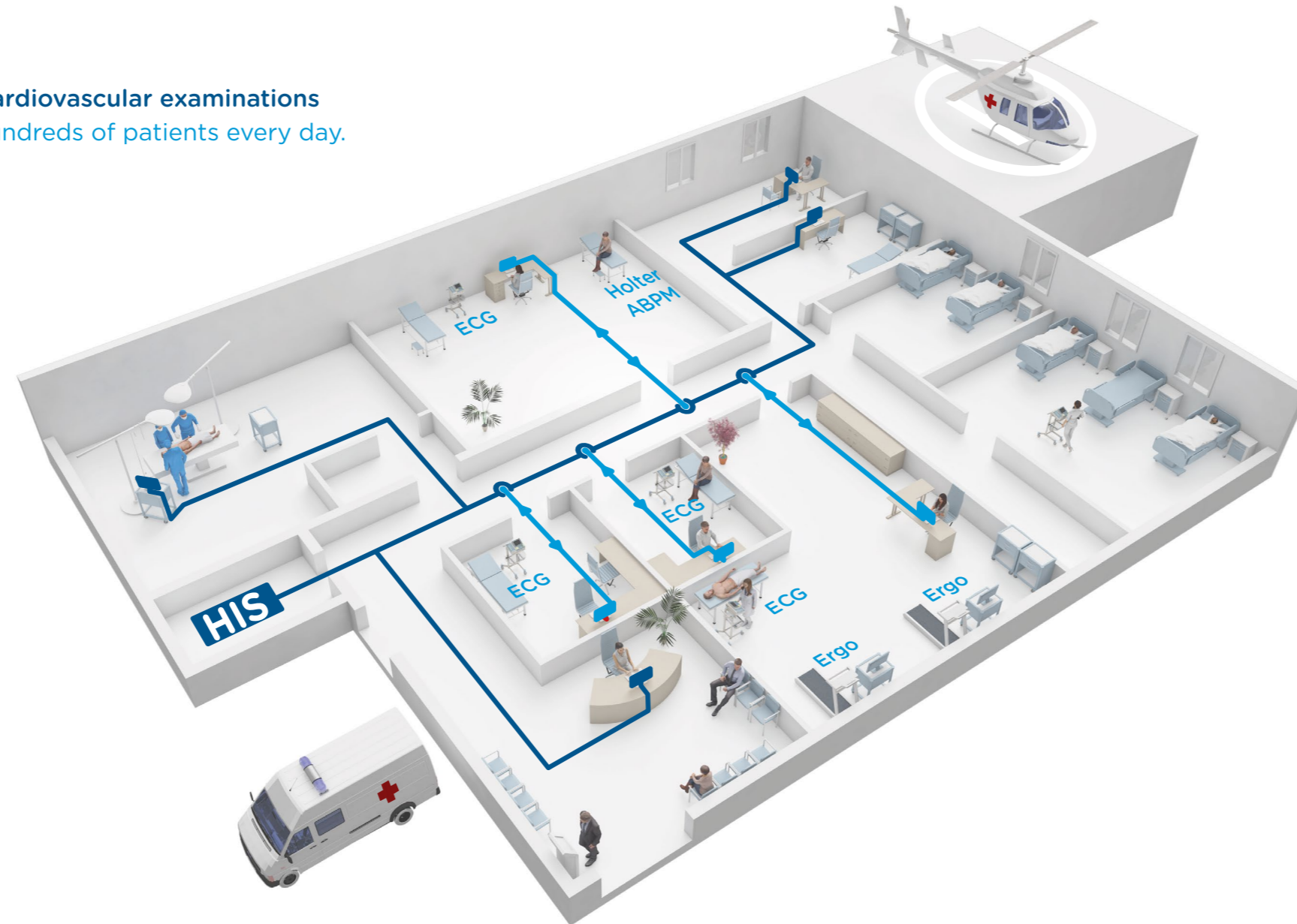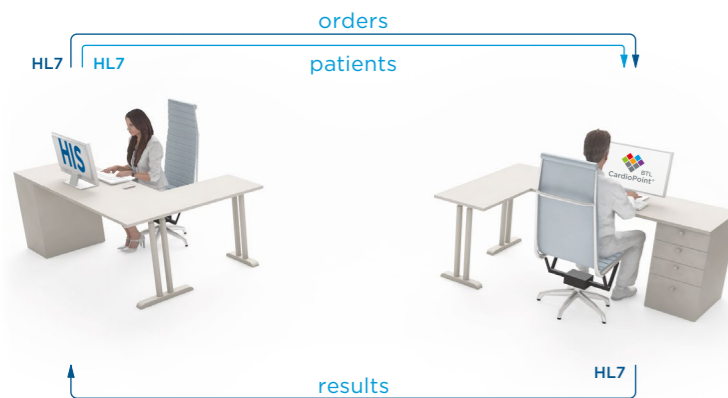
Simplifying administration

Directly in BTL CardioPoint, the doctors have access to a current list of patients and to an overview of examination orders. The results are then automatically assigned to the patient's medical record in HIS. Based on this information other doctors can decide on further treatment.

Electronic Documentation

NEThospital ensures electronic order delivery, examination results sharing and patient data updating across the systems. Using the HIS, doctors can request examinations from the specialists working with BTL CardioPoint.

80% cost reduction

Electronic documentation reduces the need of printing in routine situations.

■ BTL CardioPoint

☩ BTL CardioPoint-NEThospital

■ Hospital Information System

SOLUTION FOR TELEMEDICINE

BTL CardioPoint-NETconsult allows **remote consultations** regardless of the distance separating the consulting doctors. This solution is integrated into the BTL CardioPoint platform as an extension **increasing the availability** of cardio-diagnostics.

Making the diagnostics available

BTL CardioPoint-NETconsult makes the ECG diagnostics far more available. With this solution, any doctor can easily and quickly consult their ECG records with a specialist in a diagnostic center. Hence, both patients and doctors avoid any extra travelling, the only traveller is the ECG record.

Making the diagnostics better

It is not just the report, but a complete examination record that is transferred. This allows the diagnostic center to work with a complete diagnostic data and all the tools that the BTL CardioPoint offers. As a result, physicians can make a better decision about the patient's treatment.

NET
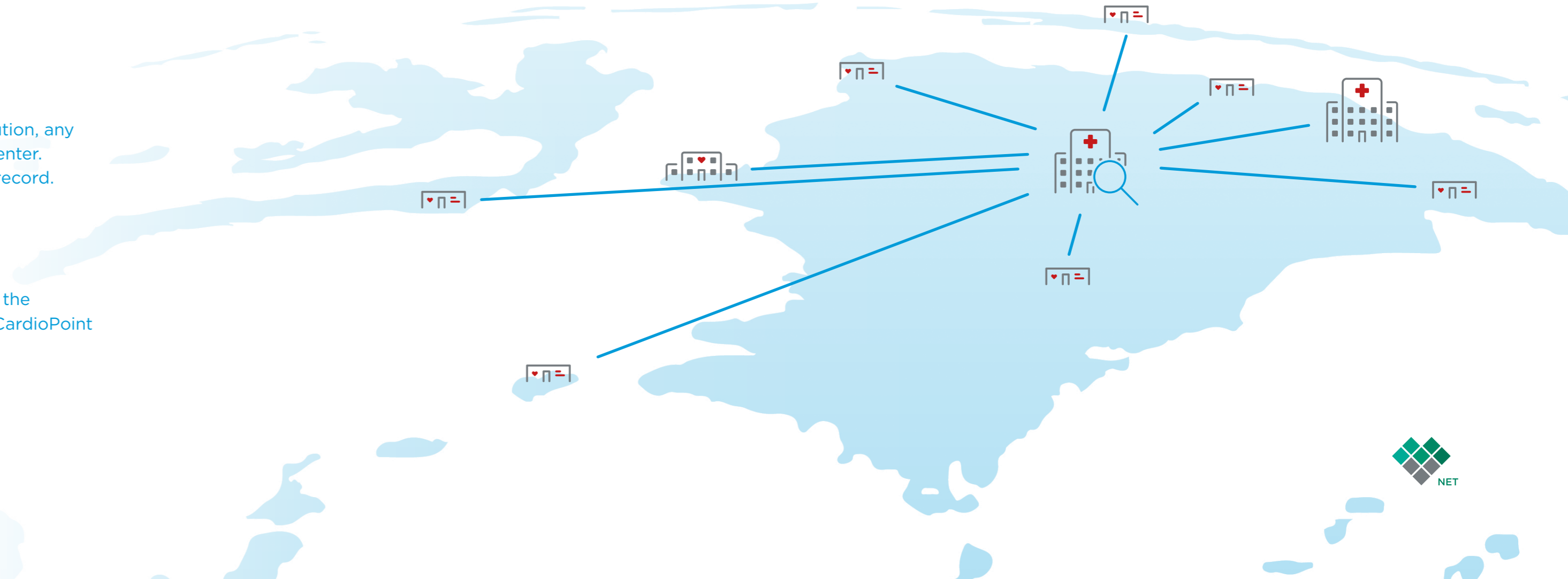
RESTING ECG

A new system from BTL presents
a breakthrough in resting ECG.

ECG

RESTING ECG

Modern ECG? That is easy operation, excellent ECG signal and fast evaluation from anywhere. And that is exactly what BTL ECGs provide.

Diagnostic confidence

BTL CardioPoint provides everything you need for an easy treatment decision – clear ECG signal and unique diagnostic tools, regardless of whether your patient is a child, an athlete or a senior.

TAILOR-MADE SOLUTION

We can help you select the right ECG device and configure the system so that it fully meets your needs.
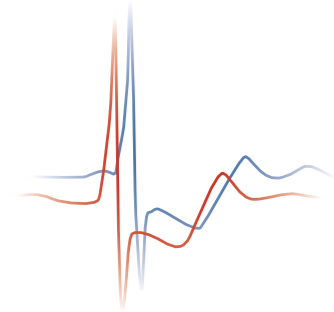
Data access from anywhere

The ECG record is safely stored in the device memory or can be instantly accessed from any computer in your facility and even outside of it! BTL CardioPoint brings the ECG records practically anywhere.

