CE

nardalert S3

Narda Broadband Monitor

Operating Manual

narda®
Safety Test Solutions
an L3 communications company

WARNING

This Monitor should only be used after you have read this manual, understood how it operates and consulted with your company's safety officer. High level electromagnetic fields may be hazardous to your health. This monitor cannot protect you from all electromagnetic hazards that you could encounter.

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1 Useful information

This chapter contains basic information about measuring electromagnetic fields, about using the Nardalert S3, and about the structure of this Operating Manual.

1.1 Measuring electromagnetic fields

1.2 About this monitor

1.3 About this Operating Manual

1.1 Measuring electromagnetic fields

In today's world, many industries utilize equipment that generates electromagnetic fields. Our modern need for communications as well as the efficiency of electromagnetic heating systems and the safety that radar systems provide us are just a sample of the applications that are benefitted by exploitation of the electromagnetic spectrum. We also have various engineering considerations as well as regulatory requirements to use the electromagnetic spectrum wisely. Various authorities have long defined limit values designed to protect users from the dangers of exposure to such emissions, and the Nardalert S3 is an effective tool to help companies and individuals demonstrate compliance.

1.2 About this monitor

The Nardalert S3 ("NS3") provides virtually everyone concerned with this subject with an instrument for monitoring non-ionizing radiation that a body might be exposed to within the frequency range from 50 Hz to 100 GHz (depending on the sensor used). The NS3 has a wide range of functions, yet it is very easy to use. It also features a handy design, robust

casing, long battery life, and high measurement accuracy. The NS3 features multiple types of sensors to accurately monitor human exposures while worn on the body. It can be used off the body to detect fields also. Sensors for various monitoring applications are connected to the NS3 basic unit. Flat frequency response sensors are (or are planned to be) available, as well as shaped sensors that evaluate the field according to a specific human safety standard. These sensors are calibrated separately from the basic unit, and include a non-volatile memory containing the sensor parameters and calibration data. They can therefore be used with any NS3 without any loss in calibration accuracy. The PC software supplied with the monitor allows you to configure and remote control the NS3, as well as to export saved measurement data and to analyze the results (if unit is configured for that option).

Applications

The NS3 performs measurements for human safety purposes, particularly in workplace environments where high electric or magnetic field strengths are likely. It can also be configured to function as a stand-alone area monitor with or without the Narda NBM-580 multiple-channel metering station.

Examples:

- Monitoring human exposure field strengths as part of general safety regulations
- Monitoring the field strengths around transmitting and radar equipment to establish safety zones and for monitoring personnel during operations
- Monitoring the field strength emanating from mobile phone base stations and satellite communications systems to ensure compliance with human safety limit values
- Monitoring operator exposures in the industrial workplace environment, such as around plastic welding equipment, RF heating, tempering, or drying equipment
- Monitoring to ensure the safety of persons using diathermy equipment and other medical equipment that generates high frequency radiation
- Field strength monitoring in TEM cells, absorber chambers or test ranges

1.3 About this Operating Manual

Structure of this Operating Manual

This Operating Manual is divided into two main parts:

1. Using the Nardalert S3
   You will find all you need to know about using the NS3 and how to deal with most measurement alarms in Chapters 5 through 7.
2. Using the NS3 Software
   The software can allow you to remotely read field levels as well as enabling the optional performance features.

Characters and symbols used

Various elements are used in this Operating Manual to indicate special meanings or particularly important passages in the text.

Symbols and terms used in warnings

According to the American National Standard ANSI Z535.6-2006, the following warnings, symbols, and terms are used in this document:

	The general danger symbol warns of risk of serious injury when used with the signal words **CAUTION**, **WARNING**, and **DANGER**. Follow all the instructions in order to avoid injuries or death.
NOTICE	Indicates a danger that results in damage to or destruction of the instrument.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Structure of warnings

All warnings are structured as follows:

SIGNAL WORD
Type and source of danger **Consequences of failure to observe warning** ⇨ Instructions for preventing danger

Symbols and marks used in this document

!	**Important instruction** Indicates an instruction that must be followed to avoid danger.
✓	**Requirement** Indicates a requirement that must be met before the next instruction can be carried out, e.g. ✓ The instrument is switched off.
⇨	**Instruction** Indicates a single instruction, e.g. ⇨Switch the instrument on.
1. 2. 3.	**Sequence of instructions** Indicates a sequence of instructions that must be carried out in the order given.
↳	**Result** Indicates the result of carrying out an instruction, e.g. ↳The instrument starts a self test.
Bold Type	**Control element** Indicates a control element on the instrument, e.g. ⇨Press the **Enter** key.
CAPITALS	**Menu name** Indicates a menu name, e.g. ⇨ Open the MAIN menu.
Blue Type	**Cross reference** (in PDF document only) Indicates a cross reference to another part of the document. Click on the blue type in the PDF document to jump directly to the cross reference.

2 Safety instructions

This chapter contains important instructions on how to use the Nardalert S3 safely. Therefore, please read this chapter carefully and follow the instructions closely.

2.1 Using this Operating Manual

2.2 Proper use

2.3 Improper use

2.4 Dangers from electromagnetic fields

2.5 Dangers from AC mains charger

2.1 Using this Operating Manual

! Carefully read this entire Operating Manual before you start using the instrument.

! Keep this Operating Manual so that it is available to everyone who uses the instrument, and ensure that this Operating Manual is with the instrument if you pass it on to a third party.

2.2 Proper use

! The NS3 is a warning device that gives active notice of the existence of dangerous fields by means of a visible and audible warning signal.

! Only use the instrument for the purpose and under the conditions for which it has been designed.

! In particular, observe the technical data given in the Specifications on pages 38-39. Proper use also includes:

  ! Observing any national accident prevention regulations at the place of use.

  ! Ensuring that the instrument is used only by appropriately qualified and trained persons.

2.3 Improper use

The NS3 is designed to monitor and evaluate electromagnetic fields.

! Ensure unit is powered on and working properly.

