

# CARDIOVIT AT-10

Top Performance  
in Laptop Size!



## SCHILLER

[www.schiller.ch](http://www.schiller.ch)

The Art of Diagnostics

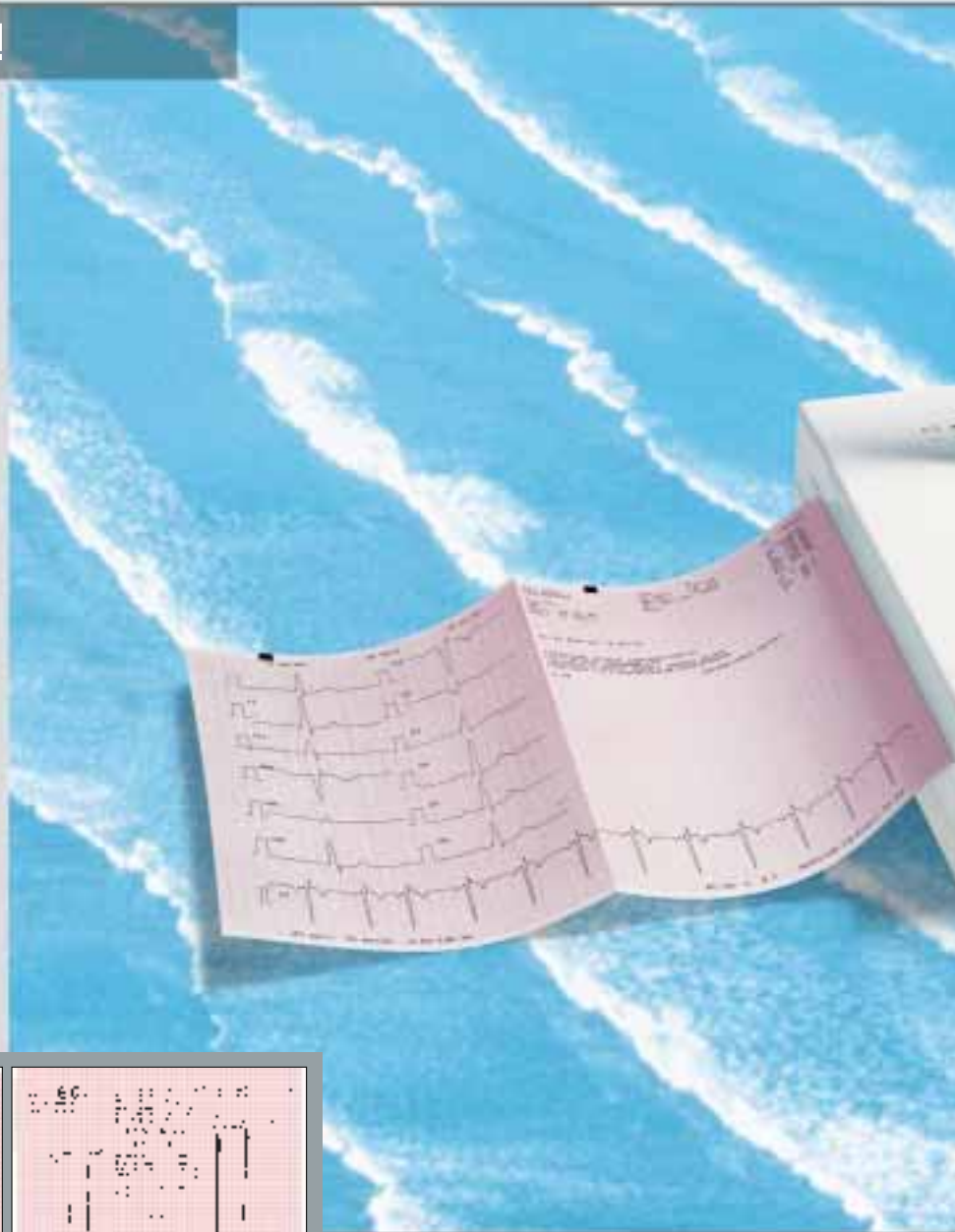
# To master the Waves!

