Product Specifications

XRF technology has taken a giant leap forward with the next generation of portable analyzers – the handheld Thermo Scientific Niton XL3t. Building on the success of the award-winning Niton® XLt Series, the Niton XL3t x-ray tube-based XRF analyzer continues to lead the market through excellence in innovation.

Thermo Scientific Niton XL3t

Niton XL3t Series analyzers provide many distinct advantages:

- **Very easy to use – even by non-technical personnel**
- **Lab-quality performance in a handheld instrument**
- **Improved cycle time for high sample throughput**

PMI for critical applications.

A History of Innovation

A history of breakthrough technologies distinguishes Thermo Scientific Niton x-ray fluorescence (XRF) analyzers. In 2002, we pioneered the use of miniaturized x-ray tubes in handheld XRF analyzers. Since that time, the performance and features of Niton XRF instruments have improved continuously. Now we introduce a groundbreaking new generation of portable XRF analyzers, combining advanced electronics and materials technology with the most powerful x-ray tubes ever used in a handheld XRF instrument: presenting the Niton XL3t.

Featuring a high-performance thermoelectrically cooled detector, 80 MHz real-time digital signal processing, and dual state-of-the-art embedded processors for computation, data storage, communication, and other functions, the Niton XL3t incorporates many new features directly benefiting the customer. From the integrated, tilting, color, touch-screen display to the customizable menus for ease of use, these ergonomic new analyzers are both the lightest weight and most ruggedly constructed x-ray tube-sourced handheld XRF analyzers ever made. Niton XL3t instruments can be used for many nondestructive testing applications, including analysis of metal alloys, screening of electronics and consumer goods for prohibited substances, mining exploration and grade control, and more. For example, the Thermo Scientific Niton XL3t 800 Series is the definitive tool for scrap metal recycling, casting and fabrication, manufacturing and Positive Material Identification (PMI). Alloy grade ID and QC testing typically take 1 to 2 seconds, with accurate alloy chemistry in as little as 3 to 5 seconds. Similarly, compliance testing for meeting the demands set forth in the Consumer Product Safety Improvement Act (CPSIA), Proposition 65, Restriction of Hazardous Substances (RoHS), and other regulations is faster than ever before with the Niton XL3t 700 Series, including screening of incoming materials, stocks and outgoing finished goods. Detection limits for all banned substances are improved – especially for cadmium – with the 50 kV x-ray tube sample excitation system.

The Niton XL3t's analytical power alone puts it in a field by itself. With its many standard

Screen toys and consumer goods with confidence

features and available options, it stands far above the competition. Integrated USB and Bluetooth™ communications provide direct data transfer to the user's PC or networked storage device, eliminating cumbersome data syncing procedures required by PDA-based XRF analyzers. A clip-on weld mask and folding test stand help users safely analyze difficult to measure samples. Additionally, the optional heat shield extends the hot-surface testing capability from 600ºF (315ºC) to 1,000ºF (538ºC), protecting both the analyzer and the operator's hand from these elevated temperatures. Add the optional integrated sample imaging system and 3 mm small spot feature to locate areas of interest in a sample, such as a small component or button, then store the image of each sample analyzed along with measurement results; or choose the Helium Purge Light Element Analysis Package for direct analysis of Mg, Al, Si, and P.

Take advantage of the standard Niton Data Transfer (NDT©) PC software suite to customize the instrument, set user permissions, generate custom reports and print certificates of analysis, or to remotely monitor and operate the instrument hands-free. Whether you need an analyzer for metal alloy analysis, RoHS compliance or toy and consumer goods screening, mining or mineral exploration, art conservation, or archaeometric analysis, the Niton XL3t combines the analytical performance of lab-grade instrumentation with the high-speed performance, ease of use, and cutting-edge technology customers have come to expect from their Niton analyzers.

Thermo Scientific Niton XL3t analyzers represent just one of our handheld analyzer solutions, which include XRF tools for metal alloy identification, lead-based paint testing, RCRA metals in soil, toy and consumer goods screening, RoHS and WEEE compliance screening, and many other analysis needs.

