Nicolet™ VikingQuest User Guide

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Nicolet VikingQuest System

Indications for use statement

The Natus Nicolet VikingQuest is intended for the acquisition, display, analysis, storage, reporting, and management of electrophysiological information from the human nervous and muscular systems including Nerve Conduction (NCS), Electromyography (EMG), Evoked Potentials (EP), Autonomic Responses and Intra-Operative Monitoring including Electroencephalography (EEG).

Evoked Potential (EP) includes Visual Evoked Potentials (VEP), Auditory Evoked Potentials (AEP), Somatosensory Evoked Potentials (SEP), Electroretinography (ERG), Electrooculography (EOG), P300, Motor Evoked Potentials (MEP) and Contingent Negative Variation (CNV). The VikingQuest may be used to determine autonomic responses to physiologic stimuli by measuring the change in electrical resistance between two electrodes (Galvanic Skin Response and Sympathetic Skin Response). Autonomic testing also includes assessment of RR Interval variability. The VikingQuest is used to detect the physiologic function of the nervous system, for the location of neural structures during surgery, and to support the diagnosis of neuromuscular disease or condition.

The listed modalities do include overlap in functionality. In general, Nerve Conduction Studies measure the electrical responses of the nerve; Electromyography measures the electrical activity of the muscle and Evoked Potentials measure electrical activity from the Central Nervous System.

The VikingQuest is intended to be used by a qualified healthcare provider.

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CE
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Labels and symbols

The following labels and symbols may be affixed to the **Nicolet VikingQuest** system:

	When applied on device: Attention: Consult Accompanying Documentation (ISO 7000-0434A) **When used in documentation:** Caution, Warning or Precaution follows.
	Consult Operating Instructions. Failure to follow operating instructions could place the patient or operator at risk (ISO 7010 M002). Image on blue background.
	Consult Operating Instructions. (ISO 7000-1641)
	Natus EU Authorized Representative
	Natus Neurology Incorporated 3150 Pleasant View Road Middleton, WI USA 53562 608-829-8500 1 800-356-0007 Fax: 608-829-8589 www.natus.com
	Disposal at end of operating life instructions.
	CE Mark and Notified Body Medical Device Regulation (MDR) product certified to comply to EC Regulation 2017/745.
	Type BF equipment.
	Class II device.
RX Only	**CAUTION:** USA Federal law restricts this device to sale or on the order of a licensed Neurology practitioner.

Read the safety reference guide

Please read the *Additional Information and Safety Notes for Assorted Nicolet Brand Products Reference Guide* on CD furnished with your Nicolet VikingQuest system thoroughly, paying special attention to the **Safety information** before applying power to and using your Nicolet system.

Electromagnetic Compatibility (EMC)

⚠ **WARNING** Please refer to the *Electromagnetic Compatibility Reference Guide* on CD furnished with your Nicolet VikingQuest system for information concerning your Nicolet VikingQuest system.

Safety summary

In this manual, two labels identify potentially dangerous or destructive conditions and procedures:

⚠ **WARNING**

The **WARNING** label identifies conditions or practices that may present danger to the patient and/or user.

⚠ **CAUTION**

The **CAUTION** label identifies conditions or practices that could result in damage to the equipment.

NOTE: Notes help you identify areas of possible confusion and avoid potential problems during system operation.

⚠ **WARNING**

Do NOT use outside of the published specification ranges. Use of device outside of the specified ranges may result in inaccurate results.

Inspecting the system

Routinely check the instrument for exterior damage.

Follow your medical facilities safety guidelines.

Disposal at the end of operating life

Natus is committed to meeting the requirements of the European Union WEEE (Waste Electrical and Electronic Equipment) Regulations 2014. These regulations state that electrical and electronic waste must be separately collected for the proper treatment and recovery to ensure that WEEE is reused or recycled safely. In line with that commitment Natus may pass along the obligation for take back and recycling to the end user, unless other arrangements have been made. Please contact us for details on the collection and recovery systems available to you in your region at www.natus.com

Electrical and electronic equipment (EEE) contains materials, components and substances that may be hazardous and present a risk to human health and the environment when WEEE is not handled correctly. Therefore, end users also have a role to play in ensuring that WEEE is reused and recycled safely. Users of electrical and electronic equipment must not discard WEEE together with other wastes. Users must use the municipal collection schemes or the producer/importers take-back obligation or licensed waste carriers to reduce adverse environmental impacts in connection with disposal of waste electrical and electronic equipment and to increase opportunities for reuse, recycling and recovery of waste electrical and electronic equipment.

Equipment marked with the below crossed-out wheeled bin is electrical and electronic equipment. The crossed-out wheeled bin symbol indicates that waste electrical and electronic equipment should not be discarded together with unseparated waste but must be collected separately.

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1 Introduction

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Technical description

Your Nicolet VikingQuest allows you to perform a wide range of Nerve Conduction Studies (NCS), Electromyography (EMG), Evoked Potential (EP) Studies and Autonomic Studies as well as Multimodality Programs such as Intraoperative Monitoring (IOM). Separate software programs and optional accessories let you customize your Nicolet VikingQuest to meet your specific clinical and O.R. monitoring needs.

Installation and servicing instructions

Device continuity maintenance and installation test

⚠ **WARNING During installation, assembly and operation, some protective ground connection points are susceptible to becoming electrically detached or not properly connected. This can pose a safety hazard to both the user and patient.**

It is recommended/required that you perform regular electrical continuity tests from exposed conductive materials on the medical system to the protective ground on the medical system. Regular testing will help ensure that proper protective grounding is maintained. This test should always be performed after installation and maintenance. Additionally, this test should be performed on a regular maintenance basis.

Specification and accuracy information

For specification details, see the system applicable specification sheet 169-420004 or 019863.

For accuracy information see 269-594705 Additional Information and Safety Guide.

Nicolet VikingQuest amplifier and system essential performance

The Nicolet VikingQuest amplifier and system is designed to function under a wide range of environmental conditions without any compromise in performance specifications.

In the event that an environmental artifact (e.g. ESD, line voltage fluctuations, etc.) is of sufficient intensity and/or duration to adversely affect system performance, the system is designed to detect this condition and send a message notifying the operator that an adverse event has occurred. Once the operator has cleared this message, the system will indicate that acquisition can resume with the settings restored to the previous state.

If this type of condition causes persistent messages, please contact your local service representative.

Protective and equipment classifications

1. This system is intended for continuous operation and has an IEC 60601-1 protective classification of Class I, Type BF and Type B applied parts, ordinary equipment, not suitable for use in the presence of flammable anesthetics.
2. The MDD equipment classification is IIb.

Intended operator

The Nicolet VikingQuest with Synergy/Viking software is intended to be used by a qualified healthcare provider.