Cost reduction

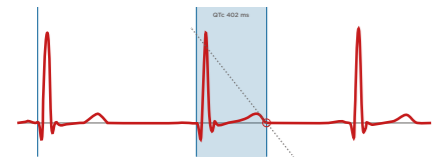Electronic documentation reduces the need of printing in routine situations.

ECG

THE LATEST TRENDS IN ECG EVALUATION

ECG Comparison

Serial ECG comparison allows evaluating your patient's treatment by tracking their test results in time.

QT Module

The QT module helps evaluating QT(c) interval to diagnose the possible risk of ventricular tachycardias that may result in sudden cardiac death. It uses the tangent method which is specifically suitable for QT measurement with higher heart rates, when there is no clear return to the baseline or the T wave has two peaks.
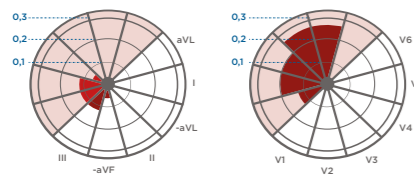
ST Maps

ST maps help to immediately recognize common pathologies associated with ST segment, e.g. they can be useful in validating mirrored ST elevations in case of posterior myocardial infarctions.

5 minutes
evaluation time

98%
98% sensitivity
of **automatic**
interpretation

Unique
visualization
of results

100%
Seattle and
International
criteria
compliance

Minimize
misdiagnoses
in athletes

Sudden death screening

Sudden Death Screening (SDS) Module is a unique tool for prevention of sudden cardiac death, the leading cause of death in young athletes.It helps to distinguish normal adaptive myocardium changes from pathological myocardium changes and to determine sudden cardiac death risk.The SDS Module is based on the Seattle and International criteria and is integrated into a routine ECG examination.

CHOOSE WHAT FITS YOU

BE UNLIMITED.
BE FLEXI.

Michael Braney
9001234567
90 bpm
12 ECG
20 s

Connected to
Flexi141We!

Speed: 12.5 mm/s   Sensitivity: 5 mm/mV

Filters: Default (0.25 - 90 Adapt.. ~50Hz0)

Download on the
App Store
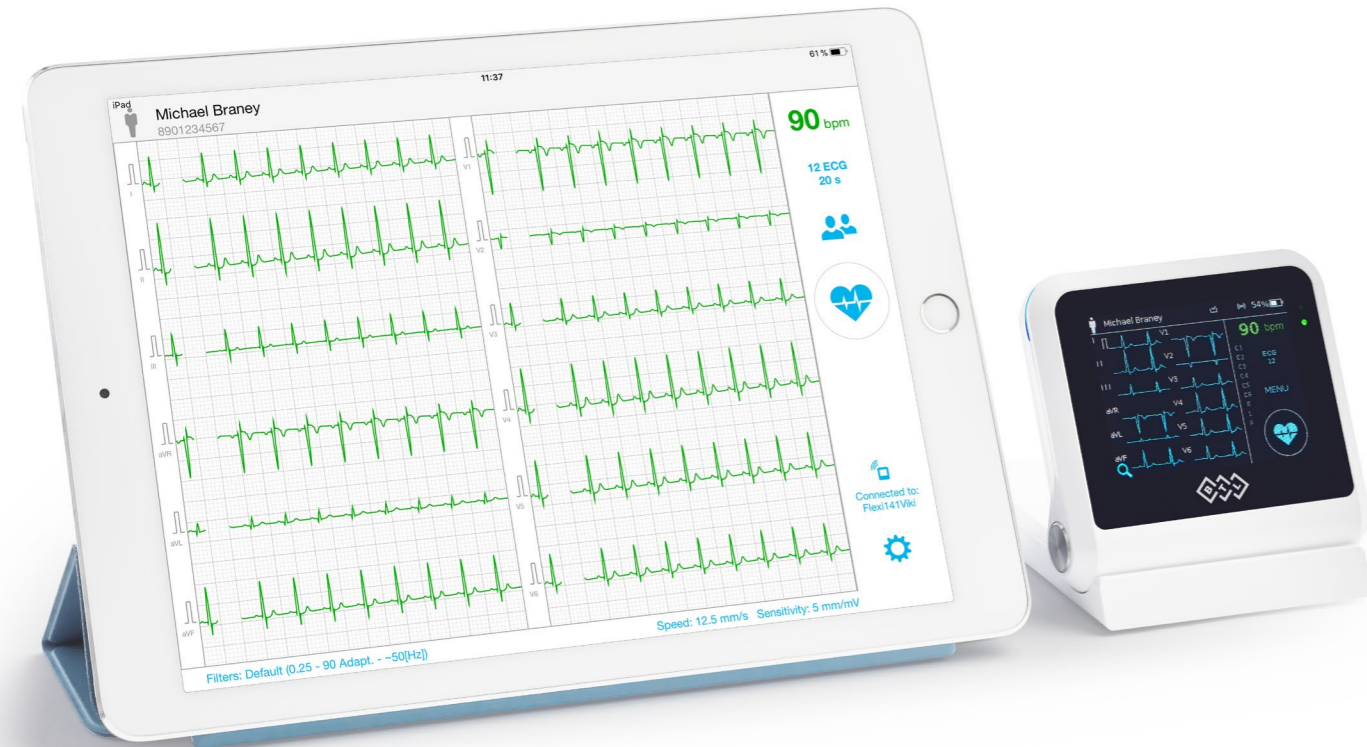
Discover the smallest individually-working wireless ECG on the market and enjoy the traditional
BTL features in a modern pocket-size design.

BTL-08 ECG LC
With optional **vacuum
electrode system**
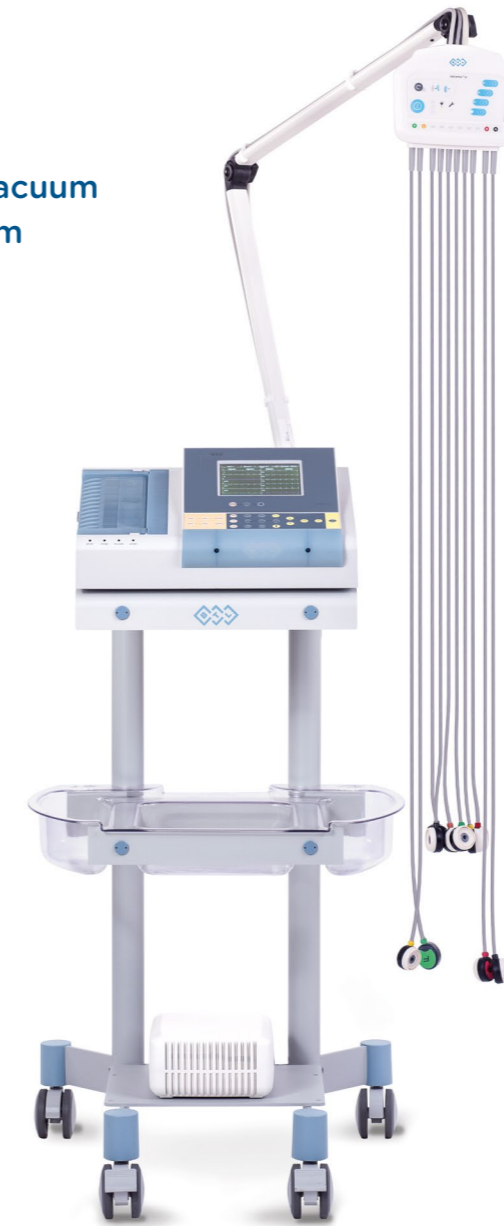
BTL-08 ECG LC Plus
A4 printouts and large
color touch screen

BTL-08 ECG MT Plus
Plenty of features
in a **compact design**

BTL-08 ECG SD
Economy

ECG

STRESS

STRESS TEST

The BTL's stress test provides all you need to safely and accurately perform the exercise. For a higher comfort, most of its functions are automated. As a result, you will discover that our stress test saves your time and increases your diagnostic confidence.

STRESS TEST

BTL CardioPoint represents a new generation of advanced stress test systems. Simple operation and number of automated features allow physicians to better focus on their patients and extract maximum information from the test.

ERGOMETER OR TREADMILL

Provides higher ECG signal quality and occupies less space in your lab.

Allows testing your patients through natural movement using the largest number of muscle groups.

Recommended bicycle ergometers:
Ergoline, Cardiowise, Lode, Monark

Recommended treadmills:
BTL Treadmill, Trackmaster, Lode, HP Cosmos
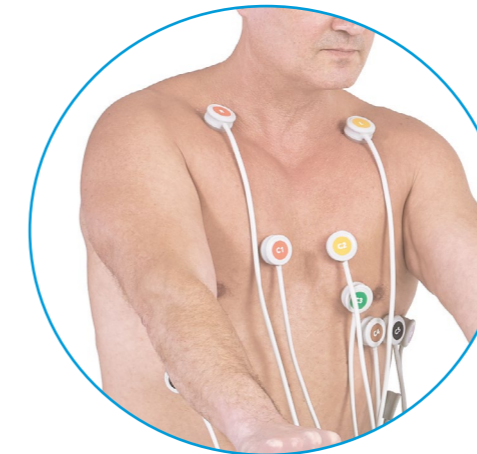
EASY ELECTRODE PLACEMENT

Having a vacuum electrode system minimizes both the time of a patient being hooked up and the time of removing the electrodes.

STRESS

WIRELESS STRESS TEST

It doesn't matter whether you perform your tests in a lab or in the field. The wireless ECG allows you to stay connected with your patient anywhere. Meet the most modern wireless stress test offering exceptional flexibility and finest ECG signal.

Excellent signal quality

The wireless ECG placed directly on a patient significantly reduces motion artefacts in the ECG signal and consequently improves its clarity.

Variability in testing

As the BTL Flexi increases mobility, it also gives you more possibilities in selecting the proper exercise, including climbing the stairs or running outdoors.

MONITOR YOUR PATIENT UNDER **ALL CIRCUMSTANCES**

Wireless ECG allows monitoring your patient's heart even when the test is stopped for emergency reasons.