Niton XL3t Specifications

Weight	**< 3.0 lbs (< 1.3 kg)**
Dimensions	**9.60 x 9.05 x 3.75 in. (244 x 230 x 95.5 mm)**
Tube	**Au anode 50 kV maximum, 40 uA maximum** **Ag anode with optional light element analysis package**
Detector	**High-performance semiconductor**
System Electronics	**533 MHz ARM 11 CPU** **300 MHz dedicated DSP** **80 MHz ASICS DSP for signal processing** **4096 channel MCA** **32 MB internal system memory/ 128 MB internal user storage**
Batteries	**Two 4 (or optional 6) cell lithium-ion battery packs**
Display	**Adjustable angle, color, touch-screen display**
Standard Analytical Range	**>25 elements from S to U**
Optional Light Elements	**Additional elements Mg, Al, Si, and P via helium purge**
Data Storage	**Internal >10,000 readings with spectra**
Data Transfer	**USB, Bluetooth and RS-232 serial communication**
Security	**Password-protected user security**
Mode **(Varies by Application)**	**Alloy Modes: Metal Alloy, Electronics Alloy, Precious Metals** **Bulk Modes: Mining, Soil** **Plastic Modes: RoHS Plastics, Toy & Consumer Goods Plastics, TestAll™, Painted Products** **Other Modes: Lead Paint, Thin Sample** **Custom Modes: Upon request (based on application feasibility)**
Data Entry	**Touch-screen keyboard** **User-programmable pick lists** **Optional wireless remote barcode reader**
Standard Accessories	**Locking shielded carrying case** **RFID reader** **Shielded belt holster** **Spare battery pack** **110/220 VAC battery charger/ AC adaptor** **PC connection cables (USB and RS-232)** **NITON Data Transfer (NDT) PC software** **Safety lanyard** **Check samples/standards**
Optional Features and Accessories	**Portable test stand, stationary test stand, tripod stand** **Extend-a-Pole™ extension pole** **Welding mask** **HotFoot™ hot surface adapter** **Soil testing guard** **Internal CCD sample imaging system** **Variable spot size aperture**
Licensing/Registration	**Varies by region. Contact your local distributor.**
Compliance	**CE, RoHS**

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Americas
Billerica, MA USA
+1 978 670 7460
niton@thermofisher.com

Europe & Africa
Munich, Germany
+49 89 3681 380
niton.eur@thermofisher.com

Asia
Central, Hong Kong
+852 2869 6669
niton.asia@thermofisher.com

www.thermo.com/niton

Thermo SCIENTIFIC

GAMMA SURVEYOR

- One control unit and a choice of probes
- 512-channel gamma-ray spectrometer for field, borehole, car, laboratory
- In situ K, U, Th analyses
- Sensitive and accurate dose rate meter
- NaI(Tl) or BGO detectors
- Simultaneous multi-probe measurement
- High quality rechargeable Li-Ion batteries for 3-4 working days
- Easy control system

Applications:
determination of concentrations of elements (especially K, eU, eTh), dose rate and gamma-ray spectra measurements, radiation sources identification for environmental radiation monitoring, geological mapping and studies, mineral and raw material prospecting, laboratory assays, health care etc.

GF Instruments

Gamma Surveyor is a new group of multi-channel gamma-ray spectrometers and dose rate meters designed for measurements of natural and artificial isotopes in ground, boreholes and laboratories.
This group of instruments covers a wide range of devices using various probes and types of detectors:

- portable gamma-ray spectrometer for field and borehole measurements
- compact handheld spectrometer
- accurate dose rate meter
- carborne spectrometer with high-volume detector
- laboratory spectrometer with special detectors and features

The control unit works with all kinds of probes.

Technical Specifications

The instrument consists of the control unit and probe(s)

Measuring modes

Spectra & Assay

- spectral measurements with determination of K, eU, eTh concentrations
- spectrum view, energy & 24 nuclide identification
- adjustable integration time

Dose rate

- precise radiometric measurements
- histogram of previous 64 readings
- adjustable integration time

Search

- quick and selective search for gamma-ray sources
- response time 0.5 s
- histogram of previous 256 readings
- variable audio indication

Control Unit:

- Works with all types of probes
- Attached to the small handheld probe forms a compact instrument
- Possibility of connection of more probes simultaneously, GPS receiver, PC (USB)
- 10 ROIs (regions of interest)
- Data memory: max. 32 MBit, max. 100 files
  - 100 000 measured points (dose rate continuous mode)
  - 58 000 measured points (dose rate)
  - 1 800 measured points (full spectra & assay)
- Graphical LCD display 320x240, white backlight
- Combined keyboard (mobile phone style), 19 keys
- Acoustic signalization
- Power supply from internal exchangeable battery pack (lithium-ion) or external power supply 6-14V (AC adapter and cable for car socket supply included in standard accessories)
- Integrated fully automatic intelligent battery charger activated by external 12 V source connection
- Possibility of firmware upgrade via Internet
- Dimensions: 256 x 90 (145) x 60 mm
- Weight: 0.5 kg
- Ambient temperature range: -10 to +50°C
- Waterproof