Intended use

See the Indications for use as listed in the beginning of this Guide. The System is expected to typically be in use for 8-10 hours per day. It would be expected that while in use (patient connected, the system would be interacted with by qualified healthcare personnel performing the various studies listed in the indications for use.

Contraindications of use

There are no known contraindications under normal clinical use for EMG/NCV/EP.

Please see 269-48801 Intra-Operative Safety Guide and 269-594705 Additional Information and Safety Guide for possible contraindications of use under certain conditions.

Using this guide

This guide provides the basic information needed to operate your Nicolet VikingQuest. It includes instructions for creating patient files, working with studies and exams and for performing a simple motor nerve conduction (MNC) study.

Your system includes a computer on which the Nicolet EMG software program is installed.

About the system

Nicolet VikingQuest system features a dedicated control panel and easy-to-use Windows-based interface to simplify operation.

Innovative software features and an intuitive interface simplify operation. The Automated-Study feature allows you to link and perform assorted protocols with a simple button press, producing faster, more accurate test results and improved repeatability. The Anatomy Database allows you to select individual muscles or nerves for exams and view innervation roots.

Synergy/Viking Software - Warning and Error Codes

In the Synergy/ Viking Application, errors and other informational messages are designed to be self-explanatory. However, additional information and suggested user actions are provided in document 022210 found on the User Guide disk 482-651400.

Cleaning

⚠ **WARNING** Disconnect all leads and electrodes from the patient before proceeding with cleaning the equipment.

All external parts of the assembly can be wiped down with the following:

⚠ **CAUTION** **Chemical contact will be limited to chemicals specified below to clean the assembly only. Other chemicals may or may not affect the device, but do not fall under tested chemicals for the assembly.**

- Water
- Isopropyl Alcohol (70-90% concentration in water)
- PDI SaniClothPlus #Q89702
- HB Quat (3M)
- Mild soap solution such as Basis, Cetaphil, Dove in water solution
- Ethyl alcohol (70-90% concentration)
- A solution of 1 part household bleach (5-6% concentrate sodium hypocholorite) and 50 parts water.

Connecting the system components

Please refer to the Nicolet VikingQuest Installation Guide for cabling instructions.

2 System Basics

This chapter introduces you to the basic hardware and software controls used to operate your Nicolet VikingQuest.

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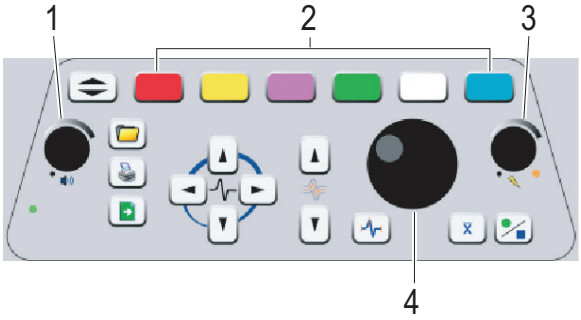
VikingQuest control panel

The Nicolet VikingQuest System control panel, located on the front of the console base, consists of hardkeys, softkeys and adjustment dials.

The control panel is active in the Nicolet VikingQuest program modes, including the Home Page, all exam modes and the Select Exam and the Patient Information screens. However, it is not active in any Windows application, the Internet or in the Report Program. In these modes, you use the mouse or keyboard to select functions and enter commands.



1. Speaker Volume Dial
2. Colored Softkeys
3. Stimulus Level Dial
4. Cursor Wheel

The Adjustment dials

The adjustment dials include the speaker volume and stimulus level dials. The **Speaker Volume** dial adjusts the speaker sound level and the **Stimulus Level** dial adjusts the stimulus intensity level within predetermined ranges. The LED indicator lights, located below each dial, signify that the unit stimulator is on, when it is lit or green.

Arrow keys

The **Trace** up and down arrow keys, next to the **Cursor Wheel**, activate the next or previous trace number for displaying recorded data.

To the left of the Trace arrow keys are the horizontal Time Base arrow keys and the vertical Sensitivity arrow keys. The left **Time Base** key numerically increases the time base and the right key numerically decreases it. The upper **Sensitivity** key numerically increases the sensitivity and the lower key numerically decreases it.

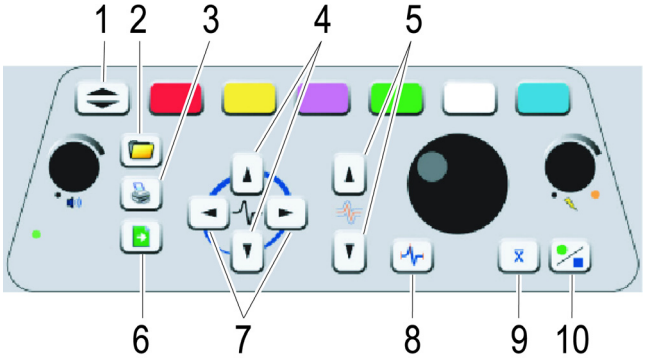
Located on the left side of the softkeys, the **Key Line** key displays a different DPA line on the lower screen.

Softkeys

The softkeys are the 6 color-coded buttons, located top center on the control panel. The functions of these six keys change according to the mode you are working in and are designated by the corresponding colored buttons shown on the lower screen in the **Display Prompt Area (DPA)**.

Hardkeys

The thirteen hardkeys, identified in the above figure, are touch keys that are assigned a single function in most operating modes, such as displaying the Select Exam screen, turning on the Averager or Stimulator, or printing Screen Copies. They are operational only in relevant exam modes.



1. Key Line
2. Select Exam
3. Screen Copy
4. Sensitivity
5. Trace Up/Down
6. Next Exam
7. Time Base Up/Down
8. Marker
9. Average
10. Switch

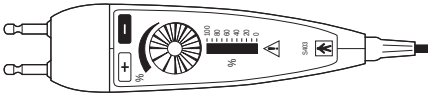
Using the Nicolet VikingQuest mouse

The mouse touch pad (or trackball) is a tool used for selecting options, entering commands and responses and scrolling through lists. You cannot enter or insert text on the Nicolet VikingQuest screen using the mouse.

The Nicolet VikingQuest mouse has a left and right button. Use the left button for selecting and entering and the right button to display a list of hardkey functions that can be activated using the mouse. These functions vary according to the current operating mode.

The S403 Electrical Stimulator probe

The S403 electrical stimulator probe has remote control for use with the Nicolet VikingQuest system.



S403 Electrical Stimulator Probe

The S403 stimulator probe connects to the DIN jack on the back of the console base.

⚠ **CAUTION Do not attempt to connect stimulating electrodes directly to the stimulator probe with the probe head removed. You may damage the stimulator probe.**

Probe head with tips

The removable probe head with tips provides direct stimulus contact to the patient. Hold the stimulator probe on the stimulus site to stimulate the patient directly. To reverse polarity, simply turn the stimulator probe over.

***Remember**:* Always apply a small amount of electrolyte gel on the probe tips to reduce skin impedance and stimulus artifact.

