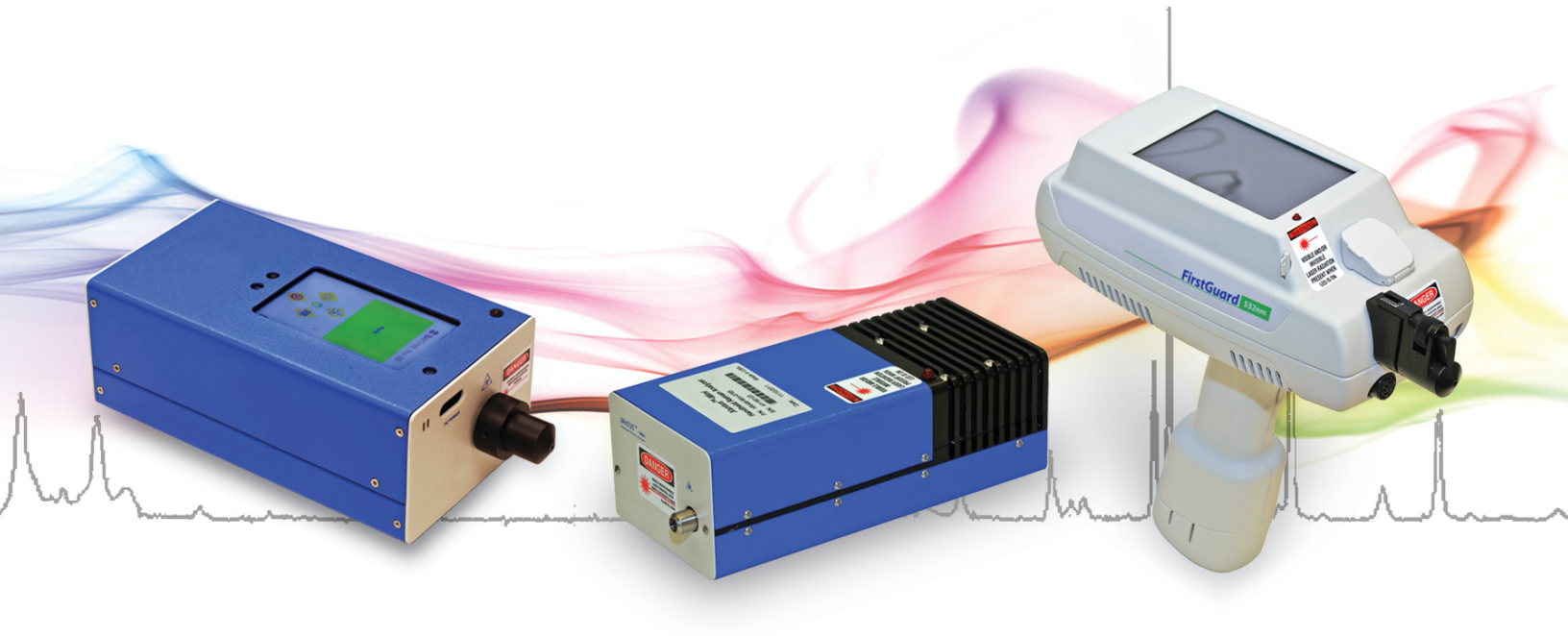
Xantus™ & FirstGuard™ Handheld Raman Analyzers

Real-World Sample Analysis

Available in 532, 785 or 1064nm



RUGGED SOLID STATE

MULTI-EXCITATION

DIRECT ASSESSMENT

COST EFFECTIVE

Rigaku

Rigaku Raman Technologies

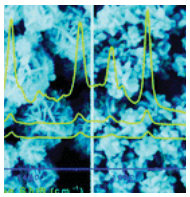
www.rigakuraman.com

Raman Handheld Analysis

Raman handheld spectroscopy is a non-destructive, non-contact analytical technique that requires no or little sample preparation. With falling price barriers and reduction in physical dimensions its application areas are rapidly expanding, from lipid content determination in algae to crystal form identification in zeolites. Some of the most common application fields are highlighted below.

Chemical

- Incoming/outgoing materials inspection and certification
- Online/at-line detector for Process Analytical Technology (PAT)
- Polymers: correlation of physical/chemical properties (molecular weight, viscosity, glass transition temperature, etc.) with Raman spectra
- Petroleum product identification and analysis
- Identification of resins, petrochemicals, and commodity chemicals



Biological

- In situ, non-contact measurement of tissue samples, non-destructive, no labeling needed
- Intracellular chemical mapping
- Lipid content quantization in algae for biofuels
- Bacteria detection
- SERS for low level biological threat detection

Homeland Security & Defense

- IED/HME explosives detection
- Unknown substance ID
- Forensics analysis
- Border Patrol/TSA Screening

Pharmaceutical

- Drug polymorphs/solvates identification and classification
- Identification of drug crystals
- Content analysis of tablets, gel caps, and liquids
- QA/QC of API, additives, and excipients
- Fast analytical tool for High Throughput Screening

Forensics

- Non-destructive and safe drug and narcotic identification/preservation of evidence
- Identification of explosives
- Trace forensic analysis of fibers, hair, pigments, ink, fabrics, etc.
- Toxic solvents identification

Food Safety & Agriculture

- Port of entry inspections
- Pesticides & Herbicides
- Field audits
- Bacterial contamination

Geological

- Non-destructive identification of geological materials
- Authentification and anti-counterfeiting of gemstones
- Origin identification of minerals and gemstones
- Evaluation of mining prospects and alteration minerology

Semiconductor/Thin films

- Wafer defect inspection
- Thin film coatings
- In-line process
- QA/QC

Xantus™-0 & Xantus™-1 Handheld Raman Analyzers

With a footprint approximately a third of a composition book and weighing less than 2 lbs, Xantus™-0 is an affordable, yet complete Raman spectrometer. The Xantus-0 comes standard with an integrated Personal Digital Assistant (PDA). The on-board data processing function enables real time communication and decision making in mission critical situations.

Xantus™–1 is designed to meet the needs of people on the move, allowing personnel to quickly and accurately identify unknown chemical substances on the spot. It is battery operated, light weight, ruggedized, and easy to use. The Xantus platform is flexible to accommodate different excitation wavelengths and detector array options.

Xantus-0 Raman Analyzer

Xantus-1 Raman Analyzer

The Xantus-0 is equipped with a 785 nm laser stabilized for Raman spectroscopy. Developed on the Xantus-1 platform, the Xantus-0 was designed to be a cost-effective material identification tool that fits in the palm of your hand. Output power: >80 mW. Linewidth: 0.2 nm FWHM typical. At the heart of every Xantus-0 is a transmissive VPG that delivers unsurpassed optical throughput.

Xantus-0 operates using an integrated PDA utilizing Rigaku's Micro 20/20 software. The streamlined user interface can output data in .csv format for easy importing to other applications. Baseline correction function is intelligently built in, which greatly facilities reduction in fluorescence interference and accounts for drift in background. The Xantus-0 comes with access to an expandable library of chemicals and mixtures. Ruggedized with no moving parts, the Xantus-0 is a robust instrument that has withstood the rigors of field testing.

The Xantus-1 is equipped with a 532, 785, or 1064nm laser stabilized for Raman spectroscopy. Output power: up to 499 mW. Linewidth: 0.2 nm FWHM typical. At the heart of every Xantus-1 is a transmissive VPG that delivers unsurpassed optical throughput. Xantus-1 runs on Rigaku's Micro 20/20 software that has an intuitive, streamlined user interface and can output data in .csv or other formats for easy importing to other applications. Baseline correction function is intelligently built in, which greatly facilities reduction in fluorescence interference and accounts for drift in background. Xantus-1 has no moving parts; its sensitive optical engine has been shock-resistant mounted, resulting in a sturdy instrument that has withstood the harsh environment of the field.

Xantus key design benefits:

- Compact size
- Flexible, powerful software
- USB 2.0 output
- No sample prep
- Ruggedized and ergonomic design
- Fast and accurate chemical identification
- Open spectral library
- Common computer platform

Applications:

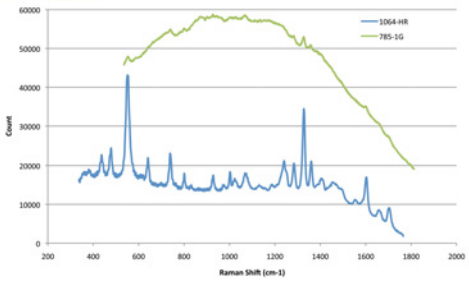
- Food Safety
- Agriculture
- Geological
- Homeland Security

Ideal for:

- Reduced fluorescence imaging
- SERS/SORS
- Raman Spectroscopy
- Field Analysis
- Narcotics & illicit street drugs
- Explosives & chemical warfare agents
- Hazardous materials & chemical spills
- Pharmaceutical IQ/OQ/PQ quality
- Gemstone authentification

Xantus Mini™ Handheld Raman Analyzer

Xantus Mini™is designed to meet the needs of people on the move, allowing personnel to quickly and accurately identify unknown chemical substances on the spot. It is battery operated, light weight, ruggedized, and easy to use. The Xantus platform is flexible to accommodate different excitation wavelengths and detector array options, ideal for integration on tactical robots.



Raman spectra of street drugs, 785nm vs. 1064nm

The Xantus Mini™ is equipped with a 532, 785, or 1064nm laser stabilized for Raman spectroscopy. The quick and accurate chemical identification of suspicious materials offers homeland security and law enforcement personnel a unique tool to deter potential terrorist threats. Output power: up to 499 mW. Linewidth: 0.2 nm FWHM typical. At the heart of every Xantus Mini is a transmissive VPG that delivers unsurpassed optical throughput. The 1064nm model offers the most chemically informative spectral region, thus leaving no pixels wasted. The detector array delivers high sensitivity at an optimal cost.

Xantus Mini runs on Rigaku Micro 2020 for PC and mobile devices, the software that has an intuitive, streamlined user interface and can output data in .csv or other formats for easy importing to other applications. The embedded mobile technology contains baseline correction functionality that is intelligently built in, which greatly facilities reduction in fluorescence interference and accounts for drift in background. Xantus Mini not only has no moving parts but also has its sensitive optical engine shock-resistant mounted, resulting in a durable instrument that has withstood the rigors of field testing.

Ideal for:

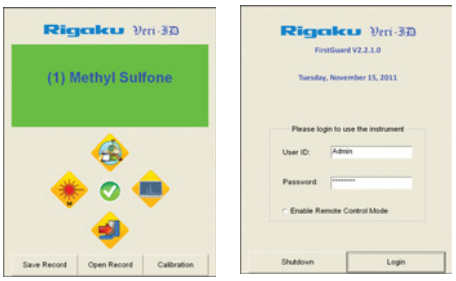
- Narcotics & illicit street drugs
- Explosives & chemical warfare agents
- Hazardous materials & chemical spills
- Raman Spectroscophy
- Gemstone authentification

Key design benefits:

- No sample prep
- Ruggedized and ergonomic design
- Fast and accurate chemical identification
- Open spectral library
- Unique Accessories

Applications:

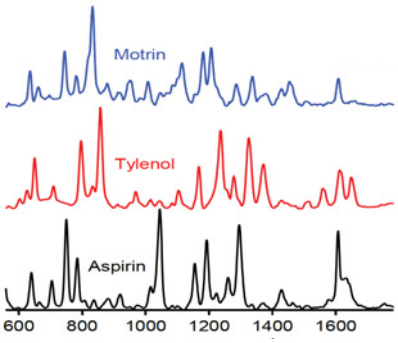
- Food Safety
- Agriculture
- Geological
- Homeland Security



Screen shot of Micro 2020/VeriID software interface

FirstGuard™–Handheld Raman Analyzer

FirstGuard™ is a new breed of handheld instrumentation, designed to be taken into the factory warehouse or in the field for real-time, fast sample measurements. Equipped with an integrated vial holder, switchable lithium ion battery, and optional barcode/RFID reader, the FirstGuard is ideal for GMP facilities and is configured with secure software for 21 CRF part 11 compliance.



Unlike most sample analysis techniques, there is no sample preparation needed for FirstGuard. It can penetrate plastic bags or clear/amber-colored glass bottles while not altering or destroying the sample, thus maintaining sample integrity. The FirstGuard is designed from the ground up for field use, with an active trigger built into an easy to grip handle.

Operated very much like a point-and-shoot camera, the FirstGuard delivers accurate identification results in a matter of seconds. Since the identification is based on the chemical fingerprint on the molecular level, there is no chance for mix-up or human error.

Due to our software's unique open architecture, the user can either build their own spectral library based on their collection of standard samples or import tens of thousands of high quality spectra from third party specialty Raman databases (such as forensics, toxic chemicals, pharmaceuticals, minerals or high volume-production solvents).

The FirstGuard is run by a full-featured Windows-based ultra-compact computer, thus it is easy to download data or communicate with centralized facilities using optional WiFi.

Key design benefits:

- No sample prep
- Direct shooting or integrated vial holder
- Ruggedized and ergonomic design
- Open spectral library
- Common computer platform
- USB interface
- 21 CFR part 11 Compliance

Applications:

- IQ/OQ/PQ incoming raw material inspection
- Forensics
- Field Analysis
- Food safety inspection

Ideal for:

- Narcotics & illicit street drugs
- Explosives & chemical warfare agents
- Hazardous materials & chemical spills
- Pharmaceutical IQ/OQ/PQ quality
- Gemstone authentification