! Remember that field levels will rapidly increase as you approach the source of the emission.

! If you remove the unit from your body it is important that the back of the unit faces your hand (body) especially at microwave frequencies. When you remove unit from body, carefully observe the actual field level displayed when you are approaching an unknown field source.

2.4 Dangers from electromagnetic fields

Strong fields

Very high field strengths can occur in the vicinity of some radiation sources.

⇨ This monitor is designed to be directional at microwave frequencies – it cannot warn you about a microwave exposure behind you if the monitor is worn on the front of the body.

⇨ Do not cross or ignore safety barriers or markings.

⇨ Persons with implanted electronic medical devices (e.g. heart pacemakers) must avoid restricted areas.

Measurement errors

Metallic labels (stickers) affixed to the black sensor area of the sensor can lead to measurement errors, usually an underestimation of the electromagnetic field strength.

⇨ Affix labels of any type only to the yellow housing. Metallic labels must be affixed to the rear of the monitor.

⇨ If the instrument malfunctions, take it out of service and contact your Narda Service Center. The addresses are listed at the end of this Operating Manual and on the Internet at www.narda-sts.com.

Sensor is not installed or operating properly

The NS3 is designed to monitor the presence of the sensor and that the sensor is functional.

- ⇨ Ensure that the sensor is attached properly to the basic unit. Sensor is designed to be even with the surface of the basic unit and to pass a functional test at turn-on. If in doubt, cycle unit off and then on again to perform connection test. If the sensor is defective, not installed or failing pre-test, it will cause the system to not proceed to measurement mode.
- ⇨ Confidence testing of RF/microwave sensors can be accomplished with a simple 2-way radio that generates more than 1 Watt. An upscale indication should be noticed on the display when the radio is transmitting close to the sensor housing. Narda offers portable sources to accomplish this important test (see Optional Accessories on page 44).
- ⇨ Before beginning any RF radiation measurement, always inform yourself of the frequencies and field strengths that you could be expected to encounter.

2.5 Dangers from AC mains charger

You could experience electric shock from the external power supply.

- ⇨ Do not open the charger as there are no user serviceable parts inside.
- ⇨ Do not expose or submerse the charger in water at any time. It is designed to be used in an indoor, protected environment.
- ⇨ Only use appropriate USB adapter cords. Never use a damaged USB cord.
- ⇨ Only supply AC voltage that meets the voltage specified at the AC input on the Charger. The AC mains charger could be destroyed if the voltage specification of the charger does not match the AC line voltage.


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3 Preparing the Nardalert S3 for use

This chapter describes all you need to do before starting to use the Nardalert S3.

3.1 Unpacking

3.2 Instrument overview

3.3 Connecting the sensor

3.1 Unpacking

Packaging

The packaging is designed to be re-used as long as it has not been damaged.

⇨ Keep the original packaging and use it whenever the instrument needs to be shipped or transported.

Items included

⇨ Check that all the following items have been delivered:

NS3 carrying case (P/N 11230500)

Nardalert S3 (P/N 2270/01)

Silicon sleeve (P/N 11229700, attached to Nardalert S3)

Cable, USB "A" male to USB mini "B" male (P/N 70889004)

Lanyard clip (P/N 11229312)

Belt clip (P/N 11229310)

Battery (P/N 70881000, inside Nardalert S3)

User's Guide and CD-ROM (P/N 43068000)

12 VDC car charger (P/N 70914000)

AC charger and plugs (P/N 70890000, packed separately)

At least one sensor will be required for the monitor to operate properly.

Transport damage

Instrument/accessories damaged during transportation

Using damaged instrument/accessories can lead to subsequent damage.

⇨ Check the instrument and all accessories for damage when you have unpacked them.

⇨ If the instrument is damaged, contact your Narda Service Center.

The addresses of Narda Service Centers are listed in Chapter 6 of this Operating Manual and on the internet at www.narda-sts.com.

After transport and storage

Condensation on an instrument can lead to damage

Condensation can form on an instrument that has been stored at a low temperature when it is brought into a warm room. It may be damaged if used.

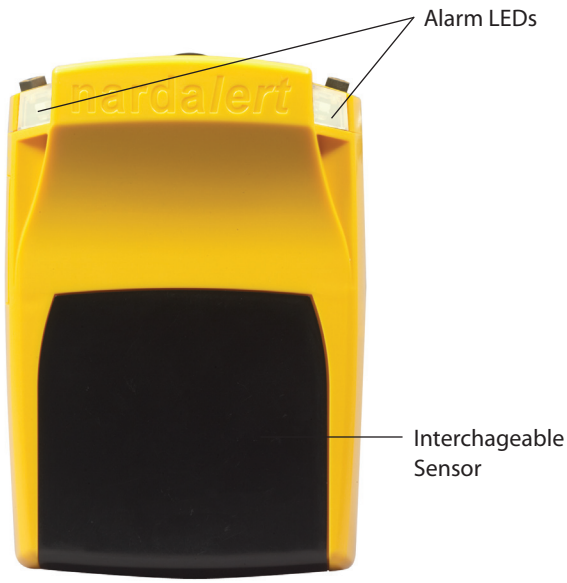
⇨ Wait until all visible condensation has evaporated from the instrument surface to avoid damaging the instrument.

Note: The instrument is not ready for use until it has reached a temperature within the operating range of -10°C to +50°C.