Using the probe controls

Stimulus Intensity dial

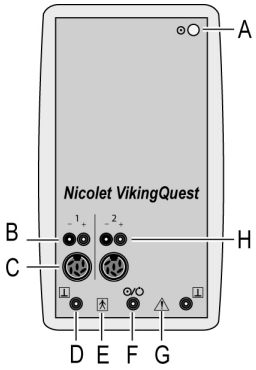
When the Nicolet VikingQuest System is in the Remote mode, the stimulus intensity dial on the S403 probe adjusts the stimulus between 0 and 100% of the maximum intensity range.

Push buttons

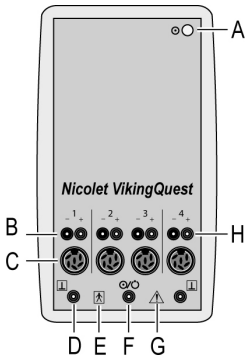
Push buttons are located on each side of the S403 probe. When the Nicolet VikingQuest System is in the single stimulus mode, pushing either button delivers a single stimulus to the patient.

About the amplifier

The Nicolet VikingQuest System Amplifier consists of 2 or 4 channels (depending on the type of amplifier you have) each with DIN inputs arranged horizontally. There is a single run/ standby switch that controls all channels. .



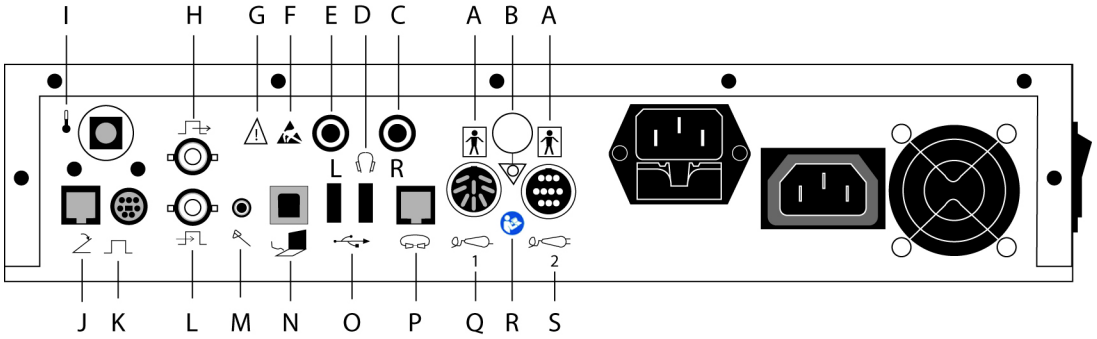
2 Channel



4 Channel

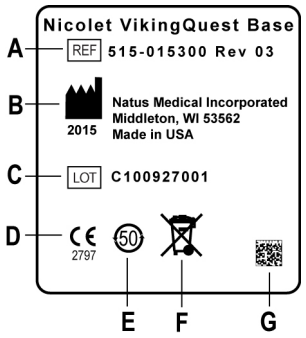
A	○	**Is in Run mode Indicator**	When the light is illuminated, the amplifier is in the Run/Standby mode.
B		**Active (-) Electrode**	Patient recording electrodes connect to the red (+) and black (-) pin jacks. Negative voltages applied to the black input jack produce an upward deflection on the Nicolet VikingQuest display. Use the black input jack as the '**active**' electrode.
C		**DIN Electrode Connector**	The DIN electrode connectors accommodate patient electrodes supplied with DIN jacks, such as concentric needle electrodes. The DIN connectors provide a negative-up convention.
D		**Common (Ground)**	Plug the patient **ground** electrode into either green jack on the amplifier. Both connections are at ground connection.
E		**Type BF Equipment.**	
F		**Run/Standby Switch**	Turns the EMG amplifier channel inputs ON and OFF.
G		See Labels and Symbols on page c in this manual.	
H		**Reference (+) Electrode**	Patient recording electrodes connect to the red (+) and black (-) pin jacks. Negative voltages applied to the black input jack produce an upward deflection on the Nicolet VikingQuest display. Use the red input jack as the **inactive** or **reference** electrode for a negative-up convention.

Nicolet VikingQuest Base Unit rear panel icons



B		Equipotentiality	**G**		See Labels and Symbols on page c in this manual.
C	R	Right ear headphone out	**L**		Trigger In
D		AEP option only - Headphones or other auditory transducers	**M**		Reflex Hammer
E	L	Left ear headphone out	**N**		Laptop (Model may vary)
H		Trigger Out - To External Stimulator	**O**		USB
I		EMG Temperature Input	**P**		VEP option only - LED Goggles
J		Footswitch for single switch only	**Q**	1	Stimulator Probe
K		Trigger	**R**		Consult Operating Instructions. Failure to follow operating instructions could place the patient or operator at risk. Image on blue background. (ISO 7010 M002)
A		Type BF Equipment	**S**	2	Optional 2nd Stimulator Probe
F		Electrostatic Sensitivity See EMC Guide 269-596201 for instructions.			

Nicolet VikingQuest Base Unit bottom panel label icons



A	REF	Manufacturing Reference Number.	**E**	50	50 years of life before leakage of contaminates into land fill.
B		Manufacturer.	**F**		Disposal at the end of operating life
C	LOT	Manufacturing Date coded into Lot number.	**G**		Manufacturer's Bar Code.
D	CE 2797	CE Mark.			

Powering the system

Turning the system on

When you switch on the main power, the system displays several startup and diagnostic messages on the screen.

Turning on a Desktop system

For the first time you switch on the system power, switch the components on in the following order.

1. Isolation Transformer
2. Monitor
3. Processor (Computer)
4. Base Unit

Turning on a Portable system

The first time you switch on system power, switch the components on in the following order:

1. Base Unit
2. Laptop Computer

Turning the printer on and off

Press the printer **Power** button to turn power on. Because the printer power is controlled by the isolation power supply, you can leave this power switch on.

⚠ **WARNING For proper isolation while the patient is connected to the system, only connect a battery powered or independently isolated printer to the system. Do not charge the printer's battery or operate the printer from a wall outlet when the system is connected to the patient.**

Logging in

After approximately one minute following the power up procedure, the system activates Windows and displays the “Log on to Windows” dialog.

1. The logon information for your Viking/Synergy software was preset at the factory. Unless your system administrator changed the information, it will read as follows:
   - The user name should be “Nicolet.”
   - There is no password.

Note: If you have difficulty logging in, consult with your system administrator.

2. Press the **Enter** key. The system displays the Windows desktop.

Launching the system software

1. To start the software, double-click on the **Viking**

icon or **Synergy**

icon. This will display the Home Page.

Note: If you are using NicVue, you will not see the Viking/Synergy Home Page. Please refer to NicVue Help for operating instructions.

Note: See Chapter 4 for example Viking/Synergy tests / studies.