STRESS

LET THE SOFTWARE GUIDE YOU

Focus on your patient and let the software guide you through the entire process of the test.
The BTL CardioPoint has been developed based on the latest guidelines!
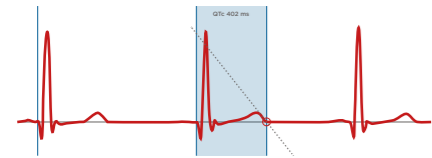
QT Module

The QT module helps evaluating QT(c) interval to diagnose the possible risk of ventricular tachycardias that may result in sudden cardiac death. It uses the tangent method which is specifically suitable for QT measurement with higher heart rates, when there is no clear return to the baseline or the T wave has two peaks.
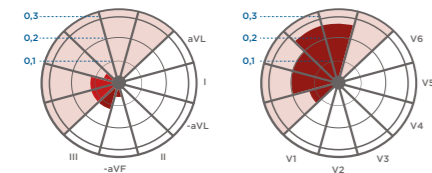
ST Maps

ST maps help immediately recognize common pathologies associated with ST segment, e.g. they can be useful in validating mirrored ST elevations in case of posterior myocardial infarctions.

VARIABILITY & COMFORT

Meeting our customer's needs is our goal. Tell us your requests and we'll be happy to present you a solution that fits you the best.

Select...

1. WORK STATION	2. ECG
OR	OR

3. STRESS DEVICE	4. OPTIONAL ITEMS
OR	Vacuum system NIBP monitor Gas analyzer

CARDIOPULMONARY EXERCISE TEST

CPET

Whether it is evaluation of a training progress or diagnosing exercise intolerance, the BTL's CPET system provides accurate results displayed in a user-friendly software.

CARDIOPULMONARY EXERCISE TEST

Measurement accuracy

In BTL, we are keen on accuracy. Prevention of gas samples mixing, no moving parts in the flowmeter, accurate CO_2 sensor zeroing – these are just three examples of challenges that we overcame to achieve excellent measurement accuracy.

Ergonomy

BTL's CPET was specifically designed to make testing easy. Optimized data display, straightforward calibration and a swivel arm is what makes your daily routine comfortable.

Low running costs

Our patented technology makes the flowmeter accurate and resistant against defects – all of it for a price of a disposable item.

Typical fields of use

	CARDIOPULMONARY DIAGNOSTICS	SPORTS MEDICINE	NUTRITIONAL ASSESSMENT
Evaluation of exercise intolerance	•	•	
Pre-operative and post-operative assessment	•		
Evaluation of cardiovascular/pulmonary diseases	•	•	
Cardiopulmonary rehabilitation prescription	•		
Evaluation of training progress		•	•
Indirect calorimetry		•	•
Evaluation for heart/lung transplantation	•		

ECG HOLTER

Holter record evaluated in minimum time and with maximum accuracy? The BTL CardioPoint-Holter has been specifically designed to save physician's time. Besides excellent signal quality, it offers a number of unique tools for verification of automatic diagnostic results.

HOLTER

ECG HOLTER

Abnormalities at first sight

BTL CardioPoint-Holter offers a variety of modern tools displaying the complete record on a single screen and yet with maximum details. Try them out and evaluate Holter records quickly without missing any important event.

Excellent signal quality

Supreme signal quality even under highly demanding conditions (e.g. tachycardia or rapid movements) means spending minimum time verifying automatic results.

Medical conclusion in two clicks

Don't waste your time typing. Rather select a predefined template and the conclusion text will be filled automatically with the correct values.

Paediatric use

Our ECG Holter has been certified for use even in children below 10 kg of weight.

SYNCOPE DIAGNOSIS

You might also be interested in diagnosing your patients with syncope using our head-up tilt test.

Contact us for more information.
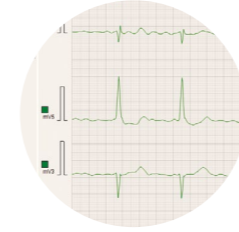
Atrial fibrillation detection
Our efforts to have the finest detection of atrial fibrillation possible resulted in 99.5% sensitivity even in patients having paroxysmal form of the disorder.
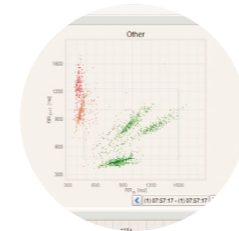
Poincaré graph
Visualizes all rhythm disorders from a complete record in a single graph and reveals their details in a single click.
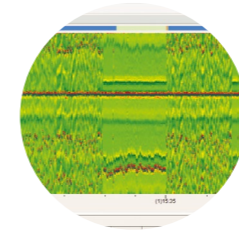
Relief map
Allows immediate detection of all irregularities, including those that can be barely read from classic ECG signal display.
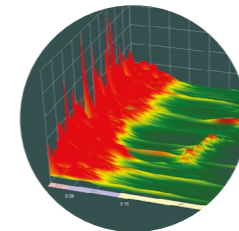
PSD graph
PSD (Power Spectral Density) graph brings Holter evaluation to an entirely new level. This tool visualizes function of the patient's autonomic nervous systems and helps to recognize the corresponding diseases.

HOLTER

AMBULATORY BLOOD PRESSURE MEASUREMENT

BTL CardioPoint-ABPM meets all the present specifications of professional blood pressure monitoring. It uses a precise lightweight recorder with silent operation and it comes with an easy-to-use software.

Comfortable to wear

Very quiet operation, low weight and small size allow your patients to do all their daily activities with almost no limitations.

Accurate results

BTL ABPM features unique stepwise deflation. This technology together with our algorithms guarantee reliable clinical outcomes meeting strict requirements of the BHS, AAMI and IEC standards.

Evaluation just in a few minutes

Measured data is automatically interpreted according to the selected guideline taking patient's age, gender and height into account.

ABPM

SPIROMETRY

The combination of the BTL pneumotachograph and the BTL CardioPoint software turns any computer into a highly sophisticated spirometer. Besides common functions, the spirometer allows comparing examination results, configuring final reports or sharing examination data with other computers in the network.

Prediction for everyone

Regardless of your patients' ethnicity, the BTL CardioPoint has a suitable prediction for everybody in the world.

Professional diagnostics

BTL spirometer was designed with respect to ATS/ERS GLI standards. It performs FVC, SVC and MVV tests, allows choosing the desired predictive norm and also provides automatic interpretation from ATS, BTS, Enright and GOLD. Recorded spirometry curves and parameters can always be compared with those from previous examinations.

Paediatric use

BTL spirometer is also well prepared for use with paediatric patients. It features 3D encouragement animations, paediatric predictions and calculates parameters such as AEX, which are useful particularly when assessing children.

SPIRO

PRODUCTS AT A GLANCE

BTL CARDIOPOINT®

BTL CardioPoint is an acquisition, archiving, data sharing and diagnostic platform which provides a complete solution for cardiology, internal medicine, pediatrics, general practice, sports medicine and more.

Modular system	BTL CardioPoint is a modular system for ECG, Stress-test, CPET, Holter, ABPM and Spirometry with a single patient database.
Complete data accessible	BTL CardioPoint saves unlimited number of patients and unlimited number of examination records (including raw measured data, medical findings, conclusions and PDF reports). Every record can be reviewed anytime in the future.
GDPR compliant	BTL CardioPoint allows administration of user accounts, patient data anonymisation or deletion and user activity tracking (e.g. medical data deletion or editing).
Active Directory support	BTL CardioPoint supports Microsoft Active Directory for easy administration of user accounts. Users may sign in the BTL CardioPoint using identical credentials as if they sign in the Microsoft Windows.
Supported operating systems	BTL CardioPoint is compatible with Microsoft Windows. We recommend Windows 10 system, the oldest supported system is Windows 7 SP1.
Server solution	BTL CardioPoint does not need a dedicated server to run. It is sufficient to install it on a workstation. However, we recommend a server solution for networks with more than 5 users.

CLINICAL WORKFLOW MANAGEMENT

Please note that it is possible to combine individual properties of the BTL CardioPoint-NET solution so that they meet specific needs of the medical facility.

LISTS OF TERMS

BTL CardioPoint-NET standard edition	BTL CardioPoint-NET is a standard and inherent part of the BTL CardioPoint. You can understand the NET as possibility to share patient and examination data among unlimited number of computers in your medical facility. It also supports integration of BTL CardioPoint into your existing AIS/EHR systems through the GDT interface. Furthermore, it allows automatic exports into HIS and PACS systems.
BTL CardioPoint-NET premium edition	The BTL CardioPoint-NETpremium offers the same services as the standard NET (see above) plus it allows bidirectional communication with your HIS system or PACS server. BTL CardioPoint thus accepts orders for examinations coming from your HIS or PACS and once the ordered examination is performed, it sends the results automatically back.
BTL CardioPoint-NET consult	This license allows connecting unlimited number of medical facilities with a single diagnostic center no matter what the distance is. With such solution, physicians may share examination data with specialists to get their medical opinions easily and quickly. All of that through Internet using a secured VPN connection. Each medical facility connected to the diagnostic center needs one license.

SUPPORTED COMMUNICATION STANDARDS

GDT	**GDT (Gerätedatentransfer)**: This standard is most commonly used in AIS or EHR systems. It is fully supported by the standard edition of the BTL CardioPoint-NET.
HL7	**HL7 (Health Level Seven)**: This standard is common in HIS systems. Standard edition of the BTL CardioPoint-NET allows using the HL7 for exporting the medical data from the BTL CardioPoint into HIS. Premium edition of the BTL CardioPoint-NET furthermore makes the BTL CardioPoint accept the orders from HIS and export the recorded medical data back.
DICOM	**DICOM (Digital Imaging and Communications in Medicine)**: This standard is often used in PACS systems. Standard edition of the BTL CardioPoint-NET allows using the DICOM for exporting the medical data from the BTL CardioPoint into PACS. Premium edition of the BTL CardioPoint-NET furthermore makes the BTL CardioPoint accept the orders from PACS server and export the recorded medical data back.
HIS	**Hospital Information System** is a medical software application that covers clinical, financial and operational aspects of hospital care.
PACS	**Picture Archiving and Communication System** is a healthcare technology for storage, management and distribution of medical images in DICOM format.
EHR	**Electronic Health Record** is a digital form of patient's medical report.
AIS	**Ambulatory Information System** is a software application used for management of patient medical records in outpatient care.