High efficiency optical design allows sampling through amber vials



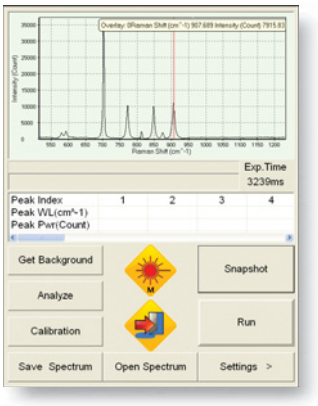

Specifications

Model	Xantus-0	Xantus-1	Xantus-Mini	First Guard
Part Number	**HRAM-0B-xxxx**	**HRAM-1-xxxx**	**HRAM-Mini-XXXX**	**HRAM-xxxx**
Format	Handheld	Handheld	Handheld	Handheld
SIZE				
Dimensions (mm)	93 x 195 x 59	125 x 233 x 85	61 x 176 x 82	325 x 122 x 286
Weight	1 kg (2.2 lbs.)	2.2 kg (4.7lbs.)	1 kg (2.2lbs)	2.3 kg (5 lbs)
EXCITATION SOURCE				
532nm		■	■	■
785nm	■	■	■	■
1064nm		■	■	■
Laser FWHM Bandwidth	<0.2nm typ./ 0.3nm max.			
SPECTROGRAPH				
Grating Technology	Transmission Volume Phase Grating (VPG®)			
Range (532nm)		200-3000 cm^{-1}	200-3000 cm^{-1}	200-3000 cm^{-1}
Spectral resolution		10-15 cm^{-1}	10-15 cm^{-1}	10-15 cm^{-1}
Output power		0-60mW	30mW, 45mW & 60mW intervals	0-60mW
Range (785nm)	400-1850 cm^{-1}	200-2000 cm^{-1}	200-2000 cm^{-1}	200-2000 cm^{-1}
Spectral resolution	15-17 cm^{-1}	7-10 cm^{-1}	7-10 cm^{-1}	7-10 cm^{-1}
Output power	80mW	0-499mW	100mW, 250mW & 480mW intervals	0-499mW
Range (1064nm)		200-2200 cm^{-1}	200-2200 cm^{-1}	200-2200 cm^{-1}
Spectral resolution		15-18 cm^{-1}	12-15 cm^{-1}	15-18 cm^{-1}
Output power		0-499mW	100mW, 300mW & 480mW intervals	0-499mW
Stray Light Reduction	0.05%	0.05%	0.05%	0.05%
DETECTOR				
Type	Uncooled CCD	TE Cooled CCD or TE Cooled InGaAs		
Cooling temperature		-20°C	-20°C	-20°C
Integration time	20ms - 300sec.	5ms - 300sec.	20ms - 300sec.	5ms - 300sec.
Digitalized output	16-bit	16-bit	16-bit	16-bit
Dynamic range	2000:1 typ.	3000:1 typ.	3000:1 typ.	3000:1 typ.
ELECTRONICS				
Interface	USB2.0 / RS232 / Ethernet			
Input power	100~240VAC/+8.4VDC	100~240VAC/+24VDC	100-240VAC/+24VDC	100~240VAC/+24VDC
Wi-Fi 802.11b/g		optional	standard	optional
Battery life	4 hrs	3-4 hrs*	3-4 hrs*	2-4 hrs*
Interchangable battery				■
Barcode reader				optional
SOFTWARE				
IQ/OQ/PQ & 21 CFR Part 11 Compliance	■	■		■
Rigaku Micro 2020	Micro 2020, Windows CE	Micro 2020, Windows XP/Vista	Rigaku Micro 2020 for PC and mobile devices	Micro 2020, Windows XP/Vista
SDK support for 3rd Party Libaries available	■	■	user only	■

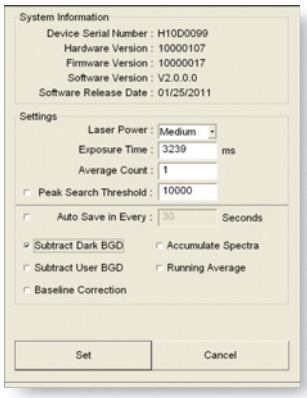
*Max battery life dependant upon environmental conditions and usage. Specifications are subject to change without notice.
Contact Rigaku Raman Technologies, Inc. for a quotation: +1 (281) 362-2325, or email: info@rigakuraman.com

Micro 20/20 software

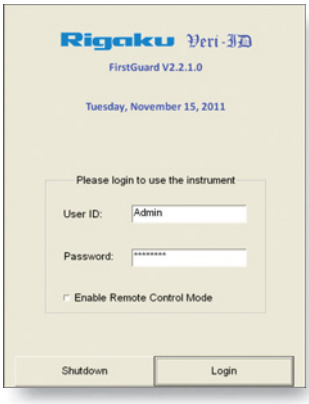
Micro 20/20 graphical user interface (GUI) is a Windows-based application program for interfacing with Rigaku's UV-VIS-NIR and Raman spectral engines. It can perform the following tasks: acquire and analyze spectra, calibrate wavelength, verify and identify substances, and manage user-built spectral libraries. Micro 20/20 is provided with a full Software Development Kit and dll support (sample code for C/C++ and Labview) included with each each system purchase.