3.2 Instrument overview

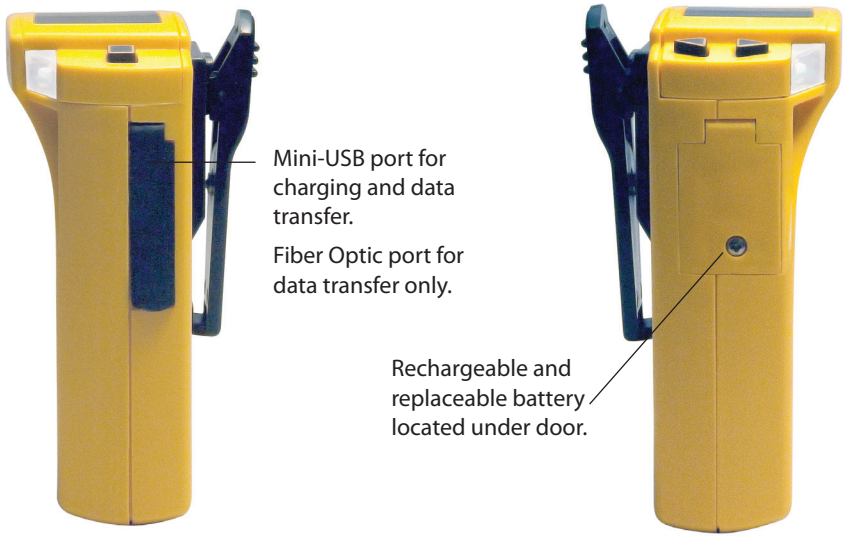
Top Panel

Front Panel



Rear Panel

Side Panels



3.3 Connecting the sensor

WARNING

If the Sensor is not operating properly, or if the proper sensor is not chosen,

you could be exposed to high field levels without your knowledge.

⇨ Refer to Sensor Specifications on page 39 to select appropriate sensor(s).

⇨ Folow instructions below to properly connect sensor.

The NS3 is designed to monitor the presence of the sensor and that the sensor is functional. In order to simplify the turn-on procedure, it is recommended that the sensor be connected to the NS3 and the battery fully charged before beginning.

⇨ Ensure that the sensor is attached properly to the basic unit. The sensor is positioned so that it easily can be inserted and secured to the basic unit by tightening the two screws shown in Section 3.2. Sensor is designed to be even with the surface of the basic unit and to pass a functional test at turn-on. If in doubt, cycle unit off and then on again

to perform connection test. If the sensor is defective, not installed or failing pre-test, it will cause the system to not proceed to measurement mode.

⇨ Charging of the monitor is accomplished by attaching the proper AC mains plug to the charger and then the supplied USB cable to the charger and NS3. The unit will be rapidly charged when using the supplied USB charger and at a slower rate (longer time) if plugged into a computer. Charging time is approximately 4 hours for a full charge. Note the battery Icon in the top right of the display when the unit is energized, indicating the amount of charge.

⇨ Confidence testing of RF/microwave sensors can be accomplished with a simple 2-way radio that generates more than 1 Watt. An upscale indication should be noticed on the display when the radio is transmitting close to the sensor housing. The NS3 provides a menu screen "Self Test", to evaluate the output from the three detectors used in the RF/microwave sensors.

⇨ Before beginning any RF radiation measurement, always try to verify the frequencies and field strengths that you could be expected to encounter.

There are many different sensors available for different applications and use with the NS3. You can find more information about the order numbers and specifications of the sensors under Ordering Information on page 43, as well as in the data sheets of the NS3. These documents can also be downloaded from the Narda website on the internet at: www.narda-sts.com.

Wrong handling of the sensor

Damage of the sensor antennas

⇨ Always try to store the sensor in the carrying case when not installed in the NS3. This should help protect it from excessive shock and vibration, as well as environmental extremes.

4

Getting started

This chapter describes how to switch on the Nardalert S3 and verify it is operating properly.

4.1 Initial display screens

4.2 Checking monitor functions

4.3 Screen navigation

4.4 Additional capabilities of optioned units

4.1 Initial display screens

The NS3 is switched on by depressing and holding the **On/Off** button on the left side of the display. The alarm LEDs will illuminate and the vibrator will activate before the splash screen (Figure 1) is displayed.

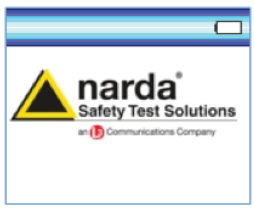


Figure 1 Splash Screen

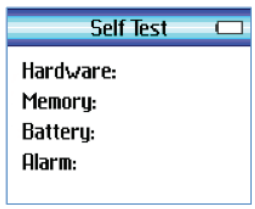


Figure 2 Self Test Screen

Figure 3 Configuration Screen

The NS3 shows each screen for a few seconds as it performs a self test, verifies the monitor and sensor's information and date of calibration before beginning to measure and display detected fields.

⇨ If the sensor is defective or not attached to the basic unit, the start-up sequence will be stopped – screens in Figures 4 and 5 will not be displayed.

⇨ If the calibration is more than 2 years old for the sensor, or 4 years old for the basic unit the calibration screen (Figure 4) will have a red background and one of the buttons needs to be depressed to continue.

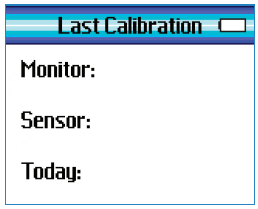


Figure 4 Calibration and Date Screen

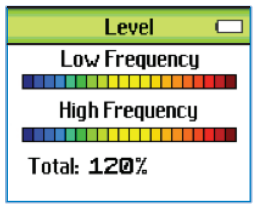


Figure 5 Normal Operation Display (RF/ microwave only)

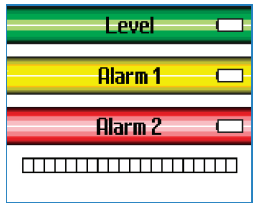


Figure 6 Alarm levels and color changes (not actual screen)

Normal operation

The operation screen (Figure 5) displays the detected fields from the low and high frequency sensors separately to provide information to the wearer about the type of source creating the display. The display considers 1 GHz (approximately) as the separator between low and high frequencies.

Alarm indication

If an alarm threshold is exceeded (Figure 6) the top color bar will change from Green to Yellow (Alarm 1) and from Yellow to Red (Alarm 2), if two alarms are used. If only one alarm is used, then the color bar will change from Green to Red (Alarm). The wearer also receives audible, vibrate and LED visual indications when alarm thresholds are exceeded (factory defaults).