## Power and Performance:

The CARDIOVIT AT-10 by **SCHILLER** meets the highest demands of cardiovascular and lung function diagnostics. This flexible unit allows you to perform a wide range of applications as follows:

- Resting ECG
- Exercise ECG EXEC
- Pacemaker measurement
- RR Heart Rate Variability
- Signal averaging
- Complete spirometry testing
- Late Potentials

All available at your fingertips!



## Top Performance

The CARDIOVIT AT-10 is ready to use at any time. Clearly labeled direct function keys and on-screen menus allow for quick, simple and reliable operation. Preprogrammed settings are activated at the touch of a key. User-selected settings for monitor and paper outputs are stored under individual base settings at the press of a key. The time required to learn how to use the unit is thus reduced to a minimum.

## The Display

The CARDIOVIT AT-10 keeps you informed! The high resolution LCD screen shows you everything that is important at a glance. Screen selections can be changed at any time without interrupting ongoing tests. Large CRT monitors can be connected to the standard video monitor interface.

## ECG Application

The standard CARDIOVIT AT-10 incorporates several software programs. You have the possibility to expand the diagnostic potential of your unit at any time.

## Measurement and average Complexes

The SCHILLER ECG measuring program precisely determines the beginning and end points of P waves, QRS complexes and T waves based on noise reduced average complexes. Electrical axis as well as exact time and amplitude measurement are provided.

## ECG Interpretation

With the clinically proven **SCHILLER** ECG interpretation program you have at your disposal a broad range of diagnostic information with regard to rhythm, electrical axis, QRS morphology changes, conduction





### The Features of a Winner:

- Compact laptop design, weighs only 4.6 kg
- Tilt-up monitor with high resolution (640 x 480 dots)
- Built-in digital printer with full size paper printout
- Rechargeable batteries
- Direct function keys and on-screen menus for safe and easy operation
- 12 lead simultaneous ECG signal acquisition
- 3, 6 or 8 channel display
- Complete data output, on-screen and on ready-to-file printout
- Fully computer-supported exercise testing at the touch of a key
- Optional software for ECG measurement and interpretation, late potential analysis, RR Heart Rate Variability, pacemaker measurement
- Optional PFT module for a complete lung function measuring station
- Integration with SEMA-200; **SCHILLER's** data management system for diagnostic tests
- Communication with peripheral units through standard interfaces (3x RS-232, RS-422, DC inputs, CRT monitor interface)

defects, hypertrophy characteristics, ST or T changes, myocardial infarction etc. With an interpretation time of less than 5 seconds the **SCHILLER** ECG interpretation program is the fastest available program on the market today.

### Pacemaker Measurements

This software program performs automatic detection and measurement of pacemakers. It measures pacing frequency, performs individual measurement of pulse width for atrial and ventricular stimulation, as well as the determining of the AV-interval frequency.

### RR Heart Rate Variability

With a recording time of only 15 to 20 minutes, this **SCHILLER** program allows you to determine the risks in connection with low RR Heart Rate Variability (i.e. sudden cardiac death). Until today, this test could only be performed with a 24 hour ambulatory recording. In addition to the graphic display of RR tachograms and histograms, numerous statistical parameters are calculated (i.e. standard deviation, mean deviation, mean value, BB50 value). All parameters are shown in relation to the mean RR interval – absolutely unique!

### Late Potentials

Extensive signal averaging and filtering makes it possible to detect existing micro-potentials located at the end of a QRS complex. Such late electric activities may indicate an increased risk of malignant ventricular tachycardia or even sudden cardiac death.

### SEMA-200 (Option)

SEMA-200 is **SCHILLER's** PC-based data management system for diagnostic tests. SEMA-200 receives, edits and archives ECG, exercise and spirometry tests. The CARDIOVIT AT-10, in its standard version, is equipped to communicate with SEMA-200.