Detectors / Probes:

- Standard probes:
  - combined spectrometric probe for surface and borehole with NaI(Tl) or BGO detector
  - compact spectrometric handheld probe with NaI(Tl) or BGO detector
  - radiometric probe (for dose rate measurements) with NaI(Tl) detector
- 512 channels, max. 250 000 pulses per second
- Measuring range 100 keV to 3 MeV
- Zero dead time
- Detectors: NaI(Tl), BGO, volumes 21.2 in^3 (0.35 l) and 6.3 in^3 (0.1 l), or other on request
- Advanced automatic stabilization of the peak position
- Stabilization using built-in or external reference source 137Cs, alternatively natural isotope K
- The probes are supplied from the control unit (no charging of the probes).
- All calibration data are stored in the probe and a user can create two user defined calibrations.
- For enlargement of the detection volume and thus achievement of a more precise and faster measurement it is possible to connect more probes (of the same type, if possible) to the control unit. It is not necessary to recalibrate the probes for this purpose.
- Dimensions and weights:
  - Compact handheld probe 90 x 120(90) x 290 mm, height with the handle 180 mm / 1.6 kg
  - Combined 2" probe ∅70 x 420 mm / 2.8 kg
  - Combined 3" probe ∅100 x 420 mm / 5.3 kg

- *The measuring system supports point, profile, borehole and continuous measurements as well as the use of external GPS receiver.*
- *User-friendly operation*
- *Output data are compatible with MS Excel, Surfer and other mapping software.*
- *The methodology is based on the recommendation of IAEA (International Atomic Energy Agency). The factory calibration is done on high-volume standards.*

Standard Accessories:

Transport case
Carrying belt
USB cable
AC/DC adapter
Car battery adapter
Gamma Surveyor installation CD
Operation manual

Optional Accessories:

Equipment for shallow borehole logging
Set for laboratory use
Set for carborne use

REPRESENTED BY:

GF Instruments, s.r.o.
Geophysical Equipment and Services

Ječná 29a, 621 00 Brno, Czech Republic
Tel.: +420 541634 366, 285
Fax: +420 541634 260
E-mail: gregor@gfinstruments.cz
www.gfinstruments.cz

PICO ENVIROTEC INC.

PGIS - GAMMA RAY SPECTROMETER

The Real Time Data Acquisition PGIS - SP is controlled by a Hand Held Computer (HHC), equipped with a Global Positioning System Receiver (GPS) and all necessary navigation guidance software and designed to operate portable gamma ray spectrometer GRS-2.

The Intelligent Gamma Detector (IGD) supplies gamma spectra on request. Spectral gain control is completely automated. It is based on natural radio nuclei, greatly simplifying operation and increasing collected data reliability. All spectrometer electronics are placed within the detection sensor. The instrument can be equipped with different radiometric sensors and if required, each of the sensors can be measured and recorded simultaneously.

Smart battery charging systems keeps the spectrometer calibrated during battery charging, making it instantly ready for normal operation. The same buttery is used for the detector and the HHC.
Small detector (0; 76; 76) is usually mounted together with the battery and hand carried or fastened on a backpack together with the GPS receiver. Larger detector volumes of up to 4 liter or larger are carried on a backpack or placed on a push-pull cart with or without a motorized drive. The size of the detector should be selected for efficient and reliable data collection.

The smallest detector used is a NaI(Tl) 3in (76mm) in length and 3in (76mm) in diameter. Such a detector is usually mounted together with the battery and hand carried or fastened on a backpack. Larger detector volumes of up to 4 liter or larger are carried on a backpack or placed on a push-pull cart with or without a motorized drive. The PGIS-Gamma Ray Spectrometer is designed for fast and reliable ground surveys or monitoring of larger areas where radioactive materials may be buried.

PGIS-SP Features:

- User friendly interface; built in Help system
- Easy to switch between different views: navigation, data charts, spectrum, etc.
- Quick start
- Touch screen display 320x240 pixels; customized key pad
- Operator guidance
- Data sampling: once per second
- Data synchronization to GPS position
- Data file: PEI Binary data format. It is easily converted into ASCII and Geosoft format by a supplied conversion program (PEIView)
- High capacity data storage (flash card)

When larger detector volume is needed, motorized cart can be used.