4.2 Checking monitor functions

Performing a function test:

1. Connect the sensor to the NS3. Turn monitor on, insure it completes it's POST (Power On, Self Test) and then set menu to Self Test.
2. Use an appropriate check source to generate an upscale indication for that sensor's display on the NS3.
3. An upscale indication indicates an OK Function Test.
4. If no indication is seen on monitor display, verify that the unit passes its turn-on tests and verify the test source is operating properly.

Note: Do not use this function test for verifying calibration. This test is only suitable for checking sensors and their connection to the NS3. The readings displayed on the monitor depend on the type of sensor and are irrelevant for this test, and as such cannot be used to verify calibration.

Appropriate test sources

A convenient method to test the RF/microwave sensors in the NS3 is to use a common two-way radio. In many countries "family radios" generate enough power to produce a full scale reading if held very close to the sensor itself. The North American frequency of 433 MHz will produce an upscale indication for both the low and high frequency sensors, providing a more complete verification.

4.3 Screen navigation

Navigation is accomplished by using the **Up/Down** Arrows and the **Enter** Key. The NS3 responds to two types of key depression, "tap" or "hold." "Tap" commands are completed by depressing the key for less than one second, while "hold" is for depressing the key for more than one second. Key use is further defined in the table below.

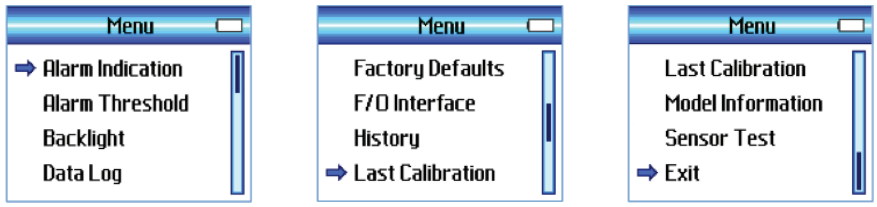
Key	**Function** – *Before Menu Interface*	**Function –** *Menu Selection Screen*	**Function –** *Sub-Menu Screen*
Enter *Tap*	Light the backlight.	Performs the operation of the item that the arrow icon is pointing to.	1. If the arrow icon is pointing to the parameter line and the selection process is not active, start the selection process. 2. If the arrow icon is pointing to the parameter line and the selection process is active, accept the current parameter and place it in hold. 3. If the arrow icon is pointing to the Cancel and Exit line, return to the Menu Selection Screen without implementing the change. 4. If the arrow icon is pointing to the Save and Exit line, implement the parameter change, save the new parameter in memory and return to the Menu Selection Screen.
Enter *Hold (>2 seconds)*	Start power down process.	Start power down process.	Start power down process.
Up Arrow *Tap*	Light the backlight.	Move the arrow icon up to the previous item on the Menu Selection Screen. Scroll the text if necessary.	1. If the selection process is active, scroll to the previous parameter choice. 2. If the selection process is not active, move the arrow icon up to the previous item.
Up Arrow *Hold (1 second)*	Scroll to next screen if unit is not in a safety alarm state.		
Down Arrow *Tap*	Light the backlight.	Move the arrow icon down to the next item on the Menu Selection Screen. Scroll the text if necessary.	1. If the selection process is active, scroll to the next parameter choice. 2. If the selection process is not active, move the arrow icon down to the next item.
Down Arrow *Hold (1 second)*	Scroll to previous screen if unit is not in a safety alarm state.		

4.4 Additional capabilities of optioned units

Your NS3 can be upgraded at any time to a full featured monitor that displays additional information as well as stores exposure data. This upgrade can be accomplished by entering a special code through the NS3-TS software and enabling the upgrade.

Menu selection screens

Below are the various menu screens and their functions.



Alarm Indication

Allows for altering of the alarm indication between Audible and Vibrate, Audible only or Vibrate only. Factory default is Audible and Vibrate.

Alarm Threshold

Allows alarm threshold levels to be altered. Alarm 1 can be set from 5% to 100% and OFF. Alarm 2 can be set from 20% to 200%. Factory default is Alarm 1 at 50% and Alarm 2 at 200%.

Backlight

Allows setting of display backlight times to OFF, 10 seconds, 30 seconds, 1 minute and Permanent ON. Factory default is 10 seconds. Longer backlight times result in lower operating time.

Data Log

Sets data logging rate from 4 per second, 1 per second, 5 seconds, 20 seconds or 1 minute. Factory default is 1 sample per second.

Factory Defaults

Resets all monitor functions back to Factory Default values.

F/O Interface

Sets fiber optic interface for communication or remote vibrator operation. Factory default is the communication setting.

History

Displays maximum, minimum and average readings for the last 6 minutes.

Last Calibration

Displays last calibration dates for sensor and monitor.

Model Information

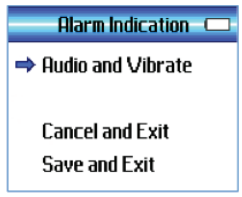
Displays information about the monitor and firmware version as well as sensor information.

Sensor Test

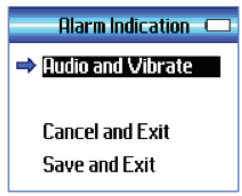
Displays individual sensor output for user to self-test system for proper function.

Navigating sub-menu screen example

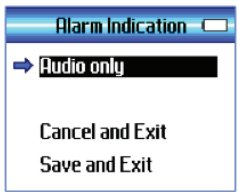
1. Tap the ■ Button when arrow is pointing at **Alarm Indication**. NS3 display changes to:

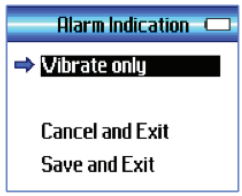


2. Tap the ■ key again to select item to be modified. Item is highlighted to confirm selection.

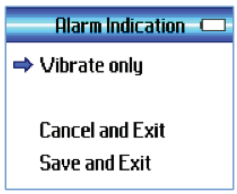


3. Tap either the ▲ or ▼ arrow to cycle through choices.

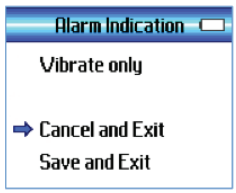




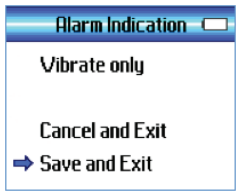
4. Tap the ■ again to select choice. Choice is not confirmed until you "Save and Exit."



