

Operator's Manual

E-Scope® II

Electronic Stethoscope

Models:
718-7700, 718-7710



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US Patent No. 5,025,809
Manual P/N: 014-7700, Revision I

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™Specialist is a trademark of Cardionics

Note: U.S. Federal law restricts this device to sale on the order of a physician.

IMPORTANT NOTE for Hearing Impaired Users.

Please be aware that using the E-Scope with your hearing aid for auscultation of the heart, lungs or Korotkoff (blood pressure) sounds may be limited by the capability of your hearing aid or the interface between your hearing aid and the E-Scope Electronic Stethoscope.

Heart Sounds have a frequency range of 20-650Hz while breath sound range from 70 to 2000Hz.

Hearing aids are designed for enhancement of voice sounds that have a frequency range from approximately 500 to 4000Hz. Some hearing aids can be programmed for lower frequencies. However, even with this additional low frequency response, the hearing aid may still not be able to reproduce the heart and lung sounds adequately for diagnosis. Also, some individuals may have hearing loss in the range for heart and lung sounds that is not compensated by their hearing aid. For these reasons, Cardionics recommends that you consult with your audiologist for advice covering your hearing loss and the response of your hearing aid.

We will be pleased to assist you or your audiologist.

Quick Setup Instructions

- **Turning the E-Scope ON/OFF:**

Press any button on the head of the E-Scope to turn it on. There is not an “OFF” button on the unit. To turn the E-Scope off, simply wait approximately 1.5 minutes and the unit will automatically turn OFF. When restarted, the E-Scope will return to the last volume automatically.

- **Adjusting the Volume:**

There are 32 steps between the highest and lowest volume positions on the E-Scope II. The best way to adjust the volume is to press and hold the plus (+) or minus (-) buttons on the stethoscope head until the desired volume is achieved.

- **Switching between Heart and Breath Sounds.**

To switch between Heart/Breath Sounds, press the “●” key on the head of the E-Scope. The default mode is Heart Sounds. By blowing on the stethoscope head as you press the “●”, you can easily determine if you are in the heart or breath sound frequency mode. Breath sounds will sound higher.

- **Changing the Battery in your E-Scope**

Simply snap the “open” panel on the back of your unit. Replace battery with a fresh “AAA.” Replace battery every 4 to 6 months. Remove battery for long periods of storage.

Safety Precautions

The following symbols are applicable to this device:

IPX0

No degree of protection against ingress of water.



Attention: Read and understand all warnings and cautions before use.



Type BF Equipment. This equipment provides a high degree of protection against electric shock.



Caution:

- The E-Scope should be used by qualified medical personnel only.
- Observe best practice. The instructions in this manual do not, in any way, supersede established medical procedures or staff preference concerning patient care. "Best Practice" as determined by the medical community is always to be observed.
- Do not operate this device in the presence of flammable anesthetics or other flammable gases.
- As a general safety precaution, this instrument should be turned off and battery disconnected before performing any cleaning procedures.
- Use only AAA alkaline batteries. Follow all warnings and instructions on the battery package including proper disposal of depleted batteries.



Cautions continued:

- At the end of the E-Scope useful life dispose or recycle in accordance with your local, state and governmental regulations.
- The E-Scope complies with electromagnetic compatibility (EMC) EN60601-1-2:2001. However, close proximity to a radio transmitter may result in interference heard through the E-Scope Binaural or headset. If this occurs, move away from the radio's transmitting antenna.
- Do not immerse any part of the E-Scope in any liquid or subject it to any sterilization processes.
- Important note for hearing aid users: Hearing deficiencies vary considerably from person to person. Your audiologist is the best source of information on your particular hearing problem. You should consult with your audiologist if you have any specific questions about the use of your hearing aid with the E-Scope Electronic Stethoscope or any similar device. The information supplied by Cardionics for hearing impaired users should be considered as a general guideline only.
- The E-Scope has significant volume output. Do not turn on higher than required for normal listening.
- No serviceable parts. Do not attempt to repair or service the E-Scope. Return to Cardionics for any and all repairs. Call 281-488-5901 for service directions.

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Product Description

The E-SCOPE II is a second generation, patented, electronic stethoscope. It allows the user to amplify or record heart and breath sounds. The E-Scope II is an electronic stethoscope featuring a slim-line design with the volume and filter controls on the head of the stethoscope. The slim design allows it to be draped comfortably around the neck. With the controls on the stethoscope head, the user will find the E-Scope easy and convenient to use. The sound quality is exceptional with 32 gain positions.