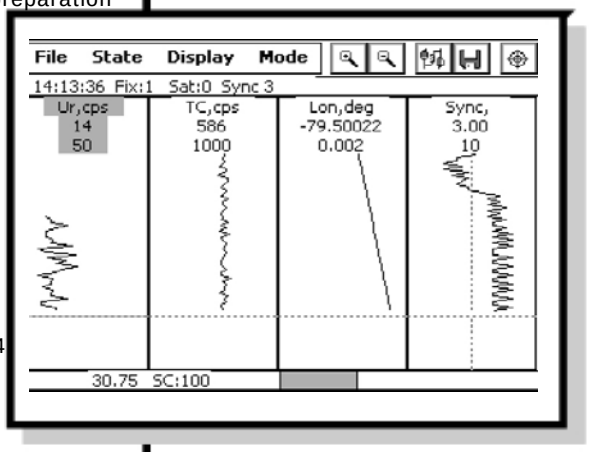
Supplied software:

Support software (running on PC) supplied with the unit allows fast data QC (PEIView) as well as data format adjustment (Geosoft GBN and ASCII output). For survey preparation and survey plot after data acquisition PEIConv program is supplied.

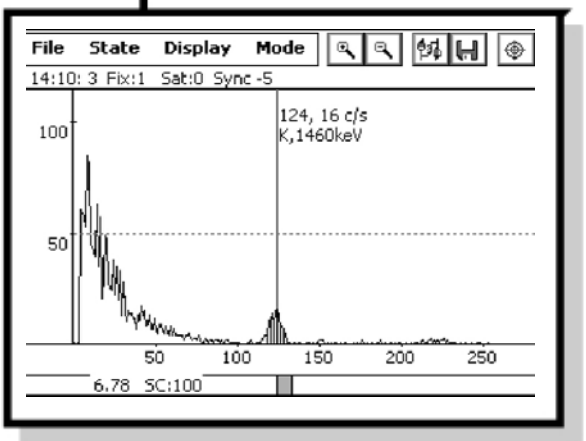
Technical Specifications

- High voltage controlled remotely via software
- Digital peak detector
- Elimination of Dead Time, elimination of pulse pile up
- Count rates of up to 60,000 cps per detector
- Count capacity per channel: 65535
- Energy detection range: 36 KeV to 3 MeV
- Cosmic channel above 3 MeV
- Collected spectra 256 / 512 channels, internal spectrum resolution 1024
- Includes up to 2 detectors
- Software:
  - Calibration:
    - High voltage adjustment
    - Linearity correction coefficients calculation
    - Communication test support
  - Real Time Data Collection:
    - Automatic Gain real time control on natural isotopes
  - PC based test and calibration software suite
- Power Requirements: Battery 12VDC

Individual channel display
With navigation guidance cross track bar



Collected spectra display
With navigation guidance cross track bar



Spectra stabilization:	Real time automatic corrections on radio nuclei: Th, Ur, K. No implanted sources.
Time to stabilization:	Usually less than 3 minutes. (Based on 76mmx76mm detector volume, from cold start.) Smart charger secures gain stabilization during the charge time. Detector stabilization parameters are stored every 15 minutes (almanac) and are used in case till new stabilization parameters are acquired.
Detector:	NaI(Tl) detector min. volume 0.35 L (approx 21 ci). Other detectors on request.
Resolution:	Detector dependant - better than 9% @Cs137
Library:	Up to 50 channels, user or factory defined
Detector carrier:	Hand carried, Back-pack, Staff, Push-pull cart, Motorized Push-pull or Vehicle mounted cart.
Temperature:	operating:-10 to +55 deg C; storage:-20 to +70 deg C
Weight of the sensor:	With battery and 0;3;3; in detector approx 8kg.
Operating time:	Approx. 5 hours @ 20deg C

Mechanical: Dimensions: w;d;l;
w: is the width, d: is the depth or the diameter and l: is the length of the detector
Detector examples:
0;3;3; inch: is a cylindrical detector 3 inches in diameter and 3 inches long
2.5;2,5;16 inch: is a detector 2.5x2.5x16 inches
100;100;400; mm: is a 4 litre detector

PICO ENVIROTEC INC.

222 Snidercroft Rd, Concord,
Ontario, Canada L4K 2K1

Tel: 905 760 9512
Fax: 905 760 9513
Email: pei@picoenvirotec.com

www.picoenvirotec.com

Dealer Info: