RESEARCH ELECTRONICS INTERNATIONAL

NEWSLETTER

Q2 2010

A Quarterly Information Publication

INSIDE THIS ISSUE:

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Circuit boards used in REI equipment are designed and manufactured in-house.

OUR MANUFACTURING IS A CORE COMPETENCY THAT GIVES THE CUSTOMER AN ADVANTAGE.

Manufacturing the Customer's Way

A little known or misunderstood fact is that REI designs, manufactures, assembles, tests and supports all of its major products at its headquarters in Algood, Tennessee. All of REI's operations are located at one centralized manufacturing center. Many REI visitors are surprised to find that every major product is manufactured in-house with a staff of less than seventy-five people.

Outsourcing to low cost producers is commonplace with high volume manufacturers, to the point that in-house manufacturing is sometimes considered unorthodox. For manufacturers who don't run massive volumes of product, however, manufacturing in-house can deliver customers some very positive results by optimizing the advantages of small and lean manufacturing.

Centralized operations have been a core REI strategy throughout decades of growth and adaptation to the changing technologies and manufacturing processes, while serving a specialized field of professionals. By no means is this an attempt to discredit outsourcing or to defend in-house manufacturing as the best model, but more to communicate how REI manufacturing methods best serve its customers.

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TALAN NLJD Test Detects Wire Taps

A quick internet search for 'wire taps' will produce hundreds of easy to acquire products from electronic retailers and spy shops. These wire taps come in varying shapes and sizes using different methods of capturing, transmitting and receiving conversations. Telephone wire taps are usually more difficult to install than most radio devices, but can also be very difficult to detect and locate without the right equipment.

The TALAN Telephone and Line Analyzer inspects and tests telephone and other wiring for taps and eavesdropping devices. It offers a variety of basic and advanced tests, one in particular is the Non-Linear

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Manufacturing the Customer's Way

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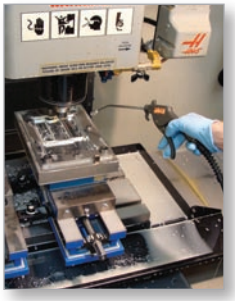

REI personnel run multiple CNC milling machines to fabricate metals into parts for tight tolerances and in-house control.

A high resolution automated optical inspection system is one of several tests used to analyze circuit boards for quality and consistency.

Foam milling in-house provides the flexibility to modify packaging on demand for improved quality and cost management.

An important result of REI's approach to manufacturing is better control of product quality. No matter who makes the product, the name stamped on the product owns the reputation that goes with it. Manufacturing in-house provides REI the opportunity to deliver the quality we want associated with our name. Our complex, high-performance products are reliable because the product is tested many times throughout production. Every product gets a quality inspection before it leaves the facility.

Another result of REI's approach to centralized manufacturing is flexibility critical to being able to adapt. When changes need to be made to the product or process during manufacturing, the change can be implemented sometimes in a matter of moments, rather than waiting days or weeks to clear a myriad of procedural hurdles. Changing priorities or production tempo is easier when the line is not only in the same time zone, it's in the same building.

An example of flexibility might be seen in REI's approach to making circuit boards. REI manages circuit board production and cost by designing and assembling all of its boards in-house. Outsourcing board production is cost prohibitive in low volumes and relinquishes a certain amount of quality and production control to vendors.

Having a fully equipped Pick and Place circuit board assembly operation and highly skilled staff provides REI the flexibility to adjust labor resources and priorities based on demand. It also keeps quality control close at hand where problems can be identified and rectified early, thereby preventing time and material waste.

Open communication throughout the plant is important to keeping things running smoothly. State-of-the-art ERP (Enterprise Resource Planning) management aids in the visibility of parts flow and products, manufacturing, design and sales information.

Engineers can walk into the production area to see the progress of product and have visibility to every phase of production. Sales people can check the status of products for customers with ease. Production workers can walk assemblies to the engineers to ask questions. Open communication and visibility prevent problems and improve efficiency.

Managing costs is a manufacturing constant that depends on communication among line managers, engineers and purchasing agents. REI optimizes costs by putting purchasing decisions at the point of use. Making good decisions in the purchasing of materials and parts benefits customers by providing stable pricing.

One of the least visible sides to REI is the Engineering team, but it is central to the success of REI products. The Engineering team incorporates 3 core functions in the development of the product: electrical; mechanical and software. Circuit board design and production, mechanical tool programming, operational software and firmware and product design are all achieved through REI's Engineering team following years of research and design, prototypes and tests. More than just products, REI engineers design solutions. Engineers who design the products also provide on-line and telephone support to customers.