There are many reasons for using an electronic stethoscope rather than an acoustic stethoscope:

- the ability to send sounds to an electronic medical record
- the ability to hear soft sounds in a noisy environment,
- the ability to record, edit and play back any sound,
- the ability to send sounds over telephone lines for diagnosis by a specialist,
- the ability to send sounds by email for diagnosis by a cardiologist,
- the ability to compare a patient with him or herself at differing time intervals,
- the ability to filter the sounds so that only certain portions of the sound complex can be heard,
- the ability to teach students by having more than one simultaneous listener with a single patient,

The E-Scope is supplied with a Specialist™ Adult Diaphragm that may be changed to a Specialist Adult or Specialist Pediatric bell. Also supplied are plastic adult, infant and pediatric size bells and a selection of ear tips for maximum user comfort.

The E-Scope is equipped with a timer that will turn the instrument off after approximately 1.5 minutes to conserve battery life.

The E-Scope has an auxiliary output for connecting to a second listener or recording type device.

The E-Scope is designed to maximize hearing of heart and lung sounds. A sound selector switch is provided to allow listening in the proper frequency response for either heart sounds or breath sounds.

E-Scope II, models include the clinical E-Scope (cat. no., 718-7700) and the belt model E-Scope for hearing impaired users (cat. no., 718-7710).



Figure 1
E-Scope II Electronic Stethoscope
Clinical model



Figure 2
E-Scope belt model for hearing impaired users
With Convertible style headphones

The Belt model E-Scope allows the user to leave their hearing aid(s) in place while listening. The headphones go over the top of their ear canals or ear molds thus not interfering with the hearing aid(s). . Figure 2 shows the detail of the Belt model E-Scope and Figure 4 shows the E-Scope in use.

Figure 3 Wearing the E-Scope
Figure 4 – Using the E-Scope



1.1 Models and Accessories

<u>Cat. no.</u>	<u>Description</u>
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Clinical Models

718-7700	E-Scope Electronic Stethoscope - Clinical model with Specialist Adult Diaphragm
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Ambulance Model for High Noise Areas

718-7800	E-Scope EMS Electronic Stethoscope For use in an ambulance or high noise area. A separate Operator's Manual is provided for the E-Scope EMS
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Hearing Impaired Models ITE (in-the-ear) or "open fit" BTE

718-7710	E-Scope Hearing Impaired (Belt) model. Supplied with Specialist Adult Diaphragm. This is the same as the E-Scope, cat. no. 718-7700, except that the ear pieces have been removed and a belt clip added. This model is designed for use with headphones (cat. no. 718-0405 or 718-0415).
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Accessories

Cat. no.

Description

718-0405

Over the head style headphone

These headphones are designed for use with the E-Scope Belt model, cat. no. 718-7710



**Figure 5. Cat. No. 718-0405
Over-the-head style headphones with external volume control.**

718-0415

Convertible style headphone

These headphones are designed for use with E-Scope model 718-7710. This style is worn over-the-head or behind-the-head. It folds up so as to fit easily in a lab coat.



**Figure 6. Cat. No. 718-0415
Convertible-style headphones**

718-0500

Stethophone

The stethophone is designed for teaching to allow a second listener to hear simultaneously.

360-7740

Specialist™ Adult Diaphragm

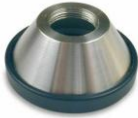
The performance of the Specialist Adult Diaphragm is, on average, about 3 dB or 40% better than a stamped metal diaphragm.



360-7750

Specialist Adult Bell

Like the above Specialist Adult Diaphragm, the Specialist Adult Bell is machined from high-grade stainless steel. Its performance is superior, allowing the listener to use the split-finger technique by placing the bell between the index and middle finger permitting gentle, controlled pressure to be applied.



360-7755

Specialist Pediatric Bell

The output of the Pediatric Specialist Bell, on average, is about 60% higher than a stamped metal pediatric bell over 50-200 Hz frequency range for both heart and breath sounds.



Accessory Pack

Each E-Scope is supplied with an Accessory pack that contains a pediatric diaphragm, plastic adult bell, plastic pediatric bell and plastic infant bell. These chest pieces can be used by replacing the existing chest piece by unscrewing. Additionally, this pack contains both mushroom and hard plastic ear tips. Inserting the mushroom ear tips will require a little force. The hard plastic eartips are self-threading. Place this eartip on the stethoscope binaural, press and with a twisting motion, screw them on.



**Figure 7 Accessory Pack
Supplied with all E-Scopes**

Upper row – adult plastic diaphragm, upper middle infant bell, upper right, mushroom eartips;
Lower row – pediatric diaphragm, pediatric plastic bell, hard plastic eartips.

Cable Connections

Cat. no.

Description

711-8605

PC Interface Cable.

Connects to a PC or recording device that accepts an 1/8th inch stereo phone plug.
Connects E-Scope to a PC.

2.0 Using the E-Scope

2.1 General Clinical Use

To use the E-Scope, place the stethoscope on the patient in the normal manner as shown in Figure 4. Press any button on the head of the stethoscope to turn it ON. Press and hold the + button until the volume is at a desired level. The filter is automatically set for heart sounds. If you wish to change it to breath sounds, press the ● button on the stethoscope head (Note: If the ● button is pressed to activate the E-Scope then the filter will be in the breath mode).

The E-Scope will turn OFF automatically after 1.5 to 2 minutes. To restart, press any button on the stethoscope head. The E-Scope retains the last volume setting and reverts to that setting when restarted.

2.2 For Teaching

For teaching purposes, it is possible to have a second person listen to a patient simultaneously. Connect the stethophone (cat. no. 718-0500) to the “sounds output” of the E-Scope. The student will hear what the instructor hears.

2.3 Recording Sounds

For recording the E-Scope side output jack can be connected to recording devices.

2.4 For Telemedicine Use

The E-Scope may be used for sending heart and/or lung sounds over telephone lines or the Internet using a recognized telemedicine system such as PolyCom or Tandberg systems. The E-Scope has been extensively tested using Tandberg (now Cisco) Teleconferencing Systems.

2.5 Other Applications

- a. The E-Scope can be used for general clinical use in place of an ordinary acoustic stethoscope.
- b. Physicians or nurses with hearing impairment.
- c. Ambulances
- d. Emergency rooms
- e. Pediatric wards

3.0 Operation

3.1 Volume Adjust

The E-Scope volume may be increased or decreased by momentarily pressing the + or – button located on the stethoscope head. Pressing and holding one of these buttons for more than one second causes the volume to move up or down. It takes about two and a half seconds for this automatic adjustment to cover the full volume range of 32 steps. The E-Scope retains the last volume setting and reverts to that setting when the power is turned on.



Figure 8
E-Scope Stethoscope head

3.2 Filter Select

The ● button on the stethoscope head alternately selects the heart or breath sound filter each time it is momentarily pressed. Pressing the ● button to power on the E-Scope initially selects the breath sound filter. Conversely, pressing either the + or – button to start power initially selects the heart sound filter.

3.3 Power

Pressing any of the buttons on the stethoscope head turns ON power to the E-Scope. The E-Scope has a timer that shuts off power after approximately 1.5 to 2 minutes. The timer is restarted each time one of the switches is pressed.

3.4 Battery

A single AAA battery powers the E-Scope. This battery will operate the E-Scope for approximately 4.5 months assuming it is used 30 times per day, 5 days per week.

To change the battery, remove the battery cover by sliding it outward. Remove the old battery and install the new in the normal manner. Remove the battery if storing the E-Scope for long periods of time.

3.5 Sounds Output

This connector, located on the body of the E-Scope, allows accessory units to be attached to the E-Scope. See Figure 9.

3.6 Headphone Output

This Connector, Located on the top corner of the E-Scope Belt Model, allows headphones to be connected to the unit. See Figure 9. When removing headphone be sure to hold E-Scope and headphone connector when removing. Do not pull wire to remove, this may cause damage to the unit.

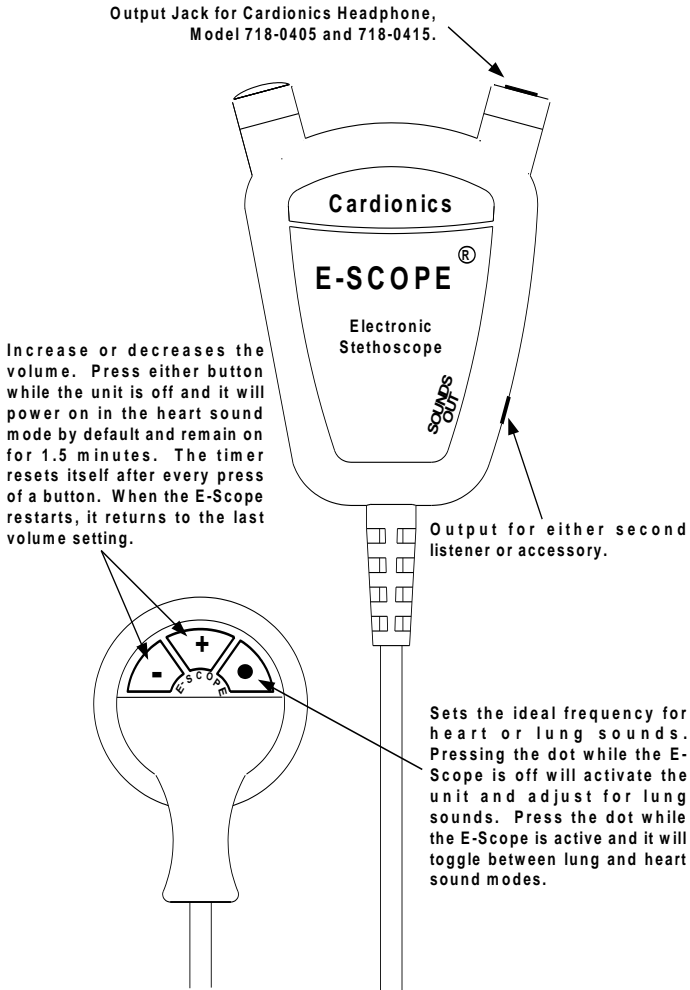
4.0 Cleaning

The E-Scope can be cleaned using a standard alcohol swab or wipe (70% Isopropyl Alcohol). Do not use excessive liquid or immerse any part of the E-Scope. Doing so may result in moisture getting inside the unit.

5.0 Transport and Storage

The E-Scope can be safely stored or transported with the following environmental conditions: -20°C – 65°C (-4°F – 149°F), <95% relative humidity.

Figure 9 - E-Scope Controls



6.0 Troubleshooting Guide

Possible Problem	Cause / Solution(s)
No power	The E-Scope will turn off automatically after 1.5 to 2 minutes of use. Press any button on the stethoscope head to restart. If this does not restart the E-Scope, check the battery and replace if necessary. If the E-Scope still does not restart, please call Cardionics for assistance.
Not enough volume	Press and HOLD the + button on the head of the E-Scope. If using a hearing aid, the volume should be increased gradually while tapping the diaphragm lightly. Be sure that diaphragm is securely tightened on the threaded housing.
Clicking noise or static	Speaker driver is clipping. (1) reduce volume until clicking sound disappears. (2) battery may be depleted. Replace, if necessary (3) Use the bell of the stethoscope. (4) Using the – button on the stethoscope head, press and hold for 3 seconds. This takes the volume to zero. Then, press and hold the + button for 1-1.5 seconds. There are 32 gain positions on the E-Scope volume control. The above maneuver has adjusted the E-Scope to mid-range. Some additional adjustments may be necessary. For static, place the chest piece lightly on the chest. There may be an initial static sound that will quickly disappear.

7.0 Limited Warranty

What this warranty covers:

1. Cardionics warrants this product to be free of manufacturing defects in material and workmanship for a period of one (1) year from the date of original consumer purchase from Cardionics or an authorized dealer.
2. This written warranty is limited to the original consumer purchaser, transferable only by written authorization of Cardionics.
3. All warranties, expressed or implied, made by Cardionics, including warranties of merchantability and fitness are limited to the one (1) year period of this warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.
4. This warranty is limited to repair of the product or replacement thereof, at the discretion of Cardionics. Calibration is considered normal maintenance and is not included in the one year warranty.

What this warranty does not cover:

1. This warranty does not cover defects or damage resulting from use of the product other than its normal, intended and customary use. This warranty does not cover defects or damages from abnormal use, abnormal conditions, improper storage, exposure to moisture or liquid, unauthorized modifications, repairs made by unauthorized personnel, unauthorized connections (those not described in this manual), misuse, neglect, abuse, accident, alternation, improper installation or other acts which are not the fault of Cardionics, including damage caused by shipping.
2. E-Scopes which have had the serial number removed or made illegible.
3. Damage resulting from use of non-Cardionics approved accessories.

Policies concerning service:

Shipping charges. The customer shall bear the cost of shipping the product to Cardionics. We suggest that you insure the package.

Authorization for return. Before sending equipment for repair, please call Cardionics, at 281-488-5901 or in the U.S. or Canada 1-800-364-5901 for a return memo authorization number (RMA#).

Reason for return. Please include a note with your name, address, telephone and email address and what you believe the problem to be.

Packing for return. Equipment requiring repair should be suitably packaged for shipping.

Where to obtain service. Ship package prepaid to Cardionics, 910 Bay Star Blvd, Webster, Texas 77598 USA. We will endeavor to complete repairs within fifteen (15) working days from date of receipt of product by Cardionics.

Out-of-warranty service. . When a product is returned for service that is out-of-warranty, Cardionics will call you to obtain your authorization prior to making the repair. We will ask for a credit card payment at the time of the call. If the repair is from an authorized Cardionics dealer or institution, Cardionics will ask for a purchase order number.

Consequential Damages

CARDIONICS SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR FAILURE OF THIS PRODUCT, INCLUDING INJURY TO PERSONS OR PROPERTY. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that may vary from state to state.

European Representative

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