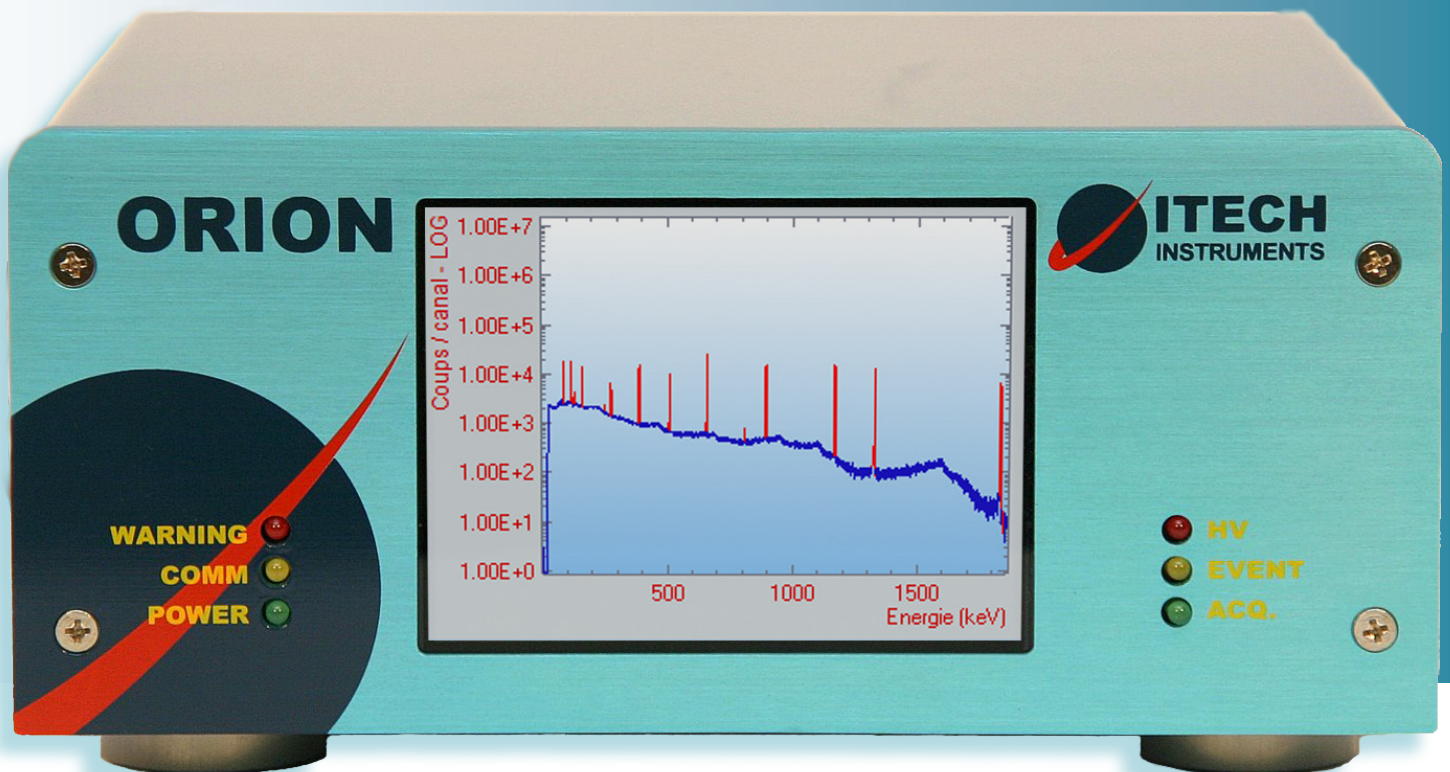


**ITECH**  
INSTRUMENTS

# Orion

## Advanced Digital Signal Processor



The **ORION** is the most advanced digital signal processor developed by **ITECH INSTRUMENTS**. It is a 64K channel analyzer based with 100% digital signal processing. The **ORION** features a 100 MHz 16 bit sampling ADC, an internal Linux computer, and internal high voltage bias supply all supporting pulse height analysis, list and peak shape data acquisition.

The front panel of the **ORION** includes a 3.5" TFT touch screen with autoranging display of peak counts and a calibrated horizontal axis displaying energy. (Below are lists of the full set of functions and displays included on the touch screen.) LED's confirm serial or Ethernet communication with a PC. Other LED's confirm HV and warn of a system or detector problem.

The **ORION** for germanium, or the NaI version, are controlled by InterWinner software. **ORION** connects to a PC via USB or Ethernet but **ORION** is a fully functiona stand-alone spectrometer with spectrum storage.

InterWinner is the most powerful and versatile gamma spectroscopy package on the market and together with Orion, make this system the most versatile, powerful and full featured spectrometer on the market.