5. Tap the ▼ arrow once to get to the "Cancel and Exit" selection. Tap ■ to leave the function without implementing the parameter change.



6. To implement the change and to store it in memory so the next time the unit is powered up it will recall the setting, move the arrow icon to the "Save and Exit" line (by tapping ▼ twice). Tap the ■ key to return to the menu selection screen.



5 Operation overview

5.1 Normal operation

5.2 Special environmental operations

5.3 Using the Nardalert S3 as an area monitor

5.1 Normal operation

The NS3 should be fully charged and configured for your personal use. The factory provides both a lanyard attachment and a belt clip for your convenience, and a silicon skin to help provide protection for the unit against shock.

Once you have verified the proper mounting configuration and have charged the unit you should verify that the alarm levels shown on the second start-up screen meet with your company's policy. The NS3 was designed to be mounted with the back side towards your body. Some customers prefer to wear the unit mounted to a waist belt while others prefer a lanyard attachment. Either method of attachment is acceptable as long as the unit is normally kept close to the body to improve the radial field sensor's performance.

The default setting for the LCD backlight is to extinguish after 10 seconds, in order to save battery life. You can momentarily depress any button to activate the LCD backlight, but the display should be visible in direct sunlight without the backlight. An LED will briefly flash every 10 seconds to indicate the unit is operating properly.

The NS3 samples the sensor's output approximately every 32 msec., and uses the average of 8 samples to log at its fastest rate. The display is updated every second, so the level displayed is an average of the four logs. The monitor can be set to log at a rate as fast as 4 times per second for high speed situations.

Alarms are indicated by the screen, LEDs, audible and vibrate alarms. In an Alarm 1 situation the tone and vibrator alternate at an approximate 1 second rate. Red and Amber LEDs will also illuminate on one side of the display. Exceeding the Alarm 2 threshold will cause the audible alarm to step through 5 tones while the vibrate rate is doubled from the Alarm 1 rate. Red and Amber LEDs on both sides of the display will illuminate alternately. If customers choose to employ only one alarm, it will indicate Alarm 2 characteristics.

The battery icon is always displayed on the unit. When the battery displays a "Red" background there is less than 20% life left and the unit should be charged immediately. If the battery level falls below 10%, audible and LED alarms will be generated without vibration or LCD backlight.

5.2 Special environmental operations

Heavy rain or snow

The NS3 was designed to be water resistant. It is recommended that the silicon skin be employed as the minimum measure to keep water from pooling within the unit. It is NOT recommended to wear the monitor inside of clothing as wet garments can seriously attenuate microwave field levels the unit may need to detect.

Extreme low temperatures will cause the LCD to respond slowly and for the battery life to be degraded, however the unit will continue to function to -20° C.

High ELF environments

The normal NS3 (with RF/microwave sensor) was not designed to function in areas where the ELF field strength is greater than 6 kV/m. Higher ELF field levels can cause the NS3 to false alarm. If operation is needed in higher field levels, special sensors can be supplied. Contact the factory (NardaSTS@L-3COM.com) for further information.

High RF/microwave environments

The NS3 has not, at the time of this writing, developed a high power sensor for use with RF clothing. Persons wearing RF clothing should not use this monitor under the clothing. Currents flowing through the clothing could cause the monitor to false alarm.

5.3 Using the Nardalert S3 as an area monitor

The NS3 functions as an effective, stand-alone area monitoring device. It may be operated continuously from the USB supply while employing the Fiber Optic interface for communicating field level information back to a computer. Multiple NS3s can be connected to the Narda NBM-580 meter (up to 8) which functions as an interface between sensors and alarms. In Section 8.4, Optional Accessories , there are part numbers given for fiber optic cables as well as the F.O. to USB adapter that would be required in order to provide area monitoring operation.

6 Instrument maintenance

6.1 Cleaning the monitor

6.2 Verification overview

6.3 Authorized service centers

6.4 Disposal

6.1 Cleaning the monitor

NOTICE

Damage to the monitor from liquids

The instrument may be damaged or destroyed if liquids are allowed to get inside the casing.

⇨ Make sure that no liquid gets inside the instrument

NOTICE

Solvents

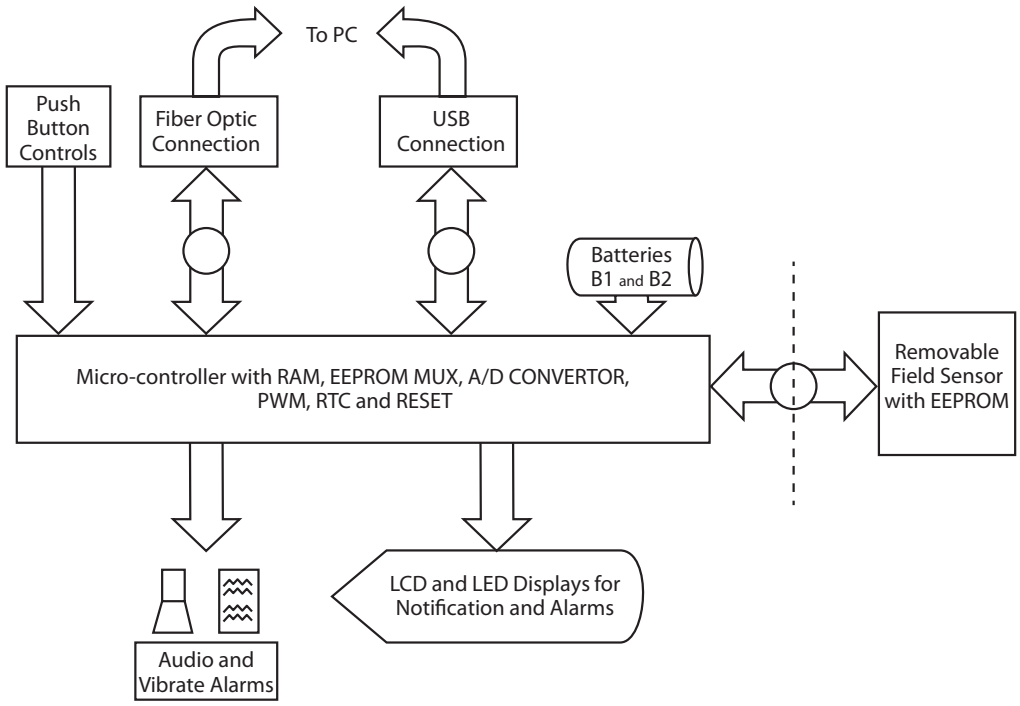
Solvents can corrode the surfaces of the basic unit, sensor and AC Adapter / Charger.