# Top Scores for the Winner!

## Ergometers:

### ERG 911 and ERG 911 BP

**Dimensions:** 40 x 83 cm (w x l)

**Weight:** 60 kg

**Braking principle:** Computer-controlled eddy current brakes with measurement of torque, independent of revolutions per minute

**Load range:** 20 – 800 W

**Range of revolutions:** 30 – 130 n/min

**Load precision:** 3 % not less than  $\pm 3$  W

**Load steps:** 5 W and 25 W manual, or multiple via program

**Time interval:** 1 – 99 min

**Adjustable seat:** Infinitely variable for height of 120 – 210 cm

**Adjustable handlebar:** Vertically for height of 120 – 210 cm

**Display:** LCD with 320 x 240 pixels, CCFT backlit for alphanumerical and graphical display of the ergometry parameters and of the user instructions as well as programming and service information

**Blood pressure measurement (option):** Indirect with special modified R-R measurement system. Computer analysis with distortion-free suppression of interferences during ergometry. Automatic pressure release with 3 mmHg/pulse. Quick pressure release at the average of high amplitudes. Optical and acoustical alarm beyond the threshold limits. Cuffs in different sizes available for adults and children

**Cuffs in different sizes available for adults and children**

**Electrical Inputs and Outputs:** Galvanically isolated digital RS-232 interface

**Power supply:** 115 V / 230 V, 50 / 60 Hz

**Safety class:** IEC/EN 60601-1

**Conformity:** CE 0124, EC 93/42/EEC (II.3)

### Ergo-Couch ERG 911 S/L

**Dimensions:** 160 x 60 cm (w x l)

**Weight:** 90 kg

**Braking principle:** Computer-controlled eddy current brakes with measurement of torque, independent of revolutions per minute

**Swivelling reclining seat:** 90 x 55 cm for heights of 140 to 205 cm and a maximum weight of 160 kg. Infinitely variable adjustment of the seat from 45 degree to horizontal position by remote control

**Load range:** 20 – 800 W

**Range of revolutions:** 30 – 130 n/min

**Load precision:** 3 % not less than  $\pm 3$  W

**Longterm precision:** Balance of torque at any time by the patient-weight

**Load steps:** 5 W and 25 W manual, or multiple via program

**Time interval:** 1 – 99 min

**Display:** LCD with 320 x 240 pixels CCFT backlit for alphanumerical and graphical display of the ergometry parameters and of the user instructions as well as programming and service information

**Blood pressure measurement (option):** Indirect with special modified R-R measurement system. Computer analysis with distortion-free suppression of interferences during ergometry. Automatic pressure release with 3 mmHg/pulse. Quick pressure release at the average of high amplitudes. Optical and acoustical alarm beyond the threshold limits. Cuffs in different sizes available for adults and children

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SCHILLER ERG 911 BP



SCHILLER Ergo-Couch



## Exercise Testing

The most commonly used test protocols are already programmed in your CARDIOVIT AT-10! Five (treadmill) or four (bicycle) user definable protocols allow you to store or modify programs exactly as you wish. The exercise testing program controls a bicycle ergometer or a treadmill. Non-invasive blood pressure is measured automatically at the beginning of every loadstep or entered manually at any time during the



test. Possible with BP-200 or the internal BP unit of the ERG 911 BP (optional). Continuously updated ECG information, including test duration, heart rate, actual rate, actual load steps and METS are viewed on-screen and documented on paper. A comprehensive final report can be printed out at the end of each exercise test.

**SCHILLER's** advanced ST measurement program EXEC provides you with continuous and real time 12 lead ST information, based on the most sophisticated beat to beat analysis.



## Treadmills:

### MTM-1500 and MTM-1500 med

#### Dimensions:

**Running surface:** 50 x 150 x 16 cm (W x L x Access), shock load reduction for the joints; belt surface with non-slippery material

**Size of frame:** 82 x 210 x 120 cm (w x l x h)

**Weight:** Approx. 200 kg

**Speed range:** 0 – 20 km/h

**Acceleration:** 7 levels (in 3 to 131 sec. from 0 to max. speed); also for deceleration, for manual or program mode

**Grade range / elevation:** 0 – 24 %, electronically adjustable, resolution 0.1 %; an electronic motor break system prevents from accelerating when running at max. elevation

**Motor system:** 1.5 kW (2.0 HP) 3-phase A.C. motor (maintenance free)

**Power transmission:** Poly-V-Belt drive (very quiet operation)

**Safety systems:** CE-0123, IEC/EN 60335-1 (VDE 0700); IEC/EN 60601-1-2 (EMC approval); IEC/EN 60601-1-4 (VDE 0701); EN 957-1, EN 957-2, EN 957-6; emergency stop switch

**For MTM-1500 med (in addition to the above-mentioned):** MDD, guideline 93/42 EEC for med. devices, IEC EN 60601-1 (VDE 0750 and VDE 0751); Potential Equalization Transformer for Potential-Isolation from the mains; emergency stop switch with mains cut

**Digital interface:** 1 x RS-232 COM1 incl. PC-, CosCom-, Blood Pressure-Monitor-, ECG-, Ergo-Spirometry- and series-printer protocol

**Free PC software:** h/p cosmos para control for display and remote control via PC

Various error messages in the form of alarm beep codes are available for error diagnosis. These beep codes can also be sent over the telephone line for remote diagnosis

**Colour of frame:** Grey aluminium, other colors available on request

**Handles:** Steel tube handrail on one side; this siderail can be mounted on the left or right; second handrail available at extra charge; frontbar handle as standard

**Voltage supply:** 220/240 Volt, 50/60 Hz, 1 phase AC, 16 Amps; special voltage supply available on request

**For MTM-1500med (in addition to the above-mentioned):** 110/120 Volt (performance limitation)

Technical data are subject to changes without prior notice.



SCHILLER MTM-1500



# Breathtaking power and performance!

## Spirometry:

### SPIROVIT SP-20/SP-150

#### Measured values:

**FVC:** FVC, FEV<sub>0.5</sub>, FEV<sub>1.0</sub>, FEV<sub>3.0</sub>, FEV<sub>0.5</sub>/FVC, FEV<sub>1.0</sub>/FVC, FEV<sub>3.0</sub>/FVC, FEV<sub>0.2-1.2</sub>, FEF<sub>25-75%</sub>, FEF<sub>75-85%</sub>, PEF, MEF<sub>75%</sub>, MEF<sub>50%</sub>, MEF<sub>25%</sub>, FVC, FIV<sub>1.0</sub>, FIV<sub>1.0</sub>/FVC, FIV<sub>1.0</sub>/FVC, PIF, MIF<sub>50%</sub>

**SVC:** SVC, ERV, IRV, TV

**MV:** MV, RR, TV

**MVV:** MVV, RR, TV

#### Presentation:

- Flow volume loop
- Flow time plot
- Measurement values table

#### Prediction equation:

**Adults:** ECCS, Crapo, Morris, Knudson, Knudson 76, Austria, Berglund, Finnish, Indian, Composite, Polgar

**Children:** Quanjer & Tammeling, Austria, India, Knudson, Knudson 76, Polgar

- Comparison pre/post medication possible
- Extrapolated predicted values

#### Standards Compliance:

ATS, OSHA, NIOSH  
SPIROVIT SP-150 pneumotach flowsensor for pulmonary function testing with disposable sensors:

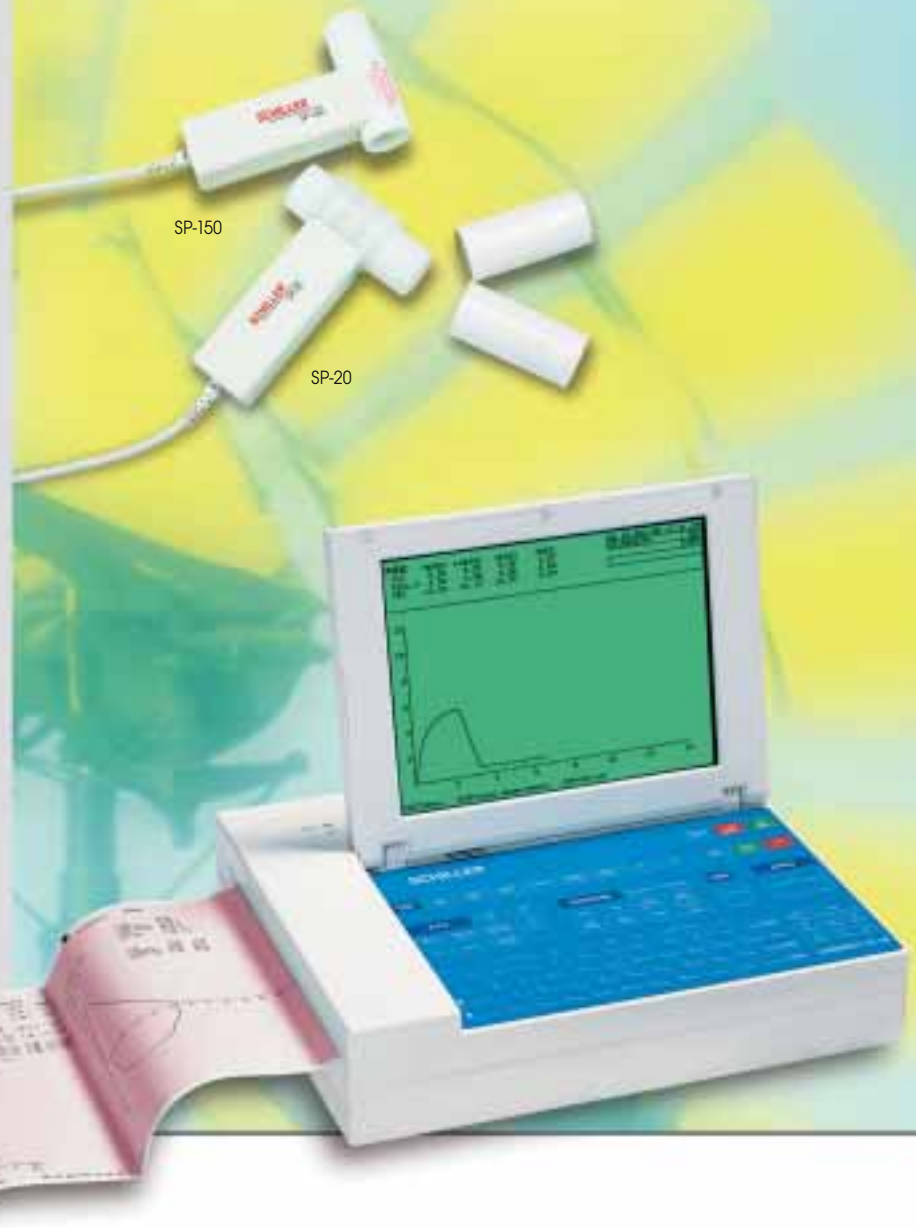
**Dimensions:** 118 x 36 x 28 mm, app. 120 g  
4.6 x 1.4 x 1.1 in, app. 0.26 lbs

**Measuring method:** Pneumotachometer

**Measuring ranges:** - Flow: 0 to  $\pm 14$  l/s  
- Volume: 0 to  $\pm 11$  l

**Measuring accuracy:** Meets ATS Standards

**Flow impedance:** < 0.2 mbar \* s/l at 12 l/s



## Spirometry

ECG and spirometry in a single unit! As an option, the AT-10 can be expanded to perform ECG and spirometry. Several expiratory and inspiratory tests can be performed and compared with country specific normal values. Pre/Post measurements and interpretation are standard. SCHILLER offers several different sensor devices.

## Reusable SPIROVIT SP-20

The SP-20 sensor is extremely comfortable to use, very accurate and easy to clean between patients. Its non-laminar design sets new standards in pneumotach sensor technology.

## Disposable SPIROVIT SP-150

With SCHILLER's unique SP-150 disposable sensors, the risk of crosscontamination is reduced to its minimum. The small, light-weight sensors are low cost and completely disposable. Simply remove, discard and replace the sensor after each patient performance.

No need for sterilization, easy handling and saving time are maximum benefits for both patient and physician!



# Technical Data

## System:

**Dimensions:** 320 x 204 x 70 mm, app. 4.7 kg,  
12.6 x 10.5 x 3.0 in, approx. 10 lbs

**Power supply requirements:** 110/130/230/240 VAC,  
50/60 Hz, independent operation with built-in  
rechargeable battery; integrated charger-unit

**Power consumption:** 13 to 30 VA

**Frequency range of digital recorder:** 0.05 Hz – 150 Hz  
(IEC/AHA)

**Patient input:** Fully floating and isolated, defibrillation  
protected

**Patient leakage current:** < 5  $\mu$ A

**Control panel and keyboard:** User-friendly splashproof  
key pads

## Standard interfaces:

- 3 x RS-232 (V24) serial interface
- 1 x RS-422 serial interface
- VGA connection
- QRS-trigger output/foot switch
- Exercise testing interface
- 2 DC inputs 0.5 V/cm

**Leads:** Up to 12 simultaneous leads: Standard/Cabrera/  
Nehb, further lead combinations freely programmable  
by the user

## Data record:

- Listing of ECG recording data, date and time of  
recording, patient data, etc.
- With option M: ECG measurement results (intervals,  
amplitudes, electrical axes), average complexes with  
optional measurement reference markings
- With option C: ECG interpretation statements and  
measurements

**Long-term rhythm recordings:** 1 lead, 10.5 min or 90  
sec/page

## Exercise ECGs with final report:

- Automatic control of bicycle ergometer and treadmill  
(user programmable)
- Final report showing trendplots of heart rate, load  
and blood pressure, physical working capacity  
(PWC 150, PWC 170, PWC max.)
- Options M and C: QRS and ST measurements

**Myogram filter (muscle tremor filter):** Adjustable at 25  
or 35 Hz, only effective for printed ECG

**Sensitivities:** 2.5 / 5 / 10 / 20 mm/mV, either automatically  
adjusted or manually selected

## SSF SCHILLER Smoothing Filter

**SBS SCHILLER Baseline Stabilizer:** Only effective on  
written ECG

## ECG amplifier:

- Simultaneous, synchronous recording of all  
9 active electrode signals (= 12 leads)
- Sampling frequency: 4000 Hz
- Digital resolution: 5  $\mu$ V
- Dynamic range:  $\pm$  10 mV
- Max. electrode potential:  $\pm$  300 mV
- Frequency response: 0.05 – 350 Hz (-3 dB)
- Pacemaker detection/measurement:  
measurement voltage range:  $\pm$  2 to  $\pm$  500 mV  
measurement duration range: 0.1 to 5 ms

**Line frequency filter:** Distortion-free suppression of  
superimposed 50 or 60 Hz sinusoidal interferences by  
means of adaptive digital filtering

## Norms:

**Safety class:** CF according to IEC 60601-1, IEC 60601-  
2-25, CSA, UL; IIa according to MDD 93/42/EEC

**Protection class:** I according to IEC 60601-1 (with internal  
battery), VDE, UL and SEV

## Environmental conditions:

- Temperature, operating: 10° to 40° C/50° to 104° F
- Temperature, storage: -10° to 50° C/14° to 122° F
- Relative humidity: 25 to 95 % (non condensing)
- Pressure, operating: 700 – 1060 hPa

**Conformity:** CE according to MDD 93/42/EEC

## Display and Printing:

### Liquid crystal display (LCD):

- Backlit for graphic and LCD alphanumeric  
representation
- Resolution: 640 x 480 dots, viewing angle adjustable
- 40 dots per mm/1000 dots per inch (time axis)
- @ 25 mm/s

**Paper speed:** 2.5 / 5 / 10 / 12.5 / 25 / 50 / 100 mm/sec.

**Chart paper:** Thermoreactive, Z-fold, 14 cm/in. by  
21 cm, Perforation each 10.5 cm (A4; lettersize)

### Printing process:

- High-resolution thermal printhead
- 8 dots per mm/200 dots per inch (amplitude axis)

### Automatic lead programs:

- 3 or 6 channel representation on one or two forms  
size A4/8.5 in by 11 in (25 or 50 mm/s)
- Options M and C: average complexes of the 12  
standard leads (25 or 50 mm/s) (1 or 2 in per s) and  
10s rhythm strip (1 or 3 leads)

**Recording tracks:** 3 to 7 channels, positioned at optimal  
width on 200 mm. (8.5 in), automatic baseline  
adjustment

## Scope of delivery:

**CARDIOVIT AT-10 basic unit** with resting ECG, automatic  
exercise testing program and pacemaker detection

### Accessories:

- 10-lead patient cable
- 1 set of electrodes, consists of 4 extremity  
electrodes, 6 precordial suction electrodes,  
electrode gel or disposable electrodes
- 1 power cable
- 1 pack of printer paper
- 1 protective cover
- 1 operating manual

**Hardware-Options:** Pulmonary function testing, video  
monitor, ergometer, treadmill, blood pressure  
measuring unit, foot switch, cart, transport case

### Software-Options:

- Measurement program M for resting and exercise  
ECGs
  - Interpretation program C for resting ECGs
  - Late potential analysis
  - RR heart rate variability
  - Pacemaker measurement
  - EXEC II interpretation program for exercise ECGs:
  - Continual construction of average complexes, ST  
measurement, rhythm monitoring
  - Representation on the monitor: of average  
complexes, ST amplitudes, performance data
- The final report contains the following data: Trend  
plots of workload, heart rate, evtl. blood pressure, ST  
amplitude and slope, average cycles of all 15 leads  
from different test phases; detailed table of measuring  
results

Technical data are subject to changes without prior notice.



# SCHILLER

Voted No. 1 not only on this  
planet, but also in space!

**CARDIOVIT AT-10**  
on NASA ISS flight 4A

## Answer fax

**Yes, I am interested in the innovative products from SCHILLER.  
Please send me more information about:**

### Resting ECG:

- ☐ CARDIOVIT AT-1
- ☐ CARDIOVIT AT-1 smartprint
- ☐ CARDIOVIT AT-2
- ☐ CARDIOVIT AT-2 plus

### Exercise ECG (Multitasking Systems):

- ☐ CardioLaptop® AT-110
- ☐ CardioLaptop® PT-160
- ☐ CARDIOVIT AT-102
- ☐ CARDIOVIT CS-200
- ☐ CARDIOVIT AT-104 PC
- ☐ CARDIOVIT AT/SP-10
- ☐ Ergometry

### Spirometry:

- ☐ SPIROVIT SP-1
- ☐ SPIROVIT SP-2
- ☐ CS-200 Ergo-Spiro
- ☐ PC Spirometry

### Monitoring:

- ☐ ARGUS PRO System
- ☐ PHYSIOGARD TM/CS 910
- ☐ Pulse Oximeter OX-2
- ☐ MR Compatible Monitoring
- ☐ ARGUS LCM Monitor

### Defibrillators/Monitoring:

- ☐ FRED® (First Responder External Defibrillator)
- ☐ FRED® easy
- ☐ DEFIGARD (1002, 3002 IH, 6002)

- ☐ **Holter ECG** MT-101/200
- ☐ **Telemedicine:** MT-120/220 and AT-4 TELE
- ☐ SEMA-200 Data Management System
- ☐ BR-102 Blood Pressure Recorder
- ☐ MS-3 Pocket ECG
- ☐ VAC-100 Vacuum Electrode System
- ☐ ECG & Spiro Accessories

Name: \_\_\_\_\_

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Your specialist:



The Art of Diagnostics

# SCHILLER

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