## Front panel commands

The **ORION** can be fully operated using the TFT screen on the front panel. Following functions are supported on the front panel:

- ▶ Status display:
  - ▶ Acquisition status
  - ▶ Instrument status
  - ▶ Network activity
- ▶ Oscilloscope mode including
  - ▶ The signal oscilloscope
  - ▶ Monitoring the high voltage
  - ▶ DC input and preamplifier supply voltages
- ▶ Spectrum display, including zoom
- ▶ Acquisition control including
  - ▶ Start
  - ▶ Stop



- ▶ Erase
- ▶ Store spectra in the internal flash memory
  - ▶ Recall spectra from the internal flash and display them
- ▶ Setup
  - ▶ High voltage selection
  - ▶ Invoke the automatic setup
  - ▶ User setup of all DSP parameters

- ▶ Store and recall different parameter sets
  - ▶ Language selection. English, French and German are supported.
- Additional firmware for standalone application (ex. global gamma activity) is available.

## Specifications

- ▶ InterWinner 7 data acquisition and analysis software
- ▶ Digital gain stabilization

- ▶ Digital oscilloscope and FFT for health-of-system analysis.

- ▶ 3,5" TFT LCD touch screen.

- ▶ 6 LLD's

- ▶ BNC Signal input
- ▶ BNCHV shut down input
- ▶ SHV Positive HV output
- ▶ SHV Negative HV output
- ▶ BNC TRP Inhibit input
- ▶ BNC Gate input
- ▶ D-SUB9 Preamplifier power output

- ▶ D-SUB25 Digital I/O, counters, SCA output, serial interface etc.
- ▶ DC DC power input
- ▶ RJ-45 Ethernet port
- ▶ USB-A USB Host interface
- ▶ USB-B USB Slave interface

## Control software

## Front panel controls

## Back panel controls

## Signal Input

- ▶ Coarse Gain range is 1x to 362x
- ▶ Input polarity can be positive or negative
- ▶ Conversion gain can be selected as 256,512,1024,2048,4096,8192,16384,32768 or 65536 channels

- ▶ Compatible with RC and TRP type detectors from different manufacturers

## Operation Modes

- ▶ Operation modes
- ▶ PHA mode with up to 65536 channels.
- ▶ Time stamped list mode

- ▶ Every event is stored together with it's arrival time in units of 10 ns. The generated list also contains the status changes of two digital trigger signals.

## Specifications

- ▶ Multi-Spectrum-Scaling
- ▶ This mode is implemented using the WinnerScan software and the time stamped list mode. The software then can sort the events into different time slices. The minimum length of a time slice is 10 ns, the maximum number of time slices is only limited by the computer memory size. More than 1000 on a modern PC.

- ▶ Internal Linux computer with 64MB RAM and 256 MB + 1 GB flash memory.

- ▶ The **ORION** contains live memory for several spectra and a flash memory for storing more than

- ▶ 10/100 BASE-TX Ethernet: Female RJ-45 connector for connection to an Ethernet switch/hub or directly to a computer using a crossover cable. TCP/IP protocol.
- ▶ USB: USB B type connector. Full speed connection.

- ▶ The **ORION** has two digital input on BNC connectors for TRP inhibit and gate. An event is integrated in the list mode data when the status of one of those input changes.
- ▶ In addition, the **ORION** also features 4 digital outputs for sample changer control or special applications

- ▶ Pulse shape mode
- ▶ In this mode, the **ORION** will report for each event not only the amplitude/channel and the arrival time of the signal but also the ADC raw data for a selectable time interval before and after the event was detected.

- ▶ TFT Touch screen

10000 spectra (at 8K) internally.

## Operation Modes

### Control processor

### Internal spectrum storage

### Communication ports

- ▶ RS-232: An RS-232 port is available for special applications, for example control of external equipment or for telephone line control of the device.

### I/O ports

- ▶ The **ORION** has 8 digital inputs for sample changer control and other applications. These inputs can also be configured as counters, for instance for connecting GM counter tubes.
- ▶ A SCA output sends a short L-TTL pulse when a valid event is detected

## Specifications

- ▶ Two SHV connectors for positive and negative high voltages
- ▶ Programmable high voltage output
- ▶ Setting resolution 12 bit.
- ▶ Voltage range  $\pm 500 - \pm 5000$  V (Germanium version) or  $\pm 200 - \pm 2000$  V (NaI version)
- ▶ HV inhibit signal polarity can be computer selected

- ▶ Metal enclosure
- ▶ Size: 173x84x180 mm

- ▶ External power supply accepting 50/60 Hz and 100-240 V

- ▶ Operating temperature range 0-50 °C

- ▶ Weight: 1850 g (4.1 lb)

- ▶ Humidity < 80%, non condensing

## High voltage power supply

## Housing

## Power supply

## Environmental

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