BTL CARDIOPOINT® NET

	STANDARD	PREMIUM
INTEGRATION INTO 3RD PARTY SYSTEMS (SUCH AS EHR, AIS...)		
Creating / updating patient in BTL CardioPoint from 3rd party system using GDT Plugin	•	•
Starting / editing examination directly from 3rd party system using GDT Plugin	•	•
Sending final report and medical conclusion back to 3rd party system using GDT Plugin	•	•
STANDALONE BTL CARDIOPOINT NETWORK		
Possibility to share patient information	•	•
Possibility to share complete examination data	•	•
Possibility to share final reports	•	•
Possibility to simultaneously access examination results from multiple computers in the network	•	•
All data saved on a dedicated drive in an encrypted format	•	•
ARCHIVING / EXPORTING		
Possibility to export / archive examination data (manually or automatically immediately after the examination is finished)	•	•
Possibility to export final reports in PDF, SVG or JPEG formats	•	•
Possibility to export complete examination data in the BTL's proprietary format (mewzip)	•	•
Possibility to anonymise exported examination data, including the change of date of birth and patient's name in the medical conclusion	•	•
HL7 / DICOM CONNECTIVITY		
COMMUNICATION FROM BTL CARDIOPOINT TO HIS / PACS		
Sending medical conclusion and PDF report back to HIS using HL7 command	•	•
Sending observation results when examination reaches certain procedure status back to HIS using HL7 command		•
Possibility to review examination results in any PACS viewer	•	•
DICOM Encapsulated PDF Storage supported	•	•
DICOM Secondary Capture Image Storage supported	•	•
DICOM Multi-frame True Color SC Storage supported	•	•
COMMUNICATION FROM HIS / PACS TO BTL CARDIOPOINT		
Creating a patient in BTL CardioPoint using HL7 command		•
Updating a patient in BTL CardioPoint using HL7 command		•
Merging patients in BTL CardioPoint using HL7 command		•
Sending worklist request into BTL CardioPoint using HL7 command		•
Updating examination order using HL7 command		•
Possibility to cancel examination order using HL7 command		•
Retrieving DICOM Modality Worklist from a server		•

BTL CARDIOPOINT® NETCONSULT

Simultaneous access to complete examination data from two locations at the same time regardless of the distance
Possibility to share complete examination data
Automatic sending and retrieval of examination data
Data transmission security using encoded VPN network
Possibility of patient data anonymisation

RESTING ECG

Get a maximum from your resting ECG machine by connecting it to the BTL CardioPoint software and using its specialized diagnostic functions and sharing options. Devote your time to your patients and leave the rest to the BTL CardioPoint system.

THE REASONS WHY

Mistype prevention	Minimize errors in mistyping the patient data by only entering a patient ID into your ECG machine. The BTL CardioPoint will then save the ECG record under the right patient and fill in the rest of the data.
Saving nurse's / Technician's time	The ECG records are evaluated, shared and archived electronically. This significantly simplifies nurse's/technician's work.
Saving doctor's time	After loading, the record is immediately available anywhere in the hospital. The doctor can evaluate the record wherever he/she currently is and whenever he/she needs to. While on WiFi, the record is typically transmitted within one minute.
Easier diagnosis decision	The doctor has the possibility to use advanced diagnostic tools and compare the results of all earlier patient's examinations. They can therefore determine patient's diagnosis based on complete patient information.
Medical consultation anytime	Medical consultations with the use of the BTL CardioPoint-NETconsult improve both diagnostic quality and availability. This tool connects any physician with an ECG expert regardless of where they are located.
Up to 80% decrease in printing costs	Evaluating the ECG record on a large computer screen is not only easier compared to evaluating it on a paper. It also saves printing costs and with the BTL CardioPoint tools it's even more precise. Yet, direct printing option remains available with the BTL-08 ECGs.
Integration into HIS/PACS system	Integration of the BTL CardioPoint into your HIS/PACS system further dramatically improves the clinical workflow. Please find more information on page 41.
Data safety	BTL CardioPoint has been designed in compliance with the European GDPR (General Data Protection Regulation). Using BTL CardioPoint means using a software according to the EU data safety standards.

AVAILABLE RECORDING MODES

Stand-alone mode	The record is loaded and immediately printed by the built-in printer in this mode. Depending on the profile settings, the record may be saved in the device memory.
- auto profile	The most commonly used profile, depending on profile settings, the ECG device can print, save and analyze standard ECG records.
- long/rhythm profile	In this profile, a record up to 10 minutes long containing two selected leads can be printed, saved and analyzed.
- manual profile	Real-time printing initiated by pressing the print button and finished by pressing the stop button. The record is not saved in the memory and is not evaluated by automatic interpretation.
Record transmission	The ECG tracings recorded with the ECG device are afterwards sent to the BTL CardioPoint software for an evaluation, storage and print.
Real-time transmission	The ECG device fully becomes a part of the BTL CardioPoint in this mode. ECG device sends ECG tracings into the software in real-time. This allows monitoring the signal on a large computer screen. Further signal processing such as evaluation, storage and print is done on a computer.

BTL CARDIOPOINT® ECG

GENERAL

The BTL CardioPoint software is the basis for a modern cardiology system. Its simple and fast operaion makes it suitable for high-traffic medical facilities.

Certified medical device

For general BTL CardioPoint specifications see page 41

RECORDING

Real-time ECG signal recording - record length from 10 sec to 10 min

Possibility to carry out multiple records in one recording session and select the records to be printed / stored

Electrode application check - graphical tool informing about the quality of the electrodes attachment

Emergency ECG option - possibility to start recording immediately without patient selection

EVALUATION

Possibility to observe / evaluate the record during online recording (even on a PC screen)

Possibility to evaluate records acquired on a different computer in the BTL CardioPoint network

Possibility to evaluate records saved in the BTL ECG device (possibility to download the record automatically through the optional WiFi module)

Lead system - Einthoven and Cabrera

Auto-adaptive filters - Automatic intelligent system of filtering increasing the ECG signal quality without distorting its components

Automatic measurement of HR, RR, P-Q-R-S-T intervals, heart axes and amplitudes

Possibility to alter positions of the diagnostic markers: Pon, Poff, QRSon, QRSoff, baseline, J, J+, Toff

Possibility to manually select beats for averaging

Supported QTc calculation methods: Bazett, Hodges, Friderica, Framingham

Caliper for manual mesurements

Automatic interpretation of recorded ECG with a possibility of displaying the interpretative statements in form of acronyms

SPECIALISED DIAGNOSTIC TOOLS

ST maps help identify signs of ischemia much faster than from the original ECG signal. The way the ST denivelations are displayed in ST maps respects the natural heart topology and makes the ST related events easy to detect.

QT module helps evaluate the long QT syndrome that can often be responsible for sudden cardiac death. It uses a tangent method specifically suitable for QT measurement with higher heart rates, when there is no clear return to the baseline or the T wave has two peaks.

ECG comparator allows comparing any ECG record with another one in the same patient. Serial ECG comparison allows evaluating your patient's treatment by tracking their test results in time.

Sudden Death Screening module (optional) helps evaluate the risk of sudden cardiac death in young athletes based on Seattle/International criteria.

Vectorcardiogram (VCG) displays electrical heart activity in a 3D orthogonal system using Inverse Dower transformation.

STORAGE / PRINT

The programme saves the final report in the PDF format. It is therefore possible to print it anytime.

Possibility to export ECG records in open XML format

For HL7 / DICOM (PACS) / GDT options communication or automatic report exports, see page 41.

Printing with any compatible office printer (e.g. laser).

ECG leads overlapping on printed reports is minimized by automatic adaptation of spaces between the printed leads.

BTL CARDIOPOINT® FLEXI

GENERAL

Professional application for Apple tablets represents a modern way of performing resting ECG

In combination with BTL Flexi 12 ECG, it is a certified medical device

Compatibility - iOS 10 and newer; Apple iPad (2017), Apple iPad Pro 9.7", Apple Air 2, Apple Mini 4

RECORDING

Wireless transmission allows you to stay up to 30 meters away from the BTL Flexi ECG. Should the trasnmission fail (e.g. if you are to far from Flexi), the ECG signal will still be recorded by the BTL Flexi and will be automatically sent to the application when the WiFi signal is available again

Real-time ECG signal displaying - min. 48 hours of continuous transmission in a single patient

Real-time ECG signal recording - record length from 10 to 20 sec

Possibility to carry out multiple records in one recording session and select the records to be printed / stored

Loose leads indicator

Emergency ECG option - possibility to start recording immediately without entering patient details

EVALUATION

Possibility to observe / evaluate the record during real-time recording (even on a tablet screen)

Possibility to download the records stored in BTL Flexi 12 ECG

Lead system - Einthoven and Cabrera

Auto-adaptive filters - Automatic intelligent system of filtering increasing the ECG signal quality without distorting its components

Automatic measurement of HR

Automatic measurement of HR, RR , P-Q-R-S-T intervals, heart axes and amplitudes

Possibility to alter positions of the diagnostic markers: Pon, Poff, QRS on, QRS off, baseline, J, J+, Toff. Possibility to manually select beats for averaging

Supported QTc calculation methods: Bazett, Hodges, Friderica, Framingham

Caliper for manual mesurements

STORAGE

Memory: max. 6000 records

Possibility to export the record in the open XML format for further sharing (e-mail, etc.)

Possibility to export the record in the PDF format for further sharing (e-mail, etc.)

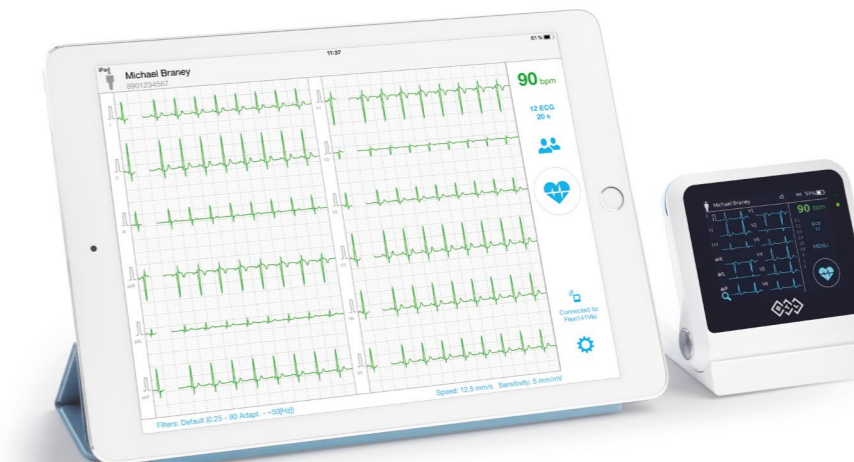Possibility to transfer the patient database to a different user's device

Printing with any compatible printer (AirPrint)

WHAT'S THE RIGHT ECG FOR ME?

BTL Flexi 12 ECG	Small size and internal memory is what makes this ECG ideal for everyone who needs rather a portable device than a stationary one. Moreover, for its excellent signal quality it is also a recommended model for stress-testing.
BTL-08 L line	Whoever needs to print on a large 210 mm thermal paper will find this ECG optimal. Thanks to its optional WiFi module, it can also send the ECG records to the BTL CardioPoint software completely automatically.
BTL-08 MT Plus	This model offers the same features as L line ECGs in a compact design. This ECG is suitable for a wide range of users.
BTL-08 SD	Excellent choice for those looking for rather economical solution. This ECG can work as a standalone device printing on a 58 mm paper or as a computerized ECG when connected to the BTL CardioPoint.

UNIT	BTL FLEXI 12 ECG
Display	IPS colour touch 2.8"
Resolution (px)	240 x 320 px
Displayed leads	12 / 3 / 1
Keyboard	Combined numerical touchpanel keyboard with functional keys
Ports	WiFi (hotspot)
Weight (including battery)	150 g
PRINT /STORAGE	
Print (office laser/ink printer)	Yes, via BTL CardioPoint-ECG / Stress / Flexi app (optional)
Stored records (10 sec strips)	Internal memory: 30 / BTL CardioPoint-ECG: unlimited
Stored records (long / rhythm)	Internal memory: 30 / BTL CardioPoint-ECG: unlimited
Stress-test storage	Internal memory: stored last 60 min of the record (suitable for recording outdoors, etc.)
RECORDING / ANALYSIS	
One touch recording	Yes (button or touch pannel)
Lead-off indication	Each electrode has its indication
Realtime transmission to BTL CardioPoint (ECG /Stress)	Via WiFi. If the transmission fails, the function of automatic download of the missing record parts from the unit memory is available (max. 60 min of record).
Record transmission to BTL CardioPoint (ECG)	Via WiFi. If the transmission fail (e.g. WiFi no longer available), the signal is recorded into the internal memory and will be automatically transmitted later (e.g. when WiFi is a vailable again).
SIGNAL PROCESSING	
ECG frequency response	0.05 Hz - 170 Hz
Pacemaker detection	Pulse width >100 μs, pulse amplitude >2 mV
Sampling frequency	ECG: Delta-Sigma A/D converter, 8 x 1000 Hz / Pacemaker: 2 axis detection by dedicated circuit with 40000 Hz function
Digital resolution	24 bits / 1 μV ±1 % at 500 SPS
Input signal range	Dynamic range: ±5mV, polarisation: ±300mV, consistent voltage offset: ±5V
Input impedance	>20 MOhm
Common mode rejection	>90 dB(filter off) / >100 dB (mains filter on)
Digital filters	See BTL CardioPoint-ECG / Stress / Flexi app

OTHER	
Accumulator capacity / type	<9 hours (WiFi off) <8 hours (online) which corresponds to <100 ECG records in real environment
Accumulator type	Lihium-ion, protected, 3.6 V, 3200 mAh
Charging time	<3 hours (if completely discharged), it is possible to charge while in operation
Operating conditions	Temperature: 10°C - 40°C, humidity: 30 % - 70 %
Mains supply	100 - 240 V, 50/60 Hz
Ingress protection	IPx2 (IEC60529)
WiFi details	Frequency: 2.4 GHz, channels: 1 - 11, modulation: DSSS / CCK / OFDM, effective power: 7,92 dBm at 11 Mbps
WiFi connection safety	Security type: WPA, WPA2

UNIT	BTL-08 LC PLUS	BTL-08 LC	BTL-08 LT PLUS	BTL-08 LT	BTL-08 MT	BTL-08 SD/SD3	BTL-08 SD1
Display	Colour touch 8.4"		Colour touch 5.7"			Grafical	
Dimensions (mm)	171 x 128 mm		118 x 89 mm			70 x 36 mm	
Resolution (px)	640 x 480					128 x 64	
Displayed leads	12 / 6 / 3					1	
Keyboard	Combined alphanumerical touch-panel keyboard with functional keys					Combined alfanumerical foil keyboard with functional keys	
Port	RS232, USB, LAN (optional), WiFi (optional)					RS232 (optional Serial-to-USB adapter)	
Dimensions	407 x 312 x 146	407 x 312 x 125	407 x 312 x 146	407 x 312 x 125	330 x 270 x 74	276 x 168 x 74	
Weight (including battery) (kg)	5.9	5.7	5.9	5.7	5.2	2	2
PRINT /STORAGE							
Print (office laser/ink printer)	Yes, via BTL CardioPoint (optional)						N/A
Print (build-in printer)	Thermal print						
Paper width (mm)	210 mm / 8"				112 mm / 4.4"	58 mm / 2.2"	
Paper type	A4/A5 Z-fold, roll, fax	A5 Z-fold, roll, fax	A4/A5 Z-fold, roll, fax	5.7	5.2	2	2
Paper speed (mm/s)	5, 10, 12.5, 25, 50						
Gain / sensitivity (mm/mV)	2.5, 5, 10, 20						
Leads print format (colums x rows + rhythm)	1x12, 1x6, 1x4, 1x3, 2x6+1R, 2x6+2R, 4x3+1R, 4x3+2R, 4x3+3R; synchro/in-time; lead system: standard or Cabrera					2x6 (SD), 4x3, 12x1	12x1
Real-time print	Yes, manual profile						
Stored records (10 s strips)	400 (typical), 250 (minimum)					7	
Stored records (long / rhythm)	10					Print only	
RECORDING / ANALYSIS							
One touch recording	Yes						
Leads-off indication	Indication of the contact of each electrode						
Stand-alone recording profiles	Auto (from 10 sec to 80 sec), Long (from 1 min to 10 min), Manual (print-stop buttons)						
User-predefined profiles	Unlimited					3+3	
Online recording to BTL CardioPoint (ECG / Stress-test)	Via serial cable, full-fidelity ECG + pacemaker pulses positions				Via serial cable, full-fidelity ECG		N/A
Offline recording to BTL CardioPoint (ECG)	Manual: via serial cable, automated: via WiFi/LAN module (optional)					N/A	
Measurements	Automatic measurement of HR, RR, P-Q-R-S-T intervals, heart axes and amplitudes						N/A
Text interpretation	Automatic interpretation of recorded ECG with a possibility of displaying the interpretative statements in form of acronyms						N/A
HRV analysis	HR trend, RR histogram, RR SD, RR CV, Min RR, Max RR, max/min ratio, RR count (long mode)					N/A	

UNIT	BTL-08 LC PLUS	BTL-08 LC	BTL-08 LT PLUS	BTL-08 LT	BTL-08 MT	BTL-08 SD/SD3	BTL-08 SD1
SIGNAL PROCESSING							
ECG frequency response	0.05 Hz - 170 Hz					0.05 Hz-150 Hz	
Pacemaker detection	Pulse width >100 µs, pulse amplitude > 2 mV						
Sampling frequency	ECG: 8 x 2000 Hz, pacemaker: 2 axis detection by dedicated circuit with 40000 Hz function						
Input signal range	Dynamic range: 15.9 mV, polarisation: ±400 mV, consistent voltage offset: ±5 V						
Input impedance	>20 MOhm						
Common mode rejection	>100 dB				>98 dB	>100 dB	
OTHER							
Accumulator capacity	<100 prints (auto) / <35 min printing (manual) / <120 min (signal monitoring)				<70 prints (auto) / <30 min printing (manual) / <90 min (signal monitoring)		<30 prints (auto) / <35 min printing (manual) / <75 min (signal monitoring)
Charging time	Approx. 4-6 hours (if completely discharged)					Approx. 3 hours (if completely discharged)	
Operating temperature	10°C to 40°C						
Humidity levels	25 % to 95 %						
Mains supply	100 - 240 V, 50/60 Hz						

Wireless stress test

Stress test

STRESS TEST

BTL CardioPoint-Stress presents a new generation of advanced computer-based stress-test systems. Its simple operation and number of automated features allow physicians to better focus on their patients during the test. Its advanced diagnostic features help extract maximum information from the test.

WHAT'S THE RIGHT CONFIGURATION FOR ME?

| Wireless stress-test | This set is supplied together with the BTL Flexi, the wireless pocket-size ECG that besides conventional stress-tests also allows performing various stress-test modifications such as outdoors tests etc. All of that with a fantastic ECG signal quality. |
| Stress-test | BTL stress-test can also be supplied together with the BTL-08 ECGs. Such configurations allow using the ECG occasionally as a standalone resting ECG device. |

BTL CARDIOPOINT® STRESS

TEST PREPARATION	14 predefined treadmill protocols available
	Load units - W, W/kg, speed, inclination, METs
	Allows creating user-defined protocols (treadmill, ergometer or without load device)
	J+ diagnostic marker settings (fixed or adaptive according to the heart rate)
	Before the test starts, the level of expected maximum exercise is displayed based on the patient's demographic data. It is possible to select a wide range of norms for prediction (Cooper, Jones, Morris, StJames, Washington, KUP 2008)
	Maximum HR prediction
	It is possible to perform a resting ECG test with automatic interpretation before the stress-test
TEST	Automatic and manual load control
	Emergency stop button
	ECG signal freeze function: It is possible to freeze the signal during the test and return to any already-recorded ECG strip during the test
	Possibility to disable noisy ECG channels during the test
	Following parameters are displayed during the test: HR, target HR, % of target HR, trend HR, Sys BP, Dia BP, trend BP, Double product (RPP), Load, Predicted Load, Time of the test and time of the current stage, ST denivelation for all leads
	Possibility to set J+ diagnostic marker before/during/after the test
	Automatic NIBP and SpO2 measurements are supported
	ST maps: ST maps display ST segment deviations in horizontal and vertical plane. They help recognize the common pathologies associated with ST segment deviations easily and quickly.
	Automatic arrhythmia detection
	Possibility of typing medical conclusion any time during the test or recovery phase
	Auto-complete tool for easy & fast medical conclusion typing
SPECIALISED DIAGNOSTIC TOOLS	QT module: The QT module helps evaluating QT(c) interval to diagnose possible risk of ventricular tachycardias that may result in sudden cardiac death. It uses a tangent method which is specifically suitable for QT measurement with higher heart rates, when there is no clear return to the baseline or the T wave has two peaks.
	Risk scoring (Duke, Detrano, StJames, VA referral, ST-HR index)
STORAGE / PRINT	ECG strip can be automatically printed at the end of each stage during the test
	Possibility to add comments to any ECG strip
	ECG leads overlapping on printed reports is minimized by automatic adaptation of spaces between the printed leads.
	The program saves full-disclosure ECG. The ECG signal can be hence fully reviewed any time in the future.
	Final report is saved in PDF at a default or user-selected location
	Printing with any compatible office printer (e.g. laser)

BTL CARDIOPOINT® CPET

Cardiopulmonary exercise tests (CPET, also called CPX) provide more accurate assessment of exercise capacity in comparison with a standard ECG stress-test. This makes it useful in many diagnostic applications where accuracy matters.

MEASUREMENT ACCURACY	The CPET adapts to the specific oxygen sensor that is inside of the gas analyzer. This improves the measurement accuracy, especially in higher breathing frequencies.
	CO2 absorber allows precise calibration of the CO2 sensor resulting in more accurate measurement of CO2 production
	The software automatically warns the user when the ambient CO2 concentration is above certain limits that could possibly compromise test results
	Use of swivel arm allows having short patient tubing. The shorter the patient tubing, the lower the chances of mixing the gas samples together and consequently, the higher measurement accuracy.
	There are no moving parts in the flowmeter. The flowmeter is thus less prone to various defects that may compromise clinical outcomes.
SUPPORTED EXAMINATIONS	Cardiopulmonary exercise test
	Stress-test
	Resting ECG
	Spirometry
	Indirect calorimetry
CLINICAL APPLICATIONS	Evaluation of exercise intolerance
	Evaluation of patients with cardiovascular/respiratory diseases
	Preoperative evaluation
	Exercise evaluation and prescription for cardiac rehabilitation
	Evaluation for lung, heart transplantation
EXERCISE TEST	Simultaneous display of ECG and pulmonary data during the test and synchronized review of the already recorded ECG and pulmonary data. For any selected pulmonary data, the corresponding ECG strip is shown and vice versa.
	Automatic and manual load control
	Possibility of creating user-defined protocols (treadmill, ergometer or without load device)
	Main measured parameters: W - Load, VO2 - Oxygen consumption, VCO2 - Carbon dioxide production, RER - Respiratory Exchange Ratio, VT -Tidal Volume, fR - Breath Frequency, VE - Minute Ventilation, MET - Metabolic Equivalent of Task, HR - Heart Rate, ST segment denivelation (any lead), pO2 - O2 Concentration, pCO2 - CO2 Concentration, PETO2 - End-Tidal Oxygen Tension, PETCO2 - End-Tidal Carbon Dioxide Tension, IC - Exercise Inspiratory Capacity
	Main graphs: Gas exchange (actual VO2, VCO2, Ventilation, Heart Rate and Load), Spirogram, 9-panel Wasserman plot, Flow-volume curve
	Main calculated parameters: VO2max - Maximal oxygen consumption (absolute or relative to body weight), AT - Anaerobic Threshold, VE/VCO2
	Methods for Anaerobic Threshold determination: RER = 1, V-slope, Ventilatory Equivalents
SPIROMETRY	Main parameters: FVC, SVC, MVV
INDIRECT CALORIMETRY TEST	Main parameters: RER - Respiratory Exchange Ratio and REE - Resting Energy Expenditure
STORAGE / PRINT	Possibility to print (merge) reports from Resting ECG, Stress-test ECG and pulmonary data into one report, accessible from BTL CardioPoint
	The program saves full-disclosure ECG. The ECG signal can be hence fully reviewed any time in the future
	Final report is saved in PDF at a default or user-selected location
	Printing with any compatible office printer (e.g. laser)
TROLLEY CONSTRUCTION	Compact cart with holders for two vertically organized monitors
	Dedicated swivel arm holding the gas analyzer
	Built-in 3L calibration syringe and dedicated calibration gas cylinder holder (2-10 L) Required calibration gas: O2 - 15%, CO2 - 6%, Accuracy - 1 % rel.
	Top desk made of non-porous Samsung Steron for easy and hygienic cleaning
	Optional isolation transformer

GAS ANALYSER	Measurement method: Breath-by-breath
	O2: Ultrafast electrochemical cell, - Response time T90: 130 ms, Range: 0-100%; Accuracy: 0.05%
	CO2: Non-dispersive Infrared (NDIR), Response time T90: 130 ms (max.), Range: 0-10 %; Accuracy: 0.05 %
	Ambient conditions: Automatic measurement of ambient temperature, humidity and atmospheric pressure
FLOWMETER	Low-resistance low-noise Pitot method (patented)
	No moving or rotating parts, no nets
	Resistance: ≤0.06 kPa/l/s @ 15 l/s
	Flow measurement range: ±18 l/s
	Flow measurement accuracy: ±2 % or ≤50 ml/s
	Dead space: ≤36ml
	Free of any electrical cables and connectors
	Can be used as a disposable item or reusable if disinfected
	Supports connection of both facial masks and mouthpieces
	BTPS correction

BTL TREADMILL

MODELS	CLINICAL	SPORT	ATHLETE
Running surface	50 x 150 cm	58 x 170 cm	65 x 190 cm
Speed range	0-20 km/h	0-25 km/h	0-32 km/h
Inclination range ange	0-25 %	0-25 %	0-22 %
Min. speed increments (from 1 km/h)		0.1 km/h	
Min. inclination increments		0.50 %	
Step-up height (belt height from floor)		17 cm	
Max. patient weight		200 kg	
Mains supply		230 V	
Current		6.5 A	
Peak current		22 A	
Dimensions (l x w x h)	205 x 80 x 112 cm	230 x 90 x 115 cm	252 x 96 x 115 cm
Weight	163 kg	220 kg	245 kg
Control panel	Optional 7" touch-screen 800 x 480 control panel for treadmill operation without computer. Speed, inclination and distance are displayed		
HOW TO ENSURE PATIENT'S SAFETY?			
2 emergency stop buttons	Standard	Standard	Standard
Full-length sidebars (optional pediatric size)	Standard	Standard	Standard
Safety lanyard - automatically stops the treadmill if the patient falls	Optional	Optional	Optional
Fall stop system - construction with a harness (prevents the patient from falling on the belt)	Optional	Optional	optional

ECG HOLTER

BTL CardioPoint-Holter has been specifically designed to save physician's time. Besides excellent signal quality, which is crucial in Holter recording, it offers a number of unique tools for verification of the automatic diagnostic results. As a result, it is possible to evaluate the Holter record in minimum time and with maximum accuracy.

THE REASONS WHY

ECG clarity	High signal quality significantly decreases the time spent on evaluation
Undo function	Any accidental operation can be easily undone
Automatic conclusion editor	Possibility of having conclusion templates further decreases time spent on evaluation
Interactivity	The evaluation software is completely interactive. Making a change in one component automatically updates other components and the final report.
Easy to customize	Each user can customize the software layout to fir their specific needs

BTL CARDIOPOINT® HOLTER

GENERAL

	H100	H300	H600
Certified medical device			
For general BTL CardioPoint specifications see page 41			
Paediatric use - The system allows evaluating even the youngest children. Even the narrowest QRS complexes are reliably reproduced. Automatic analysis takes into account patient's age and automatically adjusts limits of normality.			

WORKFLOW

		H100	H300	H600
Support of various ways of programming the recorder and starting the examination - from a computer (recording quality check on a PC screen) - directly from the recorder (recording quality check on the recorder screen) - from a recorder using pre-programmed SD card (recording quality check on the recorder screen)		•	•	•
Support of networking for an efficient clinical workflow, e.g. technician preprocessing the record (removing artifacts) and doctor evaluating the same record after on another computer		•	•	•
Possibility of reanalyzing the record with user-defined scan criteria (e.g. selection of leads, prematurity level, pacemaker etc.)		•	•	•

RECORD EVALUATION

		H100	H300	H600
ECG signal	Thanks to autoadaptive filters, the program displays the ECG signal with an excellent clarity. It is however also possible to see the raw signal.	•	•	•
	ECG signal is displayed on standard ECG strip (5-40 mm/mV, 12.5-100 mm/s) as well as in a Full-view mode (30 s/row) or Tiles-view (gives an overview of selected ECG events)	•	•	•
	Possibility of maximizing any ECG window to a full screen with a single mouse click or keyboard shortcut	•	•	•
Templates	Automated classification and distribution of detected beats into templates according to their morphology and rhythm (Normal, Normal with intraventricular conduction defect, Supraventricular, Ventricular Premature, Ventricular Interpolated, Ventricular Escape, Fusion)	•	•	•
	For any selected beat in the ECG, a corresponding template can be reached in a single click	•	•	•
	Possibility to merge any selected templates into one template	•	•	•
	Graphical split (Superimposition): advanced tool for validation of automated beat classification. This tool displays the heart beats in a superimposed way so that a physician can easily evaluate homogeneity, remove artifacts or split an ECG template into two.			•
Patient activity	Patient's physical activity (movement/standstill) is graphically visualized in the software to help correctly evaluate the record (e.g. total sleep duration, wake up time, etc.)			•
Smart summary	All detected events and their corresponding values or counts (e.g. longest RR interval or total count of ventricular beats) are summarized in a table for an easy review. The content of this table can be optimized according to doctor's needs.	•	•	•

		H100	H300	H600
Time analysis	There are plenty of graphs in the software displaying distribution of particular events in time. Such visualization allows identifying time zones with higher concentrations of detected events and making various correlations (e.g. Patient button press vs distribution of ventricular events).	•	•	•
	Events that tend to repeat on a daily basis can also be easily evaluated in multiple-day records. Beginnings of all the 24-hour graphs can be aligned according to wake-up time or medication time.	•	•	•
Rhythm analysis	Automatic detection of: - pauses - heart rate: time trend, tachogram (available only in H600), RR histogram - basal rhythm: normal (sinus, sinus tachycardia, sinus bradycardia), supraventricular (supraventricular ectopic rhythm, supraventricular tachycardia, atrial flutter or fibrillation), ventricular tachycardias (ventricular escape rhythm, accelerated idioventricular rhythm (AIVR), ventricular tachycardia). - patterns / runs: supraventricular or ventricular couplet, triplet, bigeminy, trigeminy, quadrigeminy and runs	•	•	•
	For every rhythm event, avgHR, minHR, maxHR and beat count is calculated	•	•	•
	Possibility to set / modify particular diagnostic criteria (prematurity level, RR limits, HR limits, beat count limits, repetitions limits)	•	•	•
	Advanced visualization tools such as Relief map, Poincare graph and Tachogram			•
HRV	The program provides time and frequency HRV analysis (HRV NN avg, HRV TI, HRV LI-K, HRV LI-PHI, HRV NN(50), HRV NN avg diff, HRV pNN(50), HRV RMSSD, HRV SDNN, HRV TINN, HRV LF, HRV HF, HRV LF/HF, HRV CCVHF, HRV CCVLF, logarithmic index K, logarithmic index Phi)	•	•	•
	HRV trends: data display in form of time trends		•	•
	PSD (power spectral density) graph: this tool helps diagnosing chronic fatigue, burn-out syndrome and sleep disorders			•
Pacemaker analysis	Pacemaker detection: classification of paced beats and their identification in the ECG record	•	•	•
	Pacemaker analysis: Allows evaluating correct pacemaker functionality by displaying "failure to sense" and "failure to capture" events as well as distribution of paced beats in time			•
Beat by beat measurement of PQ, QT, ST, QRS	PQ: helps evaluating conduction disorders through the detection of extreme values, PQ trend graph, PQ/RR graph and AV block analysis			•
	ST: statistical evaluation of the ST burden in a well-arranged table	•	•	•
	ST trends: allows comparing development of ST segment in time with other trend graphs (e.g patient's activity)		•	•
	Possibility of defining the position of J+ diagnostic marker as fixed or HR dependent	•	•	•
	QT/QTc: evaluation available in time trends or QT/RR (QTc/RR) graphs		•	•
	Caliper: Allows measuring the ECG right inside of the ECG strip component. For further comfort, the caliper can also automatically snap to PQ, QT and QRS intervals.	•	•	•

SPECIALISED DIAGNOSTIC TOOLS

|		H100	H300	H600
Relief and waterfall	The Relief map provides a simplified, yet complex, look at arrhythmias and changes in morphology. This unique tool allows for immediate detection of even such irregularities that are typically not visible when using the traditional methods of ECG signal analysis.			•
Interactive Poincare	Poincaré graph is a special tool allowing physicians to see the R-R-R dynamic of each beat from a complete record at a glance. Its interactivity predisposes this tool for a fast review of AF or premature beats.			•
Storage / Print	The program saves full-disclosure data. The data can be reviewed any time later. It is also possible to set its automatic back-up or deletion.	•	•	•
	Final report is saved in PDF at a default or user-selected location	•	•	•
	Export in following formats: EDF+, XML, CSV, SDF, KEC with a possibility of patient data anonymization			•
	HL7, DICOM, GDT data transfer options	•	•	•

CHOOSE THE RIGHT LEAD SYSTEM...

3 bipolar leads	High signal amplitudes, minimum amount of ECG artefacts, 5-lead patient cable - ideal solution for basic arrhythmology.
7 leads	7 ECG channels obtained through the use of 5-lead patient cable. The ECG has a shape of a standard Mason-Likar lead system (ECG waveforms have the same shape as stress-test ECG). The obtained V1 channel helps with differential diagnosis of wide QRS tachycardias.
12 leads	Standard Mason-Likar ECG obtained from a 10-lead patient cable. The ECG waveforms have a same shape as stress-test ECG. This system is particularly useful in diagnosis of myocardial ischemia.

**WHAT RECORD DURATION SHOULD YOU CHOOSE?**

The overview below shows how important it is to set correct record duration to extract desired information from the record. Frequency of cardiac issues reported by a patient (e.g. palpitations, syncope, dizziness) has to be taken into account when choosing the record duration.

|	
24 hours	Only 25 - 50 % of patients will experience a symptom
2 days	Minimal recommended time for detection of paroxysmal AF and syncopes. Fully adequate period for myocardial ischemia monitoring.
3 days	+50 % incidence of symptomatic events in comparison to 24h record
5-7 days	+75 % incidence of symptomatic events in comparison to 24h record

UNIT	BTL-08 HOLTER H100	BTL-08 HOLTER H300	BTL-08 HOLTER H600
Number of ECG channels	3 channels	3 or 7 channels	3, 7 or 12 channels
Number of electrodes	5 electrodes	5 electrodes	5 or 10 electrodes
Max. record duration	2 days	7 days	7 days 4 days (for 12 channels)
Certified for use with children <10 kg		Yes	
Certified for ST segment evaluation		Yes	
Patient activity monitoring		2 axes accelerometer	
Pacemaker detection		Pulse width >100 μsec, pulse amplitude >2 mV	
Patient button / voice recording		Yes	
Signal quality check		On built-in display or in BTL CardioPoint via USB	
Automatic start of recording - eliminates the risk of forgetting to start recording		20 minutes after inserting the batteries	
Automatic continuation of recording after battery replacement		Yes	
ECG frequency response		0.049-220 Hz (filters off)	
Sampling frequency		ECG: Delta-Sigma A/D converter, 8 x 2000 Hz Pacemaker: 2 axis detection by dedicated circuit with 40000 Hz function	
Digital resolution		24 bits / 1,52 μV	
Input signal range		Dynamic range: ±33 mV, polarisation: ±300 mV, consistent voltage offset: ±5 V	
Common mode rejection ratio		>100 dB (filter off) / >115 dB (mains filter on)	
Dimensions (including patient cable connector)		102 x 62 x 24 mm	
Operating conditions		temperatuture: 1°C - 55°C, humidity: 10 % - 95 %	
Weight		106 g without batteries, 155 g including batteries	
Battery type		2x AA >1,2 V	
Battery capacity / type		Lithium AA: cca 116 hours Alkaline AA: cca 75 hours NIMH 2500 mAh: cca 51 hours	
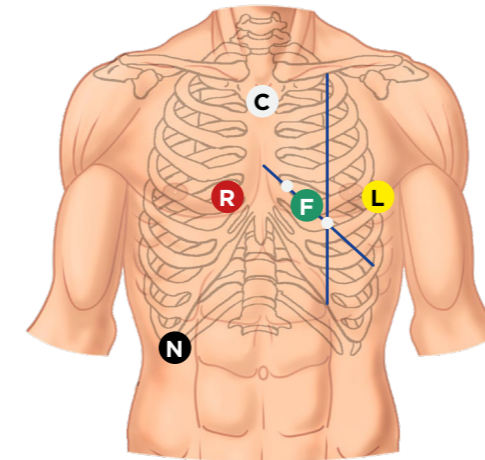
3 leads
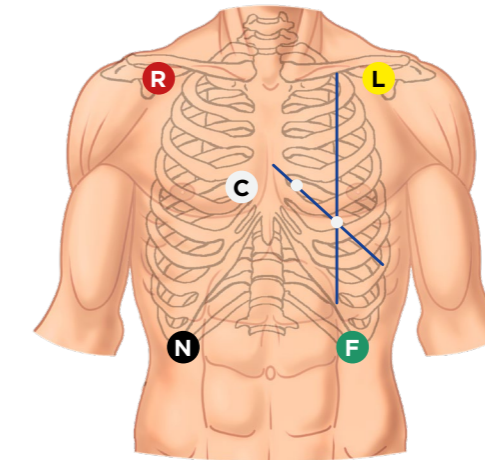
7 leads
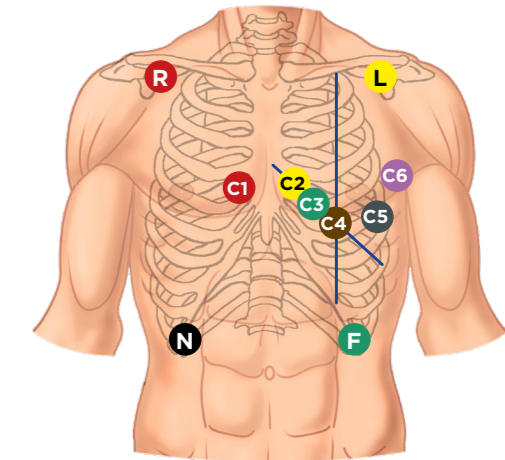
12 leads

AMBULATORY BLOOD PRESSURE MEASUREMENT

BTL ABPM records blood pressure for up to 51 hours at preset intervals. To improve measurement reliability, it uses a stepwise deflation - a measurement method that minimizes amount of possible artefacts. Provided software allows evaluating a complete record in a single screen, easily and quickly.

BTL CARDIOPOINT® ABPM

GENERAL

Certified medical device
For general BTL CardioPoint specifications see page 41

TEST PREPARATION

Possibility to create an individual measurement plan for each monitored patient
Blood pressure monitoring duration: 24, 27, 48, 51 hours
Independent measurement intervals settings for: Day, Night, Morning, Special

EVALUATION

Visual presentation of the BP results in form of interactive tables, graphs and histograms
All BP values above/below normality limits are automatically highlighted
Possibility to manually remove measurement artifacts
Measurements summary - total number of measurements (for each interval and overall), percentage of successfully finished measurements
Calculated parameters: MAP avg, PP avg, Pulse avg, Night fall index Sys/Dia, SYS/DIA day/night difference, PTE SYS/DIA,PTD SYS/DIA, SYS/DIA max, SYS/DIA min, Morning surge, SYS/DIA avg, SYS/DIA load, SYS/DIA leese,SYS/DIA hyper readings, SYS/DIA hypo readings
Histograms of SBP, DBP and MAP for overall, day and night intervals
Facility to add predefined phrases to the medical conclusion

SPECIALISED DIAGNOSTIC TOOLS

Automatic interpretation of ABPM results according to the patient demographics and selected recommendation for adults (ESH 2018, AHA 2017, NICE 2011, AHA 2005, ESH 2003, NHFA 2002) or for children and adolescents (ESH 2016 by age or height, modif. AHA 2008, modif. Chaloupecky 2006). Possibility to configure the criteria manually.

STORAGE / PRINT

Possibility to print a single page report, possibility of report customization
The program saves full-disclosure data. The data can be reviewed any time later. It is also possible to set its automatic back-up or deletion.
Final report is saved in PDF at a default or user-selected location
Export into CSV with a possibility of patient data anonymization
HL7, DICOM, GDT data transfer options

UNIT	BTL-08 ABPM
Measurement method	Oscillometric stepwise deflation
Pressure sensor type	Piezoresistive
Accuracy	±3 mm Hg or 2 % of measured value (2 years stability) accuracy validated according BHS / AAMI / IEC
Measurement range of SBP/DBP	30-260 mmHg
Inflation pressure	Automatic adaptation to each patient according to the last measured systolic BP
Maximum pressure in the cuff	300 mmHg
Inflation safety	Independent overpressure valve
Pulse measurement range	40-200 bpm
Interval between measurements	5 to 90 minutes
Memory capacity	600 measurements
Applicable cuffs	Small, standard and large sizes
Buttons	Patient button, day / night switch button, medication button
LCD display with backlight	40 x 22 mm
Displayed values	Battery capacity, measurement result (Sys/Dia/HR), service functions
Data transfer to computer	Via optical USB cable
Dimensions	98 x 69 x 29 mm
Weight	190 g without batteries, 240 g including batteries
Batteries	2x AA, 1.5 V (NiMH or Alkaline)

SPIROMETRY

BTL CardioPoint-Spiro is a modern computer spirometer for performing pulmonary function tests and managing patient records. Minimal operational costs are ensured by use of reusable sensors and mouthpieces. Results can be easily viewed on a single screen and final report adjusted according to the doctor's needs. Support of tests with medication is a matter of course.

BTL CARDIOPOINT® SPIRO

GENERAL

Certified medical device
For general BTL CardioPoint specifications see page 41

FVC TEST

Real-time graphs: Flow / Volume and Volume / Time
Compliance with ATS/ERS 2005 standards
Supported FVC maneuvers: Closed circuit method, Open circuit method
Main measured parameters: FVC, FEV0.75, FEV1, FEV3, FEV6, PEF, FEV0.75/FVC, FEV1/FVC, FEV3/FVC, FEV6/FVC, FEV0.75/VC, FEV1/VC, FEV3/VC, FEV6/VC, PIF, FIVC, FIV1, MEF75, MEF50, MEF25, FEF75, FEF50, FEF25, MMEF, FET25, FET50, MIF75, MIF50, MIF25, PEFT, FIF50, FEF50/FIF50, FEF50/VC, FEV0.75/FEV6, FEV1/FEV6, FIV1/FIVC, VEXT, Lung age, Aex, FEF25-75, VEXT, T0/PEF, T200/PEF, VEXT/FVC
Predictive norms (adult and pediatric): GLI 2012, Caussade Gutierrez 2015, ECCS 1983, ECCS/ERS 1993, Zapletal 1977, Roca Barcelona 1986, NHANES III 1999, Knudson 1983, Knudson 1976, ITS 1984, Crapo 1981, Lam 1982, Pereira 1996, Gore 1995, , Hou Shu 1990, Jia Ju-cai 1990, Sun Bin 1990, Liu Shi-Wan 1990, Liu Guo-Hua 1990, Zhu Xi 1990, Wu 1961, Ip 2006, Polgar 1979, Wang Yang 2013, Perez Padilla 2003, Platino 2006, PDPI 1992, Thai 2000, Solymar 1979
Calculation of acceptability and repeatability criteria
Automatic or manual selection of the best maneouvre
Measured values can be compared with: - LLN (value of Lower Limit of Normality) according to the patient demographics and selected norm - predicted value according to the patient demographics and selected norm - reference value from patient's history
Automatic interpretation according ATS+GOLD, ATS, GOLD, BTS, Enright
Animated incentive for children

FVC TEST WITH MEDICATION

Bronchodilatation, bronchoconstriction, NaCL tests supported
Possibility to create user-defined medication protocols

SVC TEST

Real-time graph: volume / time.
Measured parameters: SVC, ERV, IRV, TV, IC, IVC

MVV TEST

Real-time graph: volume / time.
Measured parameters: MVV, MVVf, MRf, MVVt, TV

SPIROMETRY COMPARATOR

Allows observing patient's results in time and evaluate a treatment success rate
FVC, FVC PRE/POST, SVC, MVV tests supported
Comparison displayed in form of tables, time trends and superimposed curves

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STORAGE / PRINT

Possibility to print a single page report, possibility of report customization
The program saves full-disclosure data. The data can be reviewed any time later. It is also possible to set its automatic back-up or deletion.
Final report is saved in PDF at a default or user-selected location.
Export into CSV with a possibility of patient data anonymization.
HL7, DICOM, GDT data transfer options

UNIT	PNEUMOTACHOGRAPH BTL-08 SPIRO PRO
Measurement method	According to Lilly (no moving or rotating parts, free of any electrical cables or connectors near patient mouth)
Resistance	≤0.079 kPa/l/s @ 15 l/s
Flow measurement range	±16 l/s
Flow measurement accuracy	±5 % or ≤50 ml/s
Volume measurement range	0 to 8 l
Volume measurement accuracy	±3 % or ≤50 ml/s
Sensor	Plastic, disinfectable It can be easily replaced by the user (4 pieces in the standard set)
Mouthpiece	Plastic (reusable when disinfected, 4 pcs in the standard set) / paper (disposable, optional)
Bacterial / viral filter	Yes (optional)
Sampling frequency	1000 Hz
BTPS correction	Yes, built-in sensor for ambient temperature, atmospheric pressure, relative humidity
Calibration method	Zero flow adjusting - automated flow / volume adjusting: >=3L syringe (requires optional 3L calibration syringe)
Operating conditions	temperatuture: 10°C to 40°C, humidity: 25% to 95%
Mains supply	USB powered

TILT TEST

BTL-1800 TILT

Operation	Motorized tilt couch with a continuous movement
	Automatic stop at predefined tilt angle
	Remote control
	Lifting: up to 15 sec
	Lowering: up to 5 sec, 2 speeds
	Tilt range: 0° (horizontal) to a 75°
Max. patient weight	170 kg
Couch	Length: 210 cm
	Width: 80 cm
	Height: 70 cm to 225 cm according tilt level
	Weight: 130 kg
Engine	Electric: max. el. power 185 W, Fmax: 10 kN
Safety	Electrical insulation: 4000 V
	3 safety belts and leg rest
	Shock absorber for soft coach return to the horizontal position
	Pedal switch for fast coach return to the horizontal position
Operating conditions	Ambient temperature: -10°C - 40°C, relative humidity: 30 % - 75 %

BTL: OVER 25 YEARS OF INNOVATION

55+

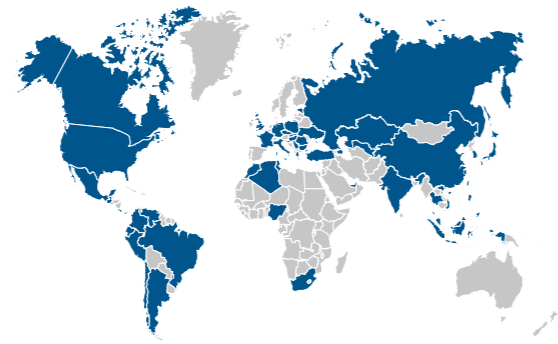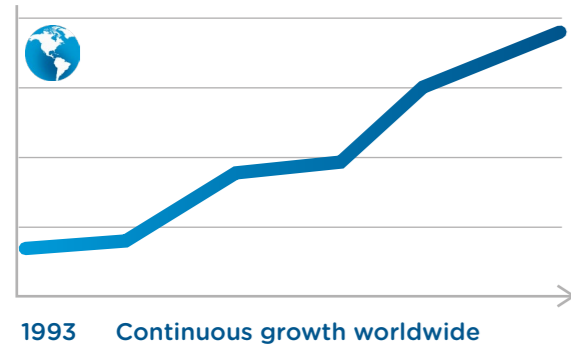More than 55 offices around the globe

1,800 employees worldwide

300

More than 300 engineers

2

2 focused divisions: medical and aesthetics

Growing to meet your needs

1993   Continuous growth worldwide

OUR COMMITMENT TO YOU

BTL will:

• Provide safe and efficacious solutions of the highest quality

• Offer technology with NO costly consumables

• Continue to offer an affordable upgrade programs

sales@btlnet.com
btlnet.com