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TALAN NLJD Test

Continued from page 1

Junction Detector test that is designed to identify whether there is an electronic device attached to the telephone line or any wire. The NLJD test measures the harmonic responses of a signal the TALAN puts on the wire allowing the user to determine if there are any unwanted electronics attached to the wire. This test can detect microphones, recorders, or parallel/serial taps usually attached by splicing the wires or by attaching alligator clips. The test will also identify which conductors have electronics attached and identify the connection as serial or parallel.

If for example, you suspect an eavesdropping device is attached to your phone line, the NLJD test will analyze all 28 pair combinations on an 8 conductor wire and display the results in a bar graph on screen in seconds. The line has to be dry (disconnected at both ends) otherwise it will simply detect the phone or the switch.

A strong second and third harmonic return indicates electronics are present on the line. Third harmonic responses on the TALAN are different than those on the ORION and should not be ignored. On the ORION NLJD, the third harmonic indicates a corrosive junction, not likely to be a threat. On the TALAN however, a third harmonic return indicates a tap with limiting diodes, often used in telephone taps. Once it's determined there is something connected to the line, other tests on the TALAN can be used to isolate the type and location of the device.

The two screen shots to the right show responses to a parallel tap installed on a typical 8 conductor line on pair 4:5. A wire with no electronics attached would show no response. In Figure 1 every pair with either a 4 or 5 has strong harmonic level (even though 4:5 indicates the strongest response). It is also important to note that the transmit power is about 70% of maximum power in the top screen. The reason the response appears on combinations of either 4 or 5 is that there is sufficient power to get good response even though only 1 wire of the pair is connected to the tap device.

To determine the proper pair with the tap, the transmit power is manually decreased in Figure 2 until only the true pair shows an NLJD response.

In this case, the Tx (transmit) power was reduced to less than 10%, and hence, the parallel tap is clearly being displayed only on pair 4:5.

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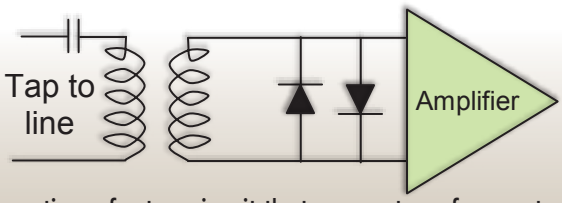

Here is a portion of a tap circuit that uses a transformer to isolate the tap electronics, a blocking capacitor to isolate DC voltage (for a parallel tap), and 2 diodes to limit the input to the amplifier circuit. These 2 diodes in parallel create an NLJD response that results in a strong 3rd harmonic response.

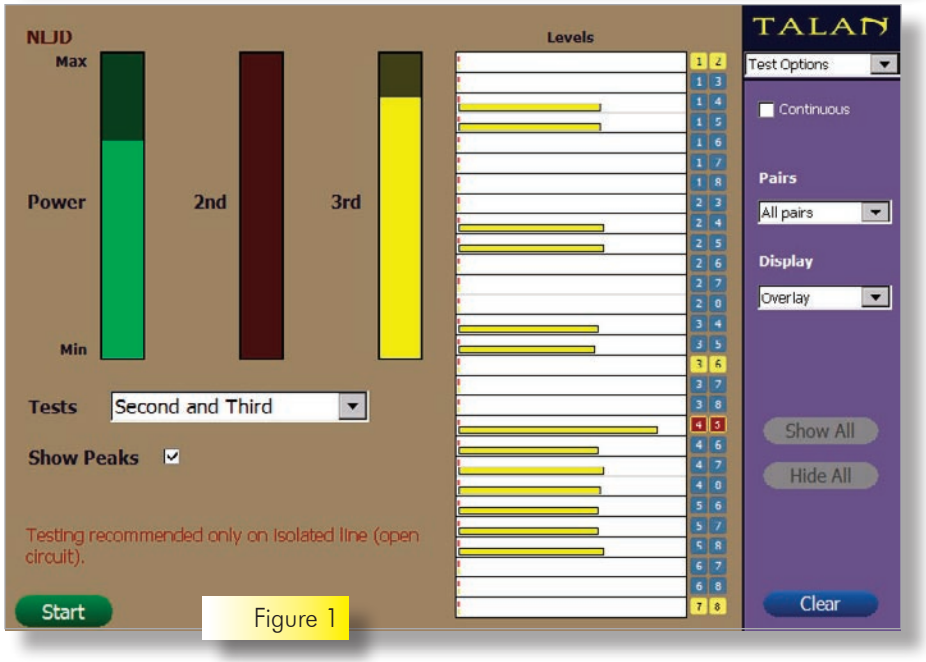

Figure 1

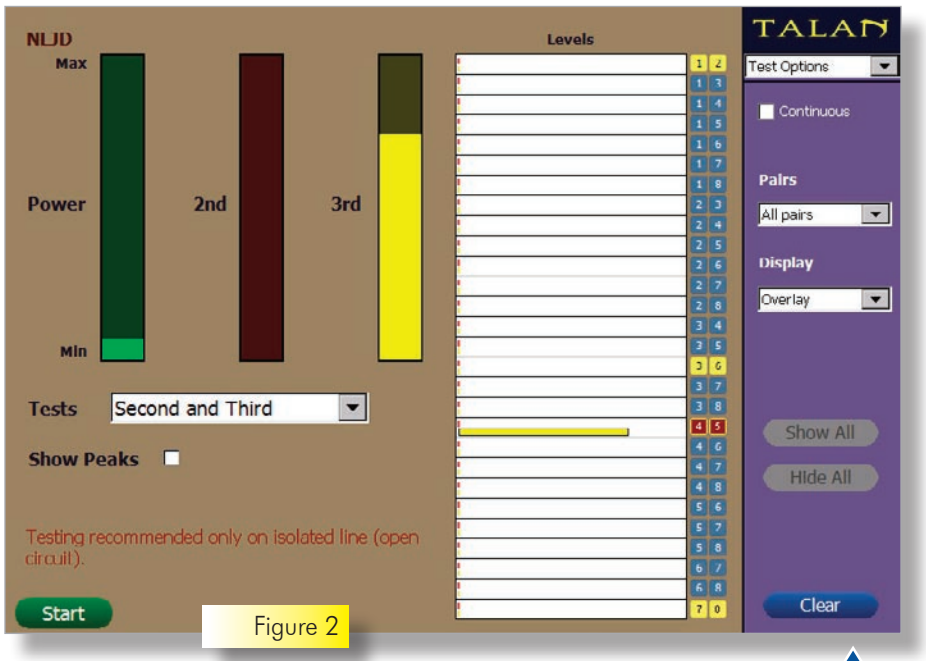

Figure 2

Continued from page 3

In the next example, (Figure 3) there is an electret microphone that is placed on an unbalanced pair combination of 1:3. You can see a strong 2nd harmonic response on many pair combinations that contain 1 or 3, and also some response on the unbalanced 2:6 pair whose conductors are balanced with 1 and 3. This is an excellent example of inductive coupling (the transfer of energy from one conductor to another) that can occur in a telephone line.

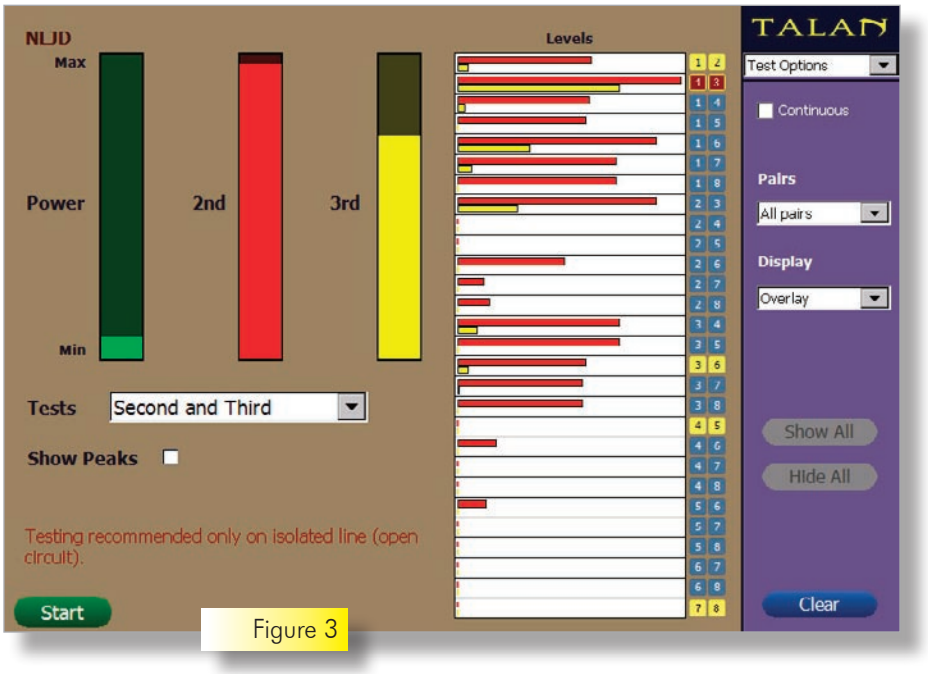

Figure 3

By further reducing the transmit power as in Figure 4, it is easy to see that the pair that is tapped is 1:3.

