



**ORION™** NJE-4000  
NON-LINEAR JUNCTION EVALUATOR

\* High Gain **ORION™** also available for specialized applications (restricted sale).

U.S. PATENTS: 5,815,122; 6,057,765; 6,163,259  
U.K. PATENTS: GB2344423; GB2351154; GB2381077; GB2381078

# ORION™ NJE-4000

## NON-LINEAR JUNCTION EVALUATOR



### ORION™ Advancements

The ORION is a state-of-the-art Non-Linear Junction Detector which detects hidden electronic devices. A Non-Linear Junction Detector transmits an RF signal and then “listens” for harmonic returns to detect the presence of electronics, regardless of whether the electronic device is radiating, hardwired, or even turned on.



### Technical Advancements

- 1 **PATENTED FREQUENCY HOPPING FUNCTIONALITY** increases detection reliability by rapidly hopping over a wide frequency band.
- 2 **ADVANCED DIGITAL SIGNAL PROCESSING ALGORITHMS** provides up to 18dB increase in detection sensitivity.
- 3 **MANUAL OR AUTOMATIC POWER CONTROL** ranges from 14 milliwatts to 1.4 watts (High Gain model available).
- 4 **SYNTHESIZED TRANSCIVER** provides frequency stability and agility to automatically search for clean operating frequencies (880–1,005MHz; 902.2–927.8MHz for USA).
- 5 **CIRCULARLY POLARIZED TRANSMIT AND RECEIVE ANTENNA** removes risk of missing a threat due to incorrect antenna polarization.
- 6 **AUDIO DEMODULATION** includes AM and FM as well as tone identification modes.



The patented technical advancements in the ORION are not paralleled in any other product in the world.

### Ergonomic Advancements

- 1 **BALANCED, LIGHTWEIGHT DESIGN** with integrated transceiver, extension pole, antenna, and display.
- 2 **OPERATIONAL WEIGHT** is 3.3 lbs (1.5 kg). Carrying case is slightly larger than a briefcase.
- 3 **MINIMAL SETUP TIME (approximately 25 seconds)** including power-up and self test. Telescopic pole simply unfolds and extends; there are no pole sections or cables to connect.
- 4 **ALL TRANSMIT AND RECEIVE SIGNALS** are multiplexed onto a single concealed cable eliminating assembly and tangled cords. Wireless infrared headphones eliminate audio cables.
- 5 **CAMCORDER-STYLE BATTERIES** are included with an external charger. (Four batteries; 2.5 hours run time per battery).



Until the ORION, Non-Linear Junction Detectors were bulky, difficult to use, and difficult to transport.

### \* High Gain ORION™ available

For specialized applications (restricted sale). Contact REI for more information.

## OPERATIONAL MODES

### Search 2 & 3 Mode

Provides evaluation of both 2nd and 3rd Harmonic returns. Strong 2nd Harmonic (red) indicates electronic components while Strong 3rd Harmonic (yellow) indicates corrosive (false) junctions.

- **Search CW** - continuous wave operation
- **Search 2 & 3** - pulsing operation
- **Search HOP** - Frequency hopping operation (provides increased detection reliability)



### Frequency Hopping (Srch-Hop) Mode

NLJD response for a specific target varies depending on NLJD transmit frequencies. The Frequency Hopping Mode hops across the ORION's entire operational transmit frequency range (880-1005MHz, 625 possible frequencies; USA: 902.2-927.8MHz, 125 possible frequencies) in less than 1.5 seconds, displaying the optimal response and transmit frequency.



The Frequency Hopping Mode quickly shows the frequency that produced the greatest response for a particular target, optimizing discrimination and detection.

### ID Mode

Provides detection of non-linear junctions using an audible tone. This mode is optimized for long-range detection of non-linear junctions.

- Produces 1kHz FM modulated tone
- Provides listening of 2nd & 3rd Harmonics



Using the ORION's audible tone to detect a junction takes advantage of the discrimination capability of the human ear.

### Listen Mode

Provides detection and discrimination of non-linear junctions using demodulation for both 2nd and 3rd Harmonics.

#### Demodulation:

- AM
- FM
- 20kHz Pulsing Mode



This mode provides excellent discrimination functions by relying on audio characteristic sounds associated with non-linear junctions or active devices.

### Additional Control Functions

Control functions are easily adjusted using the ORION keypad.

- Volume
- Transmit Power
- Frequency Selection
- Signal Processing Gain
- Trip Point Warning Settings



### Wireless Headphones

- 1 Wireless IR headphones eliminate cables that can interfere with search activities.
- 2 Headphones can be plugged into the main unit or the IR receiver.
- 3 Volume control is adjusted via the main unit.





# ORION™ NJE-4000

## NON-LINEAR JUNCTION EVALUATOR



### TECHNICAL SPECS

### ORION™ ADVANTAGES

#### FREQUENCY-HOPPING FUNCTIONALITY

INCREASES DETECTION RELIABILITY

#### REMOTE CONTROL PORT

ALLOWS USER TO OPERATE UNIT AT A DISTANCE WITH COMPUTER SOFTWARE

#### LIGHTWEIGHT

BALANCED ERGONOMIC DESIGN FOR EASE OF USE

#### SENSITIVE RECEIVER

FOR RAPIDLY SEARCHING A LARGE AREA WITH GREATER SENSITIVITY

#### MINIMUM SETUP TIME

NO CABLES, POLE SECTIONS, OR BULKY TRANSCIVER UNITS TO ASSEMBLE AND CARRY

#### WIDE OPERATING BAND

MULTIPLE OPERATING FREQUENCIES MINIMIZES POTENTIAL INTERFERENCE ON SPECIFIC FREQUENCIES

#### PROGRAMMABLE DIGITAL SIGNAL PROCESSING

PROVIDES INCREASED SENSITIVITY

#### CIRCULARLY POLARIZED ANTENNA

REDUCES SEARCH TIME AND IMPROVES RELIABILITY

#### DUAL HARMONIC RECEIVER WITH DISCRIMINATION ALGORITHMS

MINIMIZES FALSE ALARMS

#### CAMCORDER-STYLE BATTERY

WITH LONG RUN TIME AND DUAL QUICK CHARGER

#### WIRELESS HEADPHONES AND GRAPHIC DISPLAY

FOR SIMULTANEOUS AUDIO AND VISUAL INFORMATION

#### TRANSMITTER

**Frequency Bands:** 880–1005MHz in 200kHz steps. USA: 902.2–927.8MHz  
**Transmit Power:** 14 milliwatts minimum, 1.4 watts peak (effective radiated power)  
**Power Control:** Manual or auto control with 30 dB range. Pulsed operation limits average output to meet USA FCC requirements

#### RECEIVER

**Frequency Bands:** Second Harmonic (1760–2010MHz) or Third Harmonic (2640–3015MHz)  
**Sensitivity:** -133dBm for both harmonics  
**DSP S/W Integration:** Programmable between 6 and 18dB gain in sensitivity performance  
**Receiver Bandwidth:** 3kHz

#### MECHANICAL

**Extension Lengths:** 16–51 in (40.6–129.5 cm)  
**Case Dimensions:** 6.25 in x 14.9 in x 18.5 in (15.9 cm x 37.8 cm x 47.0 cm)  
**Weight with Battery:** 3.3 lbs (1.5 kg)  
**Case Weight:** 11.5 lbs (5.2 kg)  
**Weight with Tool Kit:** 23.1 lbs (10.5 kg)  
**Setup Time** (including power-up self-test): 25 seconds

#### BATTERY

**Input AC:** 100–240V, 50–60Hz  
**Run Time:** 2.5 hours per battery (SRCH mode)  
**Charge Time:** 1 hour per battery  
**Batteries:** (4 incl.) 7.2V NiMH



#### TOOL KIT OPTION

- Borescope with built-in light and right-angle viewing for inspection of walls and furniture
- Combination stud finder and metal detector for non-destructive wall evaluation
- RF Wire Tracer and Multi-meter for evaluating miscellaneous wiring
- Rubber-tipped hammer to evaluate the stability of a junction under physical vibration
- Multi-purpose geared screwdriver furnished with small drill bit for use with Borescope
- Miscellaneous Tools: pliers, wire cutters, Leatherman™, inspection mirrors, measuring tape, flashlight, UV light, UV pen, drill bits for walls

#### RCS-4000 ORION REMOTE CONTROL SOFTWARE OPTION

Allows User to control the ORION from a computer serial port.

- Keeps user at safe distance when using the ORION in potentially hazardous environments
- Provides the ability to “lock” ORION functions and settings
- Can be used for pre-screening of suspicious packages prior to X-Ray
- Available with a heavy-duty tripod & mounting bracket for stabilizing the ORION



#### HIGH GAIN ORION AVAILABLE (HGO-4000)

High Gain model (HGO-4000) provides increased transmit power (approximately 3 watts ERP) for special applications. Authorized for use only by entities not restricted by US FCC regulations.



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