Home page menus

The Home Page contains seven menus used to access the main areas of the software.

	New Patient	Click **New Patient** to create a new patient record and finalize any open visits. Patients with matching demographics will be listed, if found in the database
	Patients	Click **Patients** to select an existing patient for a new session, enter new patient information or edit existing patient information.
	Select Test	Click **Select Test** to choose the Test or Study that you want to perform on the selected patient.
	Test Screen	Click **Test Screen** to review the test data and traces recorded on the selected patient from the most recent or currently selected visit.
	Test History	Click **Test History** to show the currently selected patient's test history, review or restart a test from the list.
	Report	Click **Report** to open the report for the selected patient's currently selected or most recent visit.
	Help	Click **Help** to access application Help with links to manuals and other system information.

Note: Refer to the **On-line Help** (located in the EMG software) for more in depth information on how to use the system.

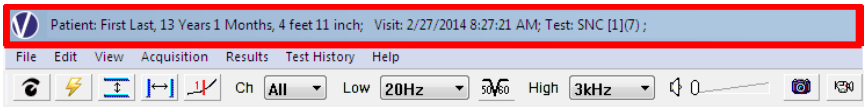
1. Enter into the **EMG software**.
2. Click on **Help > Help Topics**.

Test screen controls

Following are various test screen controls you can use during an exam. The graphics below are representational only. The actual appearance is determined by the software selected (Viking/Synergy) and the test selected.

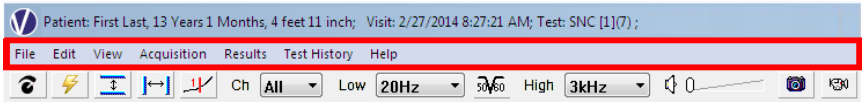
Header bar

The Header bar displays the patient's First and Last name, Age, and the visit Date and Time.



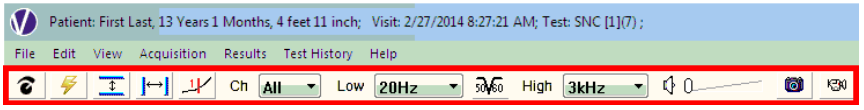
Menu bar

The Menu bar contains menus that, when clicked, displays a list of options from which you can choose to perform various operations.



Toolbar

The Toolbar contains several icons/settings fields, which are used to control the how data is displayed. The controls displayed on the Toolbar is determined by the Test/Study selected for use.



Position the mouse pointer over an icon/field to see a brief description of it's function.

Quick Access bar

The **Quick Access Bar** is located above the Function Key Area. It allows you to quickly control NCS and EMG tests.

You can end the visit, exit the test, select a new nerve and side, start the next set, and select a different test.

Function Key Area

The **Function Key Area** at the bottom of the Test window, lists the options available in the current operating mode.

If the Function Key Area contains multiple lines of options, click on the **Previous / Next** button to scroll through the lines.

To select an option, press the corresponding Control Panel **Softkey** or click on the displayed option button.

Using the Acquisition Setup panel

Displaying the Acquisition Set panel

1. To display the Acquisition Set panel, use either of the following methods:
   a. Click **Acquisition > Acquisition Setup**.
   b. From the Toolbar, click on **Ch.** ①, **Low** ③, or **High** ⑤.

Figure 1.

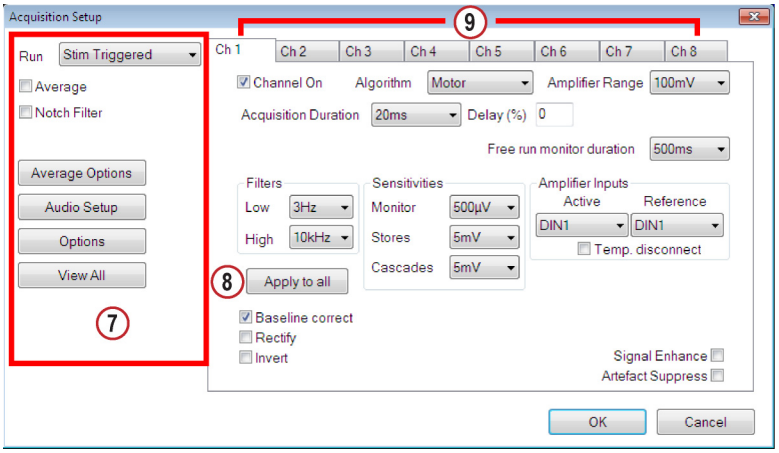


Figure 2.

Note: Changes made to the settings outlined at the left in Figure 2 ⑦ will affect **all of the channels** automatically.

---

2. Click on the **Ch #** tab ⑨ you want to set.
3. Make your settings as desired.
4. Click **OK**.

Setting individual channels on the Acquisition Setup panel

This procedure sets changes made on the Acquisition Setup panel only to the selected channel. See ***Note 1*** below Figure 2 on the previous page.

1. Click on **Ch.** (1), **Low** (3), or **High** (5).
2. Click on the **Channel** tab (e.g., **Ch 1**, **Ch 2**, **Ch 3**, etc.) you want to edit.
3. Make your changes and click **OK**.

   Changes you made are applied only to the selected channel.

Setting all channels on the Acquisition Setup panel

This procedure sets changes made on the **Channel 1 tab** to all of the channels. See ***Note 1*** below Figure 2 on the previous page.

1. Click on **Ch.** (1), **Low** (3), or **High** (5).
2. Click on the **Channel 1** tab.
3. Make your changes and click **Apply to all** (see (8) **i**n Figure 2 earlier in this chapter).
4. Click **OK**.

   Changes you made on Channel 1 are applied to all of the channels.

Applying Filter settings to all channels from the Toolbar

This procedure sets all of the channels to the same Low / High Filter setting.

Figure 3.

1. Set (2) to **All**.
2. Click the **Low** (3) or **High** (5) **Filter** show menu arrow .
3. Click on the desired Filter setting.
   The new Filter setting is applied to all of the channels.

Applying Filter settings to a single channel from the Toolbar

This procedure sets only the selected channel to the new Low / High Filter setting.

Figure 4.

1. Set (2) to the channel you want to edit (e.g., **1**, **2**, **3**, etc.).
2. Click the **Low** (3) or **High** (5) **Filter** show menu arrow .
3. Click on the desired Filter setting.
   The new Filter setting is applied only to the selected channel.

Exiting the software

To exit the Viking/Synergy program, using either of the following methods:

a. Click on the **Close** icon in the upper right corner of the software window.

b. Right-click on or the upper left corner of the software window and click **Close**.

Note: To return to NicVue, click on the **Patients** icon in the EMG application.

Turning the system off

Switch the components off in the order shown below:

Desktop system

1. Use the Windows **Shutdown** function to turn the computer off.
   a. Click **Start** > **Shut Down**.
2. Place the isolation power supply's **Power** switch to the **Off** position.

Portable system

1. Use the Windows Shutdown function to turn the laptop off.
   a. Click **Start** > **Shut Down**.
2. Place the Base Unit's Power switch to the **Off** position.

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3 Patient Information

This chapter explains how to use the Nicolet EMG Patient Information feature used for working with your patient exam files.

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The Patients screen

Patient Information has sections where you enter specific data about the patient, such as the Patient ID, Gender, Birth Date, and Patient Name as well as physician information, impressions and conclusions.

Creating a new patient information record

1. Click on the **New Patient** icon.
2. Enter the patient's information.

Note: Required fields are highlighted in yellow. **Patient ID** (1 character minimum, 11 characters maximum).

---

3. Click **OK** when finished.

Editing a patient information record

1. Display the **Patients** window:
   a. If already viewing the **Patients** window, continue with step 2.
   b. If viewing the **Select Test**, **Test Screen**, or **Test History** window, click on the **Patients** icon and continue with step 2.
2. From the list of patients, double-click on the **Patient** you want to edit.
3. To edit the Patient Information, click on the **Edit Patient** icon .
4. Click **OK** when finished.

Editing a visit record

1. Display the **Patients** window:
   a. If already viewing the **Patients** window, continue with step 2.
   b. If viewing the **Select Test**, **Test Screen**, or **Test History** window, click on the **Patients** icon and continue with step 2.
2. From the list of patients, double-click on the **Patient** you want to edit.
3. Click on the **Edit Visit** icon .
4. Edit the Visit information as necessary.

Deleting a patient information record

⚠ **CAUTION This procedure permanently erases information, which can not be retrieved.**

1. Display the **Patients** window:
   a. If already viewing the **Patients** window, continue with step 2.
   b.If viewing the **Select Test**, **Test Screen**, or **Test History** window, click on the **Patients** icon and continue with step 2.
2. Right-click on the **Patient** you want to delete.
3. Click **Delete Patient**.
4. Click **Yes**.

About NicVue

NicVue is a database used to set up and manage your patient information and exams. It allows you to select your patient and the desired test mode for acquisition or a stored exam for review from one screen.

When you first enter the program, you will see the NicVue Main window. At the top of this window is the menu bar, which lists the menus containing the NicVue options.

Below the menu bar is the program icon bar which allows you to select an operating mode and test mode. The icons displayed on this bar depend on the number and type of programs that are installed on your system's hard drive.

The remaining sections of the NicVue main window consist of two lists:

- **Patient Information** lists all patients stored on the hard drive.
- **Test Data** lists all the test exams stored for the highlighted patient. These files are identified by test type and are listed chronologically.

The NicVue Patient Information window contains administrative information, such as the patient's name, address, ID code, birth date, physical characteristics and medical history. You create or modify patient information on this window.

Note: To return to NicVue, click on the **Patients** icon in the EMG application.

Please refer to NicVue Help on your EMG system for operating instructions.

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4 Performing an Exam

This chapter provides general instructions for performing a study or exam, using a Motor Nerve Conduction Study (MNC) as an example. You can apply these basic steps to perform most of the exams available on the Viking/Synergy programs.

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Summary of steps

1. Set up the system.
2. Turn on the system.
3. Create a new patient file or recall an existing patient file.
4. Enter the Viking/Synergy program, select the exam and settings, then enter the test modality.
5. Prepare the patient.
6. Acquire the data.
7. Review the data.
8. Print the report.
9. Archive the data.

Notes

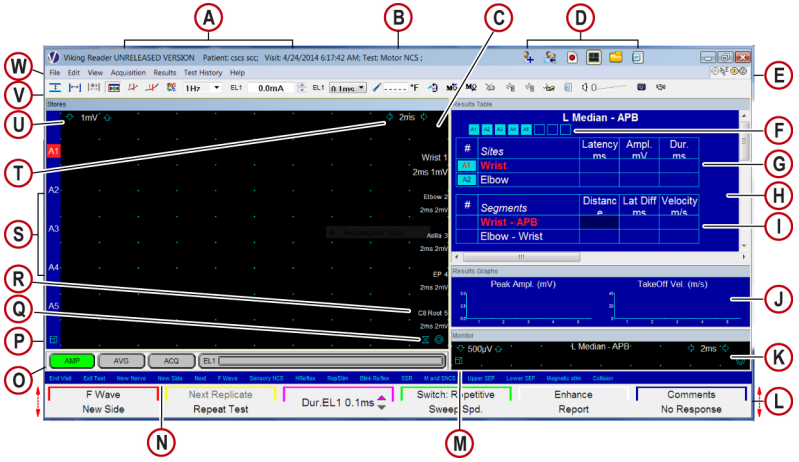
An example procedure for using the tests follows. Some procedures are common to all tests, but note that others are either different or not used at all:

1. Attach the electrodes accordingly for the individual tests.
2. Different types of stimulators are used for different tests.
3. Ensure that the stimulus used is suitable for the patient, paying particular attention to the stimulus intensity.
4. Data acquired by the instrument is stored in memory and displayed on the screen.
5. The distances between electrode sites must be entered before conduction velocity results can be calculated and displayed on the screen during Motor Nerve Conduction and Sensory Nerve Conduction tests.
6. Traces may be selected for marking or trace analysis by clicking on the trace with the mouse.

Example record window summaries

Viking Motor Nerve Conduction Study

The following example figure provides a brief description of the various areas you will view when performing an Viking NCS test.

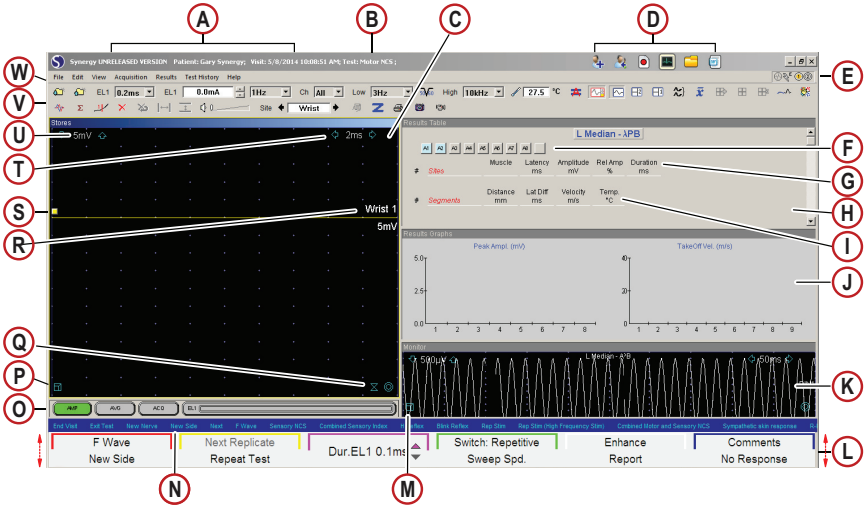


Sections of the Viking MNC Record Mode Screen

A	Patient and Visit Information	**I**	Segment Table	**Q**	Superimpose Data / Display the Screen Area Setup - Stores Panel
B	Selected Test	**J**	Results Graphs Area	**R**	Test Site
C	Data Area	**K**	Monitor Area	**S**	Nerve Step Numbers
D	Navigation Icons	**L**	Function Key Area Press the **Key Line** button on the console to select the upper or lower line of keys.	**T**	Time Base
E	Test, Acquire On/ Off, EL1 On/Off, DIN1	**M**	Monitor Area Full Screen	**U**	Sensitivity
F	Insert/Hide Traces	**N**	Quick Access Bar	**V**	Toolbar
G	Site Table	**O**	Status Bar	**W**	Menu Bar
H	Results Area	**P**	Display Area full Screen		

Synergy Motor Nerve Conduction Study

The following example figure provides a brief description of the various areas you will view when performing a Synergy NCS test.



Sections of the Synergy MNC Record Mode Screen

A	Patient and Visit Information	**I**	Segment Table	**Q**	Superimpose Data / Display the Screen Area Setup - Stores Panel
B	Selected Test	**J**	Results Graphs Area	**R**	Test Site
C	Data Area	**K**	Monitor Area	**S**	Nerve Step Numbers
D	Navigation Icons	**L**	Function Key Area. Press the **Key Line** button on the console to select the upper or lower line of keys.	**T**	Time Base
E	Test, Acquire On/Off, EL1 On/Off, DIN1	**M**	Monitor Area Full Screen	**U**	Sensitivity
F	Insert/Hide Traces	**N**	Quick Access Bar	**V**	Toolbar
G	Site Table	**O**	Status Bar	**W**	Menu Bar
H	Results Area	**P**	Display Area full Screen		

Setting up the system

Make sure the components are properly connected to your system.

⚠ CAUTION Do not turn on any system power until all cable connections have been connected properly and verified. Please see *Chapter 2* in this guide.

You will also need the appropriate application software installed on your system.

Getting started

Please refer to Chapter 2 in this guide for instructions on:

- Power the system.
- Log in.
- Launch the system software.

Turning on the system

When you switch on the main power, the system displays the Windows Logon screen.

After you log on to the system, the NicVue Main window or the Viking/Synergy Home Page is displayed.

Starting/exiting NicVue

Please refer to the **NicVue Help** on your system for instructions on using the NicVue program.

Starting a new session

1. If not already viewing the **Patients** window, click on the **Patients** icon of the window your are currently viewing.
2. Click on the **Patient**.
3. Click on the **Select Test** icon.
4. Select the **Test / Study** using one of the following methods:

    a. Click on the desired **Test** icon for the test you want to perform and select the desired **Test** and **Anatomy** from the lists.

Note: For this example, click on , click on **Motor NCS** from the Test list and then double-click on **Median** from the Anatomy list.

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    b. You can also click on the **Test Menu** icon and select the desired test from the list.

    c. You can also click on the **Study Menu** icon and select the desired study from the list.

5. Continue on the next page for an example Motor Nerve Conduction test.

Example Motor Nerve Conduction Test

Position and secure the electrodes to your patient according to your conventions for the type of test you are performing.

Note: The recording electrode is placed on a muscle, even though the interest is in the conduction along the nerve.

The nerve is stimulated using surface electrodes at two or more sites where the nerve is located superficially. The stimulator is oriented so that the cathode of the stimulator faces the active recording electrode.

Negative voltage applied to the black (-) input jack produces an upward deflection on the screen display. Use the black input jack as the **active** electrode and the red input jack as the **reference** or **inactive** electrode for a negative-up convention.

Electrode	**Amplifier Channel Connector**
Ground	Green DIN Input
Black (-) - Active Recording	Black DIN Input
Red (+) - Reference Recording	Red DIN Input
DIN (Recording)	Large 5-pin Circular DIN Input

Motor NCS electrode placement

- The active recording electrode is placed over the endplate zone of a muscle innervated by the tested nerve.
- The reference electrode is placed nearby in an electrically “quiet” area.
- The ground electrode is usually placed between the stimulating and recording electrodes.
- Using electrolytic gel between the skin and recording electrode improves the “electrical contact” and reduces noise.
- When recording from a deep muscle, one may use a concentric or monopolar needle for recording.

Sensory NCS electrode placement

- Surface disk or ring electrodes are placed over the skin where the tested nerve is superficially located.
- The nerve is stimulated at sites where it is superficially located. The cathode of the stimulator is oriented towards the active recording electrode.

Connect the stimulating electrodes

To connect external stimulating electrodes to the probe:

1. Remove the probe head.
2. Replace the probe head with the pin jack head.
3. Connect the **anode** (+) and **cathode** (-) electrodes in the corresponding pin jacks.

Create/select a patient record

Creating a new patient record

1. Create a new patient record using either of the following methods:
   a. From the Home page, click the **New Patient** icon.
   b. From the Home page, click the **Patients** icon and then click the **New Patient** icon.
2. Enter the patient information (yellow fields are required).
3. Click **OK**.
4. The Select Test window opens automatically.

Selecting an existing patient record

1. Click the **Patients** icon to display the Patients window.
2. Select the patient record using either of the following methods:
   a. Double-click on the desired **patient**.
   b. Click on the desired **patient** and then on the **Open Patient** icon.
3. Click on the **visit** you want to open.
4. Click on the **Select Test** icon to display the Select Test window.

Select a test

1. Click the **NCS** icon at the top of the Select Test window.
2. Click on the desired **Side** icon to select the exam side (left or right).
3. Click on the desired **Test**.
4. Display the Test Screen using either of the following methods:
   a. Double-click on the desired **Anatomy**.
   b. Click on the desired **Anatomy** and then on the Test **Screen** icon.
5. The Test Screen is displayed.

Acquire the data

Data is acquired by the instrument, stored in memory and displayed on the screen when the Acquisition mode is on.

1. Set the stimulus intensity to 0.
2. Position the stimulator at the appropriate site.
3. Start stimulation and acquisition using any of the following methods:
   a. Press the **Acquire ON** button on the control panel.
   b. Step on the Footswitch.
   c. Press the switch on the stimulator probe.
4. Use the ***Stim Intensity*** rotary control or the Intensity wheel on the stimulator probe to gradually increase the intensity of the electrical stimulus until it is supramaximal.
5. When an acceptable response is observed, stop stimulation and acquisition using any of the following methods:
   a. Press the **Acquire ON** button on the control panel.
   b. Step on the Footswitch.
   c. Press the switch on the stimulator probe.
6. To average responses, click **Average > Averager Setup** and check the **Average On** checkbox. If the **Averager** is Off, each newly acquired response will overwrite the previous one.
7. Push the **Next** button to start the next exam.
8. Follow the same procedure to obtain a response for each required site.

Note: The calibration signal is triggered to allow averaging. Note that high and low frequency filter settings may attenuate the amplitude of the calibration signal.

Saving test data

Automatic

When you go to **Patients** or **Select Test** , the data is saved automatically to the hard disk.

Manual

To save data manually on the hard disk without closing the Test Screen:

1. Click **File > Save Results**.

Creating / updating a report

Automatic

When you go to Select Test, New Patient, or Patient List, the report is updated automatically.

Manual

To create / update a report manually on the hard disk without closing the Test screen:

1. Click on the **Report** icon .

Printing a standard data report

To print a standard data report for the exam just completed:

1. Click on the **Report** icon .
2. Click on the **File** tab.
3. Click on **Print** at the left side of the report.
4. Make your printing settings.
5. Click **Print** in the upper left section of the window.

Capturing screen display images and videos

Capturing a screen display image

To capture a copy of the current screen display at any time, use any of the following methods:

a. Click on the **Capture Screen** icon for a softcopy (.jpg file).

b. Click **File > Print Screen** for a printed hardcopy.

c. Press **Screen Copy** on the **Viking** control panel for a printed hardcopy.

Capturing a test screen video

To capture a video of the test screen display, use either of the following methods:

a. Click on the **Capture Video** icon . Repeat to stop recording.

b. Click on **File > Producer > Capture Video**. Repeat to stop recording.

Reviewing a captured test screen video

1. Click on **File > Producer > Producer Recordings**.
2. Locate and open the video file you want to review (files are time stamped).

5 Common Procedures

This chapter describes various operations that are common between the Viking and Synergy.

The following keys identify to which system the procedures in this chapter applies.

	Steps apply to **both** the Viking and Synergy.
	Steps apply to **Viking** only.
	Steps apply to **Synergy** only.

Note: Various operations can also be performed using the Function Key Area buttons located at the bottom of Test/Review windows. These controls are not included in this chapter.

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Adding new tests to a previous visit

You can acquire new tests and add the data to a previous visit.

1. Click on the **Patients** icon.
2. Double-click on the **Patient** record.
3. Click on the **Visit** into which you want to add and store new tests.
4. Click on the **Acquire Visit** icon located above the list of previous visits.
5. Click on the **NCS**, **EMG**, **EP**, or **IOM** icon for the test you want to perform.
6. Select the **Test**.
7. Double-click on the desired **Anatomy**/**Location**/**Test**.
8. Acquire the new data.

Adding new data to a previous test

You can acquire new data and add the data to a previous test.

1. Click on the **Patients** icon.
2. Double-click on the **Patient** record.
3. Click on the **Visit** containing the test into which you add new test data.
4. Click on the **Test** into which you want to add new test data.
5. Click on the **Acquire Test** icon located above the list of previous tests.
6. Acquire the new data.

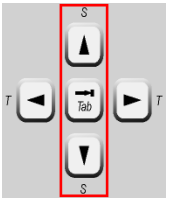
Changing the Stimulus Duration

To change the Stimulus Duration (0.01 - 1.0 ms) presented to the patient:

Viking Synergy	1. Click on the Stimulator **EL1** EL1 0.1ms setting field and click on the new setting from the menu.

Changing the Sensitivity (SNS)

To change the Sensitivity for the test:

Viking Synergy	1. Press the **Trace** **upper** or **lower** hardkey on the Control Panel to select the trace. 2. Press the **upper** hardkey to increase or **lower** hardkey to decrease the sensitivity. 

Changing the Stimulus Rate

To elect the desired Stimulator Repetition Rate, use any of the following methods:

Viking Synergy	a. Click on the **Stim Rep Rate** 1Hz field in the toolbar and type the desired rate. b. Click on the **Stim Rep Rate** show menu arrow and click on a commonly used rate.

Selecting Repetitive or Single sweep acquisition

Select **Repetitive** or **Single Sweep** stimulus delivery, using either of the following methods:

Viking Synergy	1. Click on the **Stimulus Delivery** icon to select the setting: • = Delivers a single stimulus and initiates a single sweep each time you press the **Switch** key or step on the **Footswitch**. • = Delivers repetitive stimulus and sweeps after you press the **Switch** key or step on the **Footswitch**. Press the **Switch** key or step on the **Footswitch** again to stop delivery.

Placing markers

You can have the software place markers automatically or place them manually.

Placing markers automatically

To have the software place markers automatically on the waves at the selected locations when the number of steps have been completed:

	1. Click on **Results > Marker Setup**. 2. Check the Enable checkboxes for the desired Markers. 3. Ensure the **Auto** checkboxes for the markers you want placed automatically are also checked.

All relevant measurements and calculations are displayed in the tables in the Results Tables area.

Placing markers manually

To place markers manually on the data:

	1. Click the **Marker Bar On/Off** button.
	1. Click on **View > Panels > Marker Panel**.
	1. From the Markers panel, use either of the following methods: a. Click on the **Marker Number** you want to place, position the marker icon over the wave feature you want to mark and click the mouse button. Repeat for each marker you want to place. b. Click on the **Fast Mark** button, position the marker icon over the first feature you want to mark as "**1**" and click the mouse button. Move the marker icon over the next feature and click the mouse button. Repeat until all of the desired markers have been placed. Click on the **Fast Mark** button again to turn the function off.

Moving markers on a trace

Measurements update automatically as you move the marker.

1. Click and drag the marker you want to move.
2. Click on the marker you want to move and turn the mouse cursor wheel.

Note: Positioning latency marker 1 to the far left of the data display or latency marker 2 to the far right of the data display will exclude that latency from any calculations.

No Response

If you have not recorded a response to the stimulus on a trace, you can insert an **NR** for No Response on the Results table.

1. Click on the **trace** with no response.
2. Select **No Response** from the Function Key Area.
3. "NR" is displayed on the measurement table, instead of values for the selected trace.

Resetting the markers

If you have manually repositioned markers that were placed automatically by the system, you can return those markers to their original positions:

1. Click **Results > Reanalyze**.
2. Click **Yes** to confirm you want to reanalyze the selected trace.

Changing the screen display

To change the screen display before you begin acquiring data or after acquisition is completed:

1. Use any of the following methods to select how you want to view the screen display:
   a. Click **View > Full Trace Area**, or **Full Results Area**, **Trace Area**, **Right Trace Area**, or **Trace Area Setup**.
   b. Press the **Display** softkey to show your data display options.
   c. Press the **Screen** softkey to toggle between your choices:
      - **Normal**: The Data Area covers half the screen and the Results Area is displayed.
      - **Full**: The Data Area covers the width of the screen and the Results Area is hidden temporarily.
      - Click on the desired toolbar **Display** icon.