From studying these types of responses it is easy to quickly identify different types of taps.

The REI Center for Technical Security provides comprehensive training on telephony and the use of TALAN to locate and analyze various eavesdropping devices. Visit the Training section of the REI website for

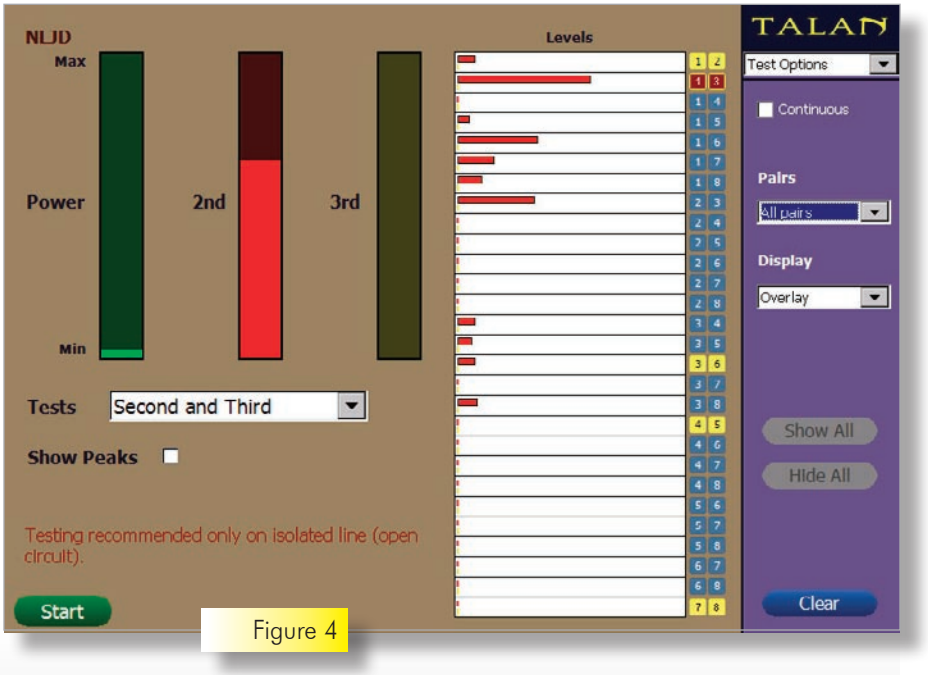

Figure 4

OSCOR™ Blue On Tour

May 26th in Orlando, FL

Join us for a free hands on demonstration of REI's new OSCOR Blue Spectrum Analyzer. To register or for more information, email *michelle@reiusa.net* or call 931-537-6032. Two sessions are available: 9 a.m. - noon and 1 p.m. - 4 p.m.

Upcoming Tour Events include:

New York, NY - June 22 & 23 (location: TBD)

California - July 27-29 (dates/location: TBD)

Seattle, WA - August 17-19 (dates/location: TBD)

Email *michelle@reiusa.net* for more details.

Due to U.S. DDTC regulations, attendees must provide proof of U.S. citizenship or valid Green Card.

ORION and Tool Kit Gets a New Case

A new, deeper, more rugged case is now available on orders for the ORION Non-Linear Junction Evaluator (NJE-4000) and the ORION Tool Kit (OTK-4000) combination.

The injection molded, mil-standard waterproof case is made of ultra high-strength polypropylene copolymer resin. Resistant to corrosion and impact damage, it is water/dust tight and submersible. The "trigger release" latch system and molded rubber cushion grip handle means you can transport the ORION and Tool Kit case securely and comfortably.

The ORION Tool Kit is neatly packed with selected tools uniquely suited to compliment the ORION while performing physical inspections and verifying the presence of threatening electronic devices. The zipped canvas case fits in the ORION case for transport.

CASE DIMENSIONS

Outside Length: 19.75 in 50.17 cm
Outside Width: 15.25 in 38.74 cm
Outside Height: 7.81 in 19.84 cm

THE ORION TOOL KIT INCLUDES:

- **BORESCOPE** with built-in light and right-angle viewing for inspection inside walls, furniture
- **WIRETRACING SYSTEM** to trace miscellaneous cables
- **FLUKE MULTI-METER** for testing miscellaneous cables and electronic devices
- **COMBINATION STUD FINDER AND METAL DETECTOR** for non-destructive evaluation
- **HAMMER** to evaluate the stability