⇨ You must not use solvents to clean the basic unit, sensor and AC Adapter / Charger.

1. Use a soft cloth to clean the monitor. You can use lukewarm water to which a little detergent solution has been added as a cleansing agent.
2. To prevent streaks and spots, wipe off the monitor with a dry cloth while it is still damp.

6.2 Verification overview

Simplified block diagram



Theory of operation

The NS3's patented design can be supplied with RF/microwave sensors (2271/XX) that detect the electric field over an extremely broad frequency range regardless of signal type or polarization.

- The low frequency detector is a low-impedance, surface-area type designed to detect the radial fields that are characteristic of low-frequency communications systems. The diode based detection operates in its "square-law" region to yield accurate results even in complex, multi-signal environments.
- A diode-dipole antenna is added to complement the low frequency sensor in the UHF region and to optimize detection of any and all polarizations.

- Higher microwave frequencies (>2 GHz) are primarily detected with thermocouple arrays. This detector is a true "square-law" sensor that will always yield RMS average results, even in a pulse-modulated exposure environment.
- Individual outputs from all three detectors are processed by the NS3 with their calibration information supplied by the sensor's imbedded EEPROM. All units are individually calibrated to facilitate field support.

The NS3's design utilizes RF shielding and absorbers to isolate it from reflections or scattering produced by the monitor, or the human body. In general, the monitor cannot detect microwave fields from behind the body when it is worn on the front of the body. At low frequencies (<100 MHz), however, the body can act as an antenna and introduce energy into the monitor, even when the source is from behind the wearer.

Testing RF/microwave sensors

The NS3 includes a menu screen (Sensor Test) that allows users to generate their own signal to see the monitor respond. Note that your signal's power and frequency need to be sufficient to register a response on the monitor. North American users may find that a common "family radio" operating at 433 MHz and at least 2 Watts of power can be used as a simple, but effective test source.

Required equipment for testing RF/microwave sensors

Standard "fields" need to be established with relatively high RF powers required (>10 Watts). The NS3 is factory tested inside of a "TEM" cell at frequencies below 300 MHz, and then positioned in front of standard gain horns from 300 MHz to 50 GHz. Special arrangements are made by Narda to test frequencies above 50 GHz. Refer to IEEE 1309 Standard for field generation methods.

This document is not intended to train the reader in the art of generating or verifying the fields used to excite the NS3. Readers are cautioned to review or familiarize themselves with the various international standards setting groups that offer guidance in this engineering discipline.

Operational tests

Units should be visually inspected for complete and correct battery conditions, switches and overall mechanical integrity. Units should pass the "Turn-on" sequence and indicate full or nearly full battery condition.

After successful completion of operational testing, units should be connected to a computer through the Fiber Optic port, to verify communication capability.

! ***All NS3 models need to be returned to their local calibration facility at least once every 4 years for replacement of their internal clock battery. There are no operator accessible controls or written procedures available to perform this critical step. If batteries are not changed they may pose a safety hazard as well as damaging the NS3 itself.***

Required field response by design

0.1 to 10 MHz = Radial Only

10 to 1600 MHz = Radial and Vertical

1.6 to 100 GHz = Vertical and Horizontal

Maximum errors are as follows:

+4.5 / -3.0 dB for 100 kHz to 30 GHz

+2.5 / -6.0 dB 30 to 50 GHz

+2.5 / -6.0 dB 50 to 100 GHz, Typical

TEM cell (f < 300 MHz)

The NS3 is factory verified in a one-meter TEM cell, for frequencies between 100 kHz to 300 MHz. Since it is responsive to the radial component, it is positioned halfway between the septum and outer wall, in the radial orientation (Label facing septum). The LEDs should be facing away from the opening of the TEM cell when using remote cables to collect data, however the unit can be positioned with the LEDs facing the front of the TEM cell when manually verifying performance.

Generally the unit is tested at 1, 10, 50, 100, 150, 200 and 300 MHz while in the TEM cell. Power should be increased slowly until the NS3 alarms at the set Alarm 1 level (50%). Slowly decrease and then increase power again to determine dB difference from calculated to actual alarm points.

Anechoic chamber (f > 300 MHz)

The NS3 is factory calibrated in an anechoic environment at frequencies above 300 MHz. Narda utilizes double-ridged waveguide horns for measurements up to 2 GHz and standard gain horns for higher frequencies. At frequencies equal and below 1.6 GHz, the NS3 is tested in the vertical and radial positions, and above that frequency in vertical and horizontal positions. The units are calibrated at a distance of 1 meter from the face of the horn to the front surface of the monitor.

6.3 Authorized service centers

Narda STS products are designed to help protect persons from high-level EMF fields. Therefore, they should be periodically calibrated and serviced by only authorized facilities that have the critical equipment and capability to service these unique products. Narda products can be returned to:

US Facility

L-3 Communications Narda-East
435 Moreland Road
Hauppauge, NY 11788
Phone: +1 631-231-1700
Fax: +1 631-231-1711
E-mail: nardaservice@L-3COM.com

Germany Facility

NardaSTS GMbH
Sandwiesenstrasse 7
72793 Pfullingen GERMANY
Phone: +49 (0) 7121 9732777
Fax: +49 (0) 7121 9732790
E-mail: support@narda-sts.de

UK Facility

Link Microtek
High Point, Church Street
Basingstoke, Hampshire RG21 7QN UK
Phone: +44 (0) 1256 355771
Fax: +44 (0) 1256 355118
E-mail: service@linkmicrotek.com

6.4 Disposal

This product is subject to European Guideline 2002/96/EC governing the disposal of waste electrical and electronic equipment (WEEE).

Do not dispose of this instrument with the normal household waste. You should dispose of it in accordance with the waste disposal ordinances in your country.

Within the European Union, all electronic measuring systems purchased from Narda after 13th August 2005 can be returned when they reach the end of their useful life. The measuring systems that come under this regulation or the documents that accompany them are clearly marked with the symbol of a garbage bin crossed out with black lines. You can obtain further information from your local Narda Sales Partner or at: www.narda-sts.com.

CAUTION

Your Nardalert S3 contains a Lithium ion battery pack.

There is a risk of fire and burns if the battery pack is handled improperly.

- ⇨ Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- ⇨ Do not attempt to open or service the battery pack.
- ⇨ Replace only with the battery pack designated for this product.
- ⇨ Recycle or dispose of batteries properly. Do not discard with your regular trash.

7

Specifications

7.1 Monitor specifications

7.2 Sensor specifications

7.3 Outline drawing

7.4 Declaration of conformity

7.5 Declaration of origin

7.1 Monitor specifications

Display Type	TFT Transmissive
Display Size	1.77 inches, 28 x 35 mm, 128 x 160 pixels
Backlight	White LEDs
Display Refresh Rate	250 msec.
Memory	62,000 events
Storage Rate	4 per second, 1 per second, 1 per 5 seconds, 1 per 10 seconds, 1 per 20 seconds, 1 per 60 seconds
Storage Time	Variable - from 4.3 hours (4 per second), to 43 Days (1 per 60 seconds)
Remote Operation	Via USB or Optical RS-232 Interface
USB	Serial, Full Duplex, 57600 baud (virtual com port), multi-function plug connector
Optical Interface	Serial, Full Duplex, 57600 baud, no parity, 1 start bit, 1 stop bit
Recommended Calibration Interval	4 years[a]
Temperature Range	Operational: -10°C to +50°C Non-operational (transport): -30°C to +70°C
Humidity	5 to 95% relative humidity, no condensation; ≤29 g/m^3 absolute humidity (IEC 60721-3-2 class 7K2)
Size (minimum)	117.1 x 82.6 x 31.8 mm (4.61 x 3.25 x 1.25 in.)
Weight	0.5 lbs. (0.23 kg), with sensor
Accessories (included)	AC Charger with Plugs, Car (12VDC) Charger, Charger/Data cable (USB), Carrying Case, Belt Clip, Lanyard Clip, User's Guide, NS3-TS Software, Calibration Certificate(s)

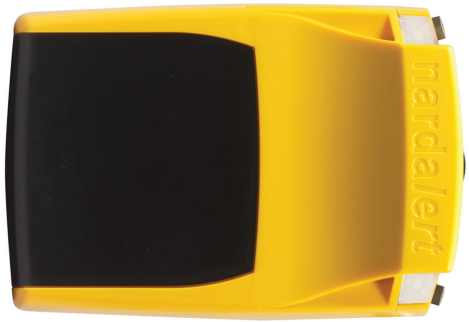
[a] Only for basic instrument; sensors are specified separately

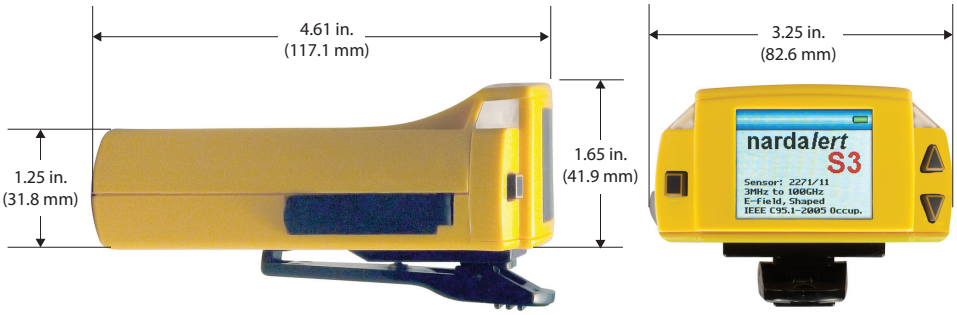
7.2 Sensor specifications

At the time of this publishing, four sensors are available for the NS3. That number will increase and later revisions of this manual will also cover those items.

Sensor	2271/01 FCC	2271/11 IEEE	2271/21 SC6	2271/31 ICNIRP
Frequency Range	100 kHz to 50 GHz	3 MHz to 50 GHz	100 kHz to 50 GHz	
Field Measured	Electric Field, V^2/m^2			
Sensor Design	Radial Field, Diode-Dipole and Thermocouple Array			
Frequency Sensitivity	+4.5 / - 3.0 dB (100 kHz to 30 GHz) +2.5 / -6.0 dB (30 to 50 GHz) +2.5 / - 6.0 dB (50 to 100 GHz, Typical)			
CW Overload	3000% of Standard or Guidance			
Peak Overload	32 dB Above Standard or Guidance (related to 100%)			
ELF Immunity	6 kV/m			
Recommended Calibration Interval	2 years			

7.3 Outline drawing





7.4 Declaration of conformity

Declaration of Conformity
(In accordance with ISO/IEC 17050-1)