Activating markers

To activate a marker, use either of the following methods:

	1. Click on the **marker** you want to activate. It will turn Red.
	1. Press **Marker** to activate the first latency or amplitude marker on a trace. Press this key again to activate the next latency or amplitude marker on the trace.

Superimposing traces

In a single nerve study, superimposed traces are displayed in the center of the screen. In a two-nerve study, waveforms recorded from Nerve A are displayed on the upper half of the screen; waveforms recorded from Nerve B are displayed on the lower half.

	1. Use either of the following methods to superimpose traces: a. Select the **S. Impose** button from the Function Key Area. b. Click **View > Superimpose**.

Calculating Conduction Velocities

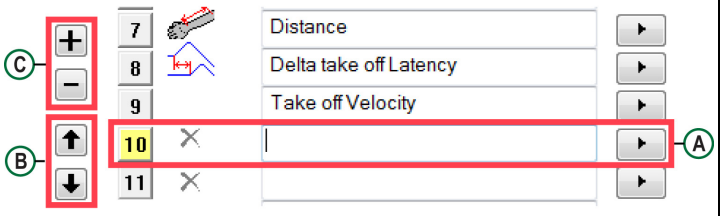
To calculate and display the conduction velocity of specific segments:

1. Click **Edit > Site Setup**.
2. Check the **Velocity** checkbox(es) to select which segments will display the velocity in the Segments results table.
3. Click **OK**.
4. Type in the **distance** for each of the sites for which you want to view the Velocity values.

Measuring patient temperature

If enabled, the system enters the patient's temperature automatically on the trace or segment table during acquisition.

1. Secure the temperature probe to an appropriate location on the patient's skin.
2. Connect the temperature probe to the amplifier.
3. Use either method below to display the Results Table Setup panel.
   a. Click **Edit > Results Table Setup**.
   b. Click on any results value **column heading** on the Results Table (e.g., Distance mm, Lat Diff ms, etc.).
4. Click on an empty field's **Show Menu** button (**A**) below.
5. Click on **Temperature**. The selected field now reads Temperature.
6. To move Temperature to a different column location in the Segment table, click the Up or Down Arrow (**B**).
7. To remove a column from the Results tables, click on the corresponding number and click the **Minus** button (**C**).
8. The **Plus** button (**C**) inserts an empty field above the currently selected field.



9. Click **OK** when done.

Changing the nerve name

To change the nerve label from either the Record or Review mode.

1. Right-click anywhere in the **Results Table** area at the right of the **Data** display area.
2. Click on **Change Nerve Label** from the popup menu.
3. Click on the **Nerve** name with which you want to replace the current label.
4. Click **OK**.

Viewing the nerve list

To choose how you want to view the Test / Anatomy list on the Select Test window.

1. Right-click on the **Heading** at the right side of the **Select Test** window.
2. Click on the desired method with which you want to view the list.

Choosing a side for the exam

To select a Side during the exam, use either of the following methods:

1. From the **Select Test** window, click on to choose the **Left** side or to choose the **Right** side.

Erasing data

The following steps will erase data:

	1. Click on the **trace** you want to erase. 2. Click on the **Erase** button. 3. To restore the trace you just erased, click on the **Unerase** button.
	1. Select the data trace you want to remove. 2. Click **Edit > Erase**. 3. To restore the trace you just erased, click **Edit > Unerase**.

Capturing a video

You can capture a video of the screen display during an exam.

Viking Synergy	1. Click on the **Capture Video** icon to start the video recording. 2. Click on the **Capture Video** again to stop the video recording.

Setting up a report

You can choose the content of the reports.

From the Patients window

Viking Synergy	1. Click on the **Patients** icon. 2. Click **Edit > User Setup > Report Setup**. 3. Edit the Report contents as desired. 4. Click **OK**.

From the Test screen

Viking Synergy	1. Display the Test screen. 2. Click **Edit > Test Report Setup**. 3. Edit the Report contents as desired. 4. Click **OK**.

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6 Backing up/restoring settings and importing legacy Viking Settings Setup

This chapter contains instructions for backing up and restoring your Settings and Test Folders as well as importing legacy Viking Settings Setup.

Note: The procedures in this chapter **do not back up data** acquired from exams.

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Backing up settings and test folders

1. Click on **Start** > **All Programs** > **Natus** > **Emg** > **Utilities** > **Backup Settings**.
2. Click **Yes** on the EMG Settings Backup dialog.
3. Create a **Name** for the Settings folder.
4. Click **Save**.
5. Click **OK** on the EMG Settings Backup dialog, which identifies the location of your backed up Settings folder.

Restoring settings and test folders

From the Desktop:

1. Click on **Start** > **All Programs** > **Natus** > **Emg** > **Utilities** > **Restore Settings**.
2. Click **Yes** to confirm you want to override the existing settings on your system.
3. Click on the Settings folder your want to restore.
4. Click on **Open**.
5. Click **OK**, when notified that the settings have been restored.

Importing legacy Viking settings

This procedure imports previously created legacy Viking settings.

1. From any Viking window other than the Test window, click **File** > **Import** > **Viking Settings**.
2. Browse to the location of your Viking Settings (for example, **C:\Nicolet\VikDir\Settings.Sel**).

You can choose to import all of the Viking Setup and System Setup files, only the selected Viking Setup Settings file(s), or only the Viking System Setup files.

Importing all Viking Tests and System Setup

This method imports **all Viking Test Setups** and **Viking System Setup**, which includes the Look and Feel, Producer, Printer, Regional Settings, etc.

1. If you wish to change the default label of the Test Folder into which the setting(s) will be imported, type in the desired label.
2. Click **Import**.

Importing only the selected Viking Setups

This method imports only the **selected Viking Test settings** that you choose.

1. From the Viking Import Setup window, click **Expand** to display the Import Viking Settings pane, which allows you select specific settings files for import.
2. Uncheck **Select All**.
3. Click on the **Settings** file(s) you want to import.
4. Click the **Import Test Setups** button.
5. An Import status dialog appears.
   a. If the import was successful, click **Close**.
   b. If the import could only be completed partially, either:
      i. Click **Show Log** to view a list of settings that may require modifications after importing the selected setting(s).
      ii. Click to close the Log window.
      iii. Click **Close** to close the Import status dialog.
6. Click **Close** to close the Import Viking Settings pane.

Importing only the Viking System Setup

This procedure imports only the **Viking System Setup settings**, which includes the Look and Feel, Producer, Printer, Regional Settings, etc.

1. From the Viking Import Setup window, click **Expand** to display the Import Viking Settings pane, which allows you select specific Setup files for import.
2. Click **Import System Setup**.
3. An Import status dialog appears.
   a. If the import was successful, click **Close**.
   b. If the import could only be completed partially, either:
      i. Click **Show Log** to view a list of settings that may require modifications after importing the selected settings.
      ii. Click to close the Log window.
      iii. Click **Close** to close the Import status dialog.
4. Click **Close** to close the Import Viking Settings pane.

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