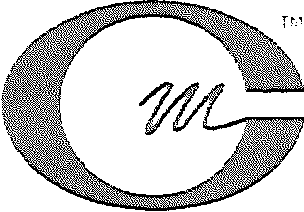
to purchaser for indirect or consequential damages of any kind or character. This warranty does not cover defects arising from modifications or misuse of the electrode caps or documentation

after purchase or receipt. *Quik-CapTM*

### DISCLAIMER OF WARRANTIES - EXCEPT AS PROVIDED HEREIN, THE ELECTRODE CAPS AND DOCUMENTATION ARE PROVIDED "AS IS" AND WITHOUT EXPRESS OR LIMITED WARRANTY OF ANY KIND (INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND

FITNESS FOR A PARTICULAR PURPOSE) BY EITHER COMPUMEDICS NEUROSCAN OR ANYONE WHO HAS BEEN INVOLVED IN THE CREATION, PRODUCTION OR DISTRIBUTION OF THE ELECTRODE CAPS. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE ELECTRODE CAPS IS WITH YOU. SHOULD THE ELECTRODE CAPS PROVE DEFECTIVE, YOU (AND NOT COMPUMEDICS NEUROSCAN OR ANYONE ELSE WHO HAS BEEN INVOLVED IN THE CREATION, PRODUCTION OR DISTRIBUTION OF THE ELECTRODE CAPS) SHALL ASSUME THE. ENTIRE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

***User's Guide***



COMPUMEDICS

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For Technical Support ...

If you have any questions or problems, please contact Technical Support through any of the following routes. If you live outside the USA or Canada, and purchased your system through one of our international distributors, please contact the **distributor** first, especially if your system is under warranty. In all other cases, please use [**techsup@compumedicsusa.com,**](mailto:techsup@compumedicsusa.com) or see the other Support options on our web site ***(http://www.Compumedics.com).*** Or, if you live in the USA or Canada, please call **1-877-294- 1346.** International callers should use **704-749-3200.** For Sales related questions, please contact your local distributor, or contact us at [**sales@compumedicsusa.com.**](mailto:sales@compumedicsusa.com)

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**Electrode Caps**

Compumedics Neuroscan, a division of Compumedics USA, Ltd (Neuroscan) warrants the electrode caps it manufactures to be free from defects in materials and workmanship through the warranty period. For Quik-Caps™, the warranty term is six months from the date of shipment by Compumedics Neuroscan. The Quik­ CapPSG warranty term is one-year from the date of shipment. For Maglink RT caps, the warranty term is one-year beginning upon the date of installation by Compumedics Neuroscan. Damage incurred in and due to shipment to the original purchaser is covered under this warranty. Otherwise, this warranty does not cover damage due to external causes, including accident, servicing not authorized by Compumedics Neuroscan, usage not in accordance with product instructions, failure to perform required preventative maintenance, or any other abuse or misuse.

Compumedics Neuroscan, at its own discretion, reserves the right to repair or replace caps returned to Compumedics Neuroscan's facility. To request warranty service, you must contact Compumedics Neuroscan within the warranty period. If warranty service is required, Compumedics Neuroscan will issue a Return Merchandise Authorization Number (RMA). Cap owner is required to ship the products back to Compumedics Neuroscan in its original packaging or appropriate equivalent at their own expense. Compumedics Neuroscan recommends the owner insure the shipment or otherwise accept all the risk of loss or damage during shipment. Compumedics Neuroscan will ship the repaired or replacement products to you, freight prepaid. Compumedics Neuroscan owns all parts removed from repaired products. Compumedics Neuroscan reserves the right to use new and/or equivalent-to-new parts made by various manufacturers in performing warranty repairs and in-building replacement products. If Compumedics Neuroscan repairs a product, the original warranty term is not extended; if Compumedics Neuroscan replaces a product, the replacement is warranted for the remainder of the original term or 60 days, whichever is greater. Repair or replacement as provided under this warranty is the exclusive remedy to the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose, and Compumedics Neuroscan shall in no event be liable

solution for more than 10 minutes. After disinfectant, rinse the cap thoroughly and hang it up to dry.