DoC no:	2011-S3-01
Issuer Name:	L-3 Communications, Narda-East
Issuer Address:	435 Moreland Road Hauppauge, NY 11788 United States
Object of Declaration:	Nardalert S3 with Sensor Assembly
Model Number:	2271/101, 2271/111, 2271/121, 2271/131
Description:	Non-Ionizing Radiation Monitor

The object of the declaration described above is in conformity with the requirements of the following documents:

2004/108/EC	Directive of the European Parliament and of the Council on the approximation of the laws of the Member States relation to electromagnetic compatibility and repealing 89/336/EEC
EN 61326-1:2006	Electrical equipment for measurement, control and laboratory use. EMC requirements
Signed for and on behalf of:	L-3 Communications, Narda-East
Place and date of issue:	Hauppauge, May 4, 2011
Signature:	
Name, function:	Ralph Curcio, Director of Quality

Annex-EMC of Declaration of Conformity

DoC no: 2011-S3-01

Device: Non-Ionizing Radiation Monitor

Model Number: 2271/101, 2271/111, 2271/121, 2271/131

Conformance of the product with Directive 2004/108/EC (EMC Directive) is given according to the harmonized European standard: EN 61326: 2006

Tests performed according to EN 61326:

Emission Requirements	**Standard**	**Test level, condition**
Conducted Emissions, AC Power Ports	CISPR 11	150 kHz to 30 MHz, Limit: CISPR 11, Group 1, Class B
Radiated Emissions, Power Leads	CESPR 11	30 MHz to 1 GHz, Limit: CISPR 11, Group 1, Class B
Harmonics	IEC 61000-3-2	# of Ports Tested: 1
Voltage Fluctuations and Flicker	IEC 61000-3-3	# of Ports Tested: 1
Basic Immunity Requirements	**Standard**	**Test level, condition**
Electrostatic Discharge	IEC 61000-4-2	Level: 4 kV Contact, 4 kV Air Discharges
Radiated Immunity (EM Field)	IEC 61000-4-3	3 V/M, 80 to 1000 MHz 3 V/M, 1.4 to 2 GHz 1 V/M, 2.0 to 2.4 GHz
Voltage Dips and Short Interruptions	IEC 61000-4-11	Level: 0% for ½ cycle, 0% for 1 cycle, 70% for 25/30 cycles, 0% for 250/300 cycles
Electrical Fast Transient Burst	IEC 61000-4-4	Level: 1.0 kV
Surge	IEC 61000-4-5	Level: 0.5 kV Differential Mode, 1.0 kV Common Mode
Conducted RF	IEC 61000-4-6	Level: 3 Vrms, 150 kHz to 80 MHz

7.5 Declaration of origin

Country of Origin	United States of America


Nardalert S3
Personal Monitor Transfer Software
& Instruction Manual
nardalert
S3
DELL

8

Ordering information

This chapter contains the information needed for ordering the NS3, together with its sensors and accessories.

8.1 Nardalert S3 part numbers

8.2 Sensor part numbers

8.3 Nardalert S3 system part numbers

8.4 Optional accessories

8.1 Nardalert S3 part numbers

Nardalert S3 Set 1 Narda Broadband Field Monitor ***Includes*:*** Nardalert S3 Basic Unit, including 1 x LIon battery, RCR123A (2270/01) Carrying Case, holds monitor, charger and accessories (11230500) AC Charger and Plugs (70890000) 12 VDC Car Charger (70914000) Belt Clip, non-conductive (11229310) Lanyard Clip, non-conductive (11229312) Cable, USB interface for NS3, 1 m (70889004) User's Guide and CD-ROM (43068000) *Sensors are NOT included	**2270/101**

Data Logging Option for NS3 (Option Key)	**2270/90.01**

8.2 Sensor part numbers

Sensor Module, FCC 1997 “Occupational/Controlled”	2271/01
Sensor Module, IEEE C95.1-2005, “Controlled”	2271/11
Sensor Module, Safety Code 6, “Controlled”	2271/21
Sensor Module, ICNIRP 1998, “Occupational”	2271/31

8.3 Nardalert S3 system part numbers

Nardalert S3 with FCC Sensor Module	2271/101
Nardalert S3 with IEEE Sensor Module	2271/111
Nardalert S3 with SC6 Sensor Module	2271/121
Nardalert S3 with ICNIRP Sensor Module	2271/131

8.4 Optional accessories

Cable, optical fiber, duplex (1000 µm) RP-02, 2 m	2260/91.02
Cable, optical fiber, duplex (1000 µm) RP-02, 20 m	2260/91.03
Cable, optical fiber, duplex (1000 µm) RP-02, 50 m	2260/91.04
Cable, optical fiber, duplex, F-SMA to RP-02, 0.3 m	2260/91.01
Nardalert S3 Mounting Bracket (for fixed monitoring)	11232200
Fiber Optic Converter RS232, RP-02/DB9	2260/90.06
Fiber Optic Converter USB, RP-02/USB	2260/90.07
Cable, adapter, USB 2.0 - RS232, 0.8 m	2260/90.53
Extra copy of software and manuals	43068000

Warranty information

Narda Safety Test Solutions (Narda STS) warrants each product to be free from any defect in material and workmanship for a period of two years after delivery to, and return by the original purchaser. All warranty returns, however, must first be authorized by a factory office representative.

The limit of liability under this warranty shall be to repair or replace any product, or part thereof, which proves to be defective after inspection by Narda STS. This warranty shall not apply to any Narda STS product that has been disassembled, modified, physically or electrically damaged or any product that has been subjected to conditions exceeding the applicable specifications or ratings.

Narda STS shall not be liable for any direct or consequential injury, loss or damage incurred through the use, or the inability to use, any Narda STS product.

Narda STS reserves the right to make design changes to any Narda STS product without incurring any obligation to make the same changes to previously purchased units.

This warranty is the full extent of obligation and liability assumed by Narda STS with respect to any and all Narda STS products. Narda STS neither makes, nor authorizes any person to make, any other guarantee or warranty concerning Narda STS products.

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43067900 Rev. A