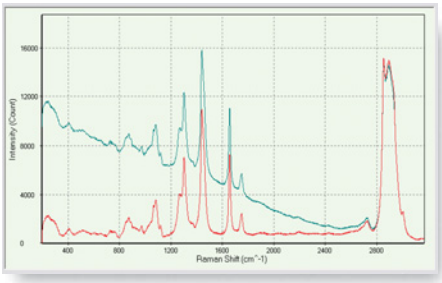
Intuitive Graphical User Interface (GUI):
Important setup parameters, spectrum display, and real-time status indicators are all on a single, easy-to-see screen. Especially designed for touch screen operations. (Pane 1: Spectrum window, Pane 2: Data viewer, Pane 3: Control panel)



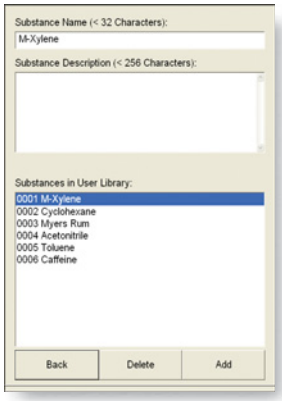
Flexible, Multiple Data Formats:
Can save and open data files in ASCII (.txt), Excel (.csv), or Grams/AI (.spc) to allow user the maximum flexibility in data storage and retrieval and interfacing to third party software packages.



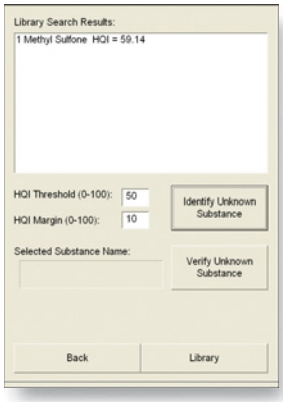
Security Features:
Micro2020 supports the US FDA 21 CFR Part 11 for security levels, electronic signatures, and records for audit trail of data. Users can save, view and print analysis reports.



Intelligent Baseline Correction Function:
Baseline constructed from a multi-segment, smoothed polynomial allows effective removal of fluorescence background and slanted baseline with minimal artificial bias.



Tailored Substance Libraries:
With Micro 20/20 the user can quickly and easily build his/her own compound libraries to meet his/her specific identification needs, or can import libraries from third party vendors.



Powerful Substance Identification Functions:
Whether the library is user built or imported from third parties, Micro 20/20 can identify unknown substances instantaneously and report quantitatively the match quality. It can even be trained to recognize mixtures.

Rigaku Corporation was founded in 1951 in Japan. Today the Rigaku companies are global leaders in the development, manufacturing and sales of laboratory and industrial x-ray diffractometers and spectrometers; small molecule and protein crystallography instrumentation; portable Raman spectrometers; sealed and rotating anode x-ray generators; x-ray optics and imaging systems; high-performance rotary magnetic fluid feed-throughs; thermal analysis instruments; automated sample preparation and analysis solutions; and non-destructive testing products.

Rigaku employs over 1,100 people worldwide in operations based in Japan, the U.S., Europe and China. We value our people. Our value comes from them. Close collaboration between our users and employees sets the direction and focus of our work, allowing us to address customers' needs and stay close to the market place.

A Message from the President: Always Look to the Customer

Humankind has always pursued longevity, good health and improved quality of life. All of us hope that the work we do today will make the world a better place for the generations to come. We at Rigaku endeavor to support these pursuits as a leading global scientific analytical instrumentation company specializing in X-ray analysis, thermal analysis and non-destructive testing.

At Rigaku, we are determined to present our customers with the tools they need to solve today's problems. Indeed, the hallmark of Rigaku management is to provide solutions to our users based on careful observation of their needs based on a deep understanding of their fields and industries. We devote ourselves to customer satisfaction at all times.

Our corporate mission is to contribute to the enhancement of humanity through scientific discovery and technological development. I view our customers as trusted partners in this goal, and we strive to work with them to realize mutual progress.

As we continue our work to provide the highest quality of instrumentation, application and service support, it is my sincere hope that you will rely on Rigaku to resolve your own challenges in the scientific and industrial world.

Rigaku

Rigaku Raman Technologies

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