It is recommended that the cap be left to dry at room temperature. It can also be dried more quickly with a hand-held hair dyer. However, never use high temperature settings when drying the cap as it will rapidly degrade the elastic material. USE ONLY LOW TEMPERATURE OR ROOM TEMPERATURE SETTINGS on

a portable hair dryer to dry the Quik-Cap™.

*Sf* Note: *Compressed air can be used to blow moisture from the*

*electrodes and wire entry points and is very useful for extending*

*the life of your Quik-Cap™.*

*{iJ1*Note: *Electrodes should be cleaned and disinfected, but sterilization is generally not necessary because they are used externally.*

We recommend that you inspect electrodes for extensive wear or damage prior to use. If the electrode wire, termination, or surface area is worn so as to impair performance, the electrode should be discarded. Compumedics/Neuroscan is not responsible for injury, infection, or other damage resulting from improper electrode preparation or use.

### Rechloriding Non-sintered Ag/ AgCI Electrodes

If you use Ag/Ag Cl coated electrodes (non-sintered electrodes), you may experience problems over time with large DC offset potentials that affect your EEG recordings. This is likely due to the gradual loss of the chloride coating on the electrodes. Compumedics/Neuroscan provides a rechloriding service. - Contact [techsup@Compumedicsusa.com](mailto:techsup@Compumedicsusa.com) for details.

other than your own personal use is a violation of United States copyright laws. For information, contact Compumedics/Neuroscan.

### Compumedics Neuroscan Quik-Cap™

Neuroscan makes a variety of Quik-Caps™ to meet your recording needs. Caps range in numbers of channels from basic 10-20 system (19 channels) to 256+ channels for high density recordings. The Maglink caps are especially designed for use with fMRI recordings. The electrodes are made from high quality gold, sintered silver, or silver with a silver chloride coating. Sizes are available for children and adults. Below are some of the important features of the Quik-Caps™.

* Highly elastic cap provides uniform fit over wide range of head shapes and sizes.
* Electrodes are carried in soft rubber holders for added wearer comfort.
* All wires are located outside the cap, keeping them out of the

way during positioning and gel injection, reducing hair entanglement and minimizing shorted electrodes.

* Electrodes are clearly labeled on the cap, not the amplifier connector.
* Cap fastens at the chin, not under the throat or with a chest strap.
* fMRI compatible versions are available with carbon fiber leads.
* If needed, cap electrodes can be replaced during a recording session.

Your Quik-Cap™ has been designed with a highly elastic fabric that provides a uniform fit over a wide range of head sizes and shape variability. Sintered silver electrodes minimize DC offset potentials and ensure stable EEG recordings (and need no rechloriding).

The electrodes are attached to an external wiring harness for easy cap placement, particularly in thick hair. The wiring harness includes all EEG, as well as Reference, Ground, and Vertical and Horizontal EOG leads. The harness is positioned for maximum comfort, while maintaining the lead wires away from the electrodes for easy access during electrolyte application. There are several variations in caps, the application and maintenance is similar for all variations.

### Description of Caps

Caps are available with Silver-Silver Chloride disk electrodes or sintered electrodes. The sintered electrodes contain

the same materials (i.e., silver and chloride) as the Silver-Silver Chloride disks but are constructed as a compressed disk pellet containing a mixed Silver-Silver Chloride compound. The reported disadvantage of the sintered electrode is marginally higher impedances. We have found the differences in impedances between conventional and sintered electrodes to be negligible and the quality of the recorded EEG to be very comparable. The major advantage of the sintered electrode is the absence of an easily damageable electrode surface. We recommend that due care always be taken in cleaning (see description of cleaning electrodes below) and handling all electrodes, however, sintered electrodes do not lose a chlorided surface as the chloride is embedded in the structure of the electrode itself. Even with careful handling, silver­ silver chloride electrodes will eventually require re-chloriding of the surface. This process is not necessary with the compressed structure of the sintered electrode.

***Because* of *the special design·* of *the cap, DO NOT USE QUIK-CAP™S OR ANY OTHER CAPS IN PLACE OF***

***MAGLINK CAPS. For the* same *reason, do not attempt* to *service the cap yourself; DAMAGED CAPS MUST BE RETURNED TO COMPUMEDICS/NEUROSCAN FOR REPAIRS.***

With all Quik-Caps™, successful recording of EEG depends on a good conductive path between the recording electrode and the scalp of the subject. There are several steps that can be taken to ensure a good contact between the electrode and the scalp of the subject. These steps are listed below.

**Subject Scalp Preparation and Quik-Cap™ Application**

1. The night/day before scheduled testing, contact the subjects

and make sure that they wash their hair the morning of testing. They should wash their hair with a normal shampoo that does not contain any conditioner. Conditioner coats the scalp and makes it t much more difficult to obtain low impedance connections. After shampooing, the subject should not use any conditioners or styling gels that would also coat the scalp and hair.

1. Once arriving at the laboratory for testing, have the subject vigorously brush their hair and scalp with an old-fashioned bristle

·hairbrush for 3-5 minutes. This will help to exfoliate the scalp surface and will dramatically reduce (any in some cases eliminate) the need to abrade the scalp surface after loading the electrodes with gel.

1. Prepare the skin areas where drop electrodes will be located. It is usually sufficient to clean these areas with an alcohol or acetone

the cap, thorough cleaning is critical. The following method is recommended for cleaning and disinfecting your Quik-Cap™.

After each use remove all tape, markers, and electrode pads from the cap and unhook any wire harness shoulder restraint. Unplug the wire harness from the amplifier equipment and remove the cap from the wearer. Take the cap to a sink and rinse off any electrolyte on the outside of the cap and electrodes. Next, turn the cap inside out to expose the electrodes that are down inside the rubber holders. Run a tight stream of very warm or hot water from the faucet to remove the electrolyte from the holder cavity. This should remove the electrolyte completely if you are using Quik-Gel. If not, and the electrolyte has oils in it (like ECI-Gel), you will need to use cotton swabs to help remove the electrolyte residue from the electrode surface while the water is running. Do this carefully to avoid scratching or pitting the surface of the electrodes.

We strongly recommend the use of a WaterPik®-like device. This is a device consisting of a small water reservoir that

projects a high-pressure stream of water through a nozzle that is designed for cleaning teeth. The jet-stream of water produced by these devices does an excellent job of cleaning the surface of the electrode and the electrode reservoir without using any object that comes in contact with and potentially damages an electrode's surface. When cleaning the cap using such a device, fill a sink (or basin) with moderately hot water. Hold the cap under the water so that the nozzle of the WaterPik® is also under the surface of the water. Direct the jet-stream of water from the nozzle into the electrode holder. It is important to keep the nozzle of the WaterPik® directed at the electrode and under water to prevent any back-spray onto the person cleaning the cap. Clean both the under surface and top surface of each electrode holder. Next, turn the cap back out and use the water to remove any additional electrolyte from the outside of the cap.

When you are satisfied that nearly all electrolyte has been removed, place the cap and wire harness into a warm water and soap bath being careful not to get the connector at the end of the harness wet. The bath should contain 4 quarts of water with 1or 2 ounces of mild dish soap (Ivory™, Dove™, etc.). Let the cap sit in the bath for approximately 1/2 hour. Remove and rinse the cap with warm water and place it into a disinfecting solution (such as Envirocide, Metricide, or Betadine) in a concentration of 1 part disinfectant to 4 parts water. If this disinfectant method is selected, leave the cap in the solution for 15 to 30 minutes. If full strength disinfectant is desired, the cap should not be left in

the subject. We have routinely prepped the 128 channel cap for use in the MR in 30-40 minutes.

**Using Quik-Gel**

Quik-Gel is unique in its formulation and requires a few simple techniques to reduce your EEG electrode application time. Quik-Gel can absorb moisture from the scalp's dead skin barrier to rapidly lower electrode impedance. Therefore, little or no skin abrading is necessary to attain the same result as with other brands of EEG electrolyte.

Follow accepted selection and preparation techniques for reference, ground and EOG electrode locations. Inject a small amount of Quik-Gel into each electrode cup and apply to the skin using normal methods, being careful not to bridge the electrolyte between neighboring electrodes. For application into thick hair, press firmly on the electrode housing, insert the syringe tip and gently abrade as mentioned above.

## TIPS

* Ensure that the syringe tip is lifted through the hair while Quik-Gel is being injected in order to ensure an unbroken contact between the scalp and electrode surface (with no air pockets).
* Apply electrolyte to all electrodes before measuring electrode impedance. In this manner, Quik-Gel will work to reduce the input impedance to acceptable levels necessitating less skin abrasion and patient discomfort.
* Use an elastic gauze size 4, 5 or 6 to cover the cap. You will find a more uniform pressure of the electrodes and a more stable impedance reading.
* When exposed to air, Quik-Gel will begin to crystallize. Place a glass of water next to your installation and when the syringe is not in use place the tip in the glass.
* KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE.
* Do NOT refrigerate Quik-Gel.
* Distilled water can be used to thin the mixture. Be sure to shake well to ensure uniform consistency.

## Cleaning and Disinfecting Instructions

Your cap represents a considerable investment. To maximize the life of the cap and the quality of data obtained from

swab. It is important that these areas are clear of makeup and foundation to ensure low impedances.

1. Position the cap on the head of the subject. This is typically a two-person process, one of which may be the subject. While standing behind the subject, have a second assistant (or the subject) place their thumbs under the front edge of the Quik­ Cap™. Then pull the cap onto to the head, slowly, carefully ensuring that midline row of electrodes is properly aligned on the head.
2. Attach all drop electrodes. If necessary, use two butterfly tapes to make sure the electrodes are in secure contact with the skin.

***OPTIONAL*** - *This is a good point at which to digitize the*

*electrode positions on the scalp. Optionally, locations may be digitized at the end of the experimental session.*

1. Load all electrodes with electrode gel beginning with the

ground and reference electrodes. *Remember,* the electrode gel is

used to build a column of conductive medium between the scalp and the surface of the electrode. If too little gel is loaded, this conductive column will contain gaps. Consequently, contact between the scalp and the electrode will be intermittent. If too much gel is loaded, it will spread beyond the proximity of the electrode reservoir and (with high density electrode arrays) could result in a salt bridge with other electrode locations.

1. If all electrodes are reading high impedances, this usually reflects high impedance at either the ground or reference electrode location. After loading the ground and reference electrodes, load all remaining cap and drop electrodes. It is a good idea to let the gel soak in before testing the impedances; the gel will lower the impedances significantly on its own without abrading.
2. Perform the first impedance test. If the subject has clean hair and a well prepared scalp, many of the electrodes will have impedances that are sufficiently low (< 5-10k0hm) so that no further preparation is required.
3. When abrading is necessary, always begin with the ground and reference electrodes. Do not direct force down on the needle toward the scalp. It is usually sufficient to make sure that the needle has contact with the scalp, and then simply rotate the needle in a circular manner (rotate the needle in an arc). Place fight pressure down the electrode holder with one hand while abrading with the other hand. This will ensure that the electrode gel remains confined to the reservoir of the electrode holder. Run the ACQUIRE module of system software while. preparing the

subject. Watch the impedances while abrading. As soon as the impedance for an electrode begins to decrease, stop abrading and

*/!J*

Note: *We have recently released the QuikCell liquid electrode*

remove the preparation needle from the electrode. Usually the

impedance will continue to fall. An immediate increase in electrode impedance after removing the preparation needle usually indicates

that the column of gel in the electrode reservoir is intermittent - the preparation needle is thus the conductor between the scalp and the electrode. In this situation, inject a little more gel into the

electrode holder. Slightly withdraw the needle while injecting the gel. This will help to construct a column of conductor that is

uniform and will last throughout the recording sessions. Use the extra gel that flows out of the top of the electrode reservoir to seal the opening - this will keep air out of the electrode and prevent

the gel in the reservoir from drying out.

*Take your time and try to get all impedances*

*<SkOhm, and balanced across electrodes. This is especially critical for obtaining clean recordings in the MR.*

*IMPORTANT* - *Always use a clean blunt-end needle when abrading. Never reuse syringes and blunt needles for more than one subject. Use a "sharps" dispenser to dispose of blunt needles, if available.*

1. Heads vary greatly in both size and shape. While we

endeavor to make Quik-Caps™ that snugly conform to the surface of the head, some electrodes may not always be in good contact

with the scalp. In these cases, we recommend using the wound gauze mesh over the top of the Quik-Cap™. The mesh can be cut

into lengths of 10-15 cm in length and then pulled over the top of

the Quik-Cap™. Under most conditions it is not necessary to place the gauze mesh over the frontal pole electrodes as the cap is

typically quite snug at these locations. Subjects/patients are likely to experience excessive pressure and some discomfort if the gauze

is placed over these electrodes.

1. Of special importance for EEG recordings in the MR is the placement of electrodes to record the electrocardiogram (EKG).

This is critically important as this data will be used as a trigger for extracting the ballistocardiogram. Optimally, the EKG electrodes should be placed in locations above and below the plane of the heart. For ease of placement, these electrodes may be placed along the midline of the chest. Because of the location of these electrodes, it is important to clearly explain the need for these electrodes to the patient, particularly to female subjects.

*application system. Please contact us for more information on this*

*fast, clean method of electrode preparation.*

### Critical Tips for Subject Comfort

1. Prepare in advance. If recording in a magnet, time is extremely valuable. Optimize testing procedures by preparing all electrode application materials in advance. Prior to subject arrival,

load the necessary number of needles with gel to complete the entire cap (32-40 channels, 2 syringes; 64 channels, 3-4 syringes,

etc.). Have gauze mesh cut to length (10-12 cm). Have all

butterfly tapes available and ready for placement. Have the SCAN software open and ready for testing electrode impedances.

1. Do not place the mesh over the frontal pole electrodes Fpl and Fp2 (or other frontal pole electrodes). These electrodes typically do not require any additional force to be firmly in contact

with the scalp. Placing mesh over these electrodes may result in discomfort to the subject.

1. Do not place a drop electrode under the edge of the Quik­

Cap™. This will result in discomfort for your subject. At frontal

electrode locations, this discomfort can rapidly advance to nausea and/or headache.

1. Check for special medical conditions. The Quik-Cap™ is

secured to the head using a fairly snug chin strap, which can cause discomfort. This discomfort can be particularly acute for individuals

with temporal-mandibular joint disease (TMJ - disease). Ask your subject in advance if they are affected by TMJ. If such individuals are to be tested, perform a recording sequence outside the MR environment to determine their tolerance (including time of

comfort). Prolonged testing of TMJ subjects with the Quik-Cap™ can result in acute discomfort.

1. Subject Comfort is a Priority. Routinely inquire about your subject's comfort during preparation and during testing. EEG

recordings in MR environments are qualitatively different from those performed in the relative comfort of a testing lab.

### Time Estimates for Quik-Cap™ Application/Preparation

With experience and with the subject's cooperation (by

following the above preparations) it is possible to complete the Quik-Cap™ application and preparation process for a 32-40 Quik­ Cap™ in 15-20 minutes. It is recommended that with higher electrode applications (64-128 channels) two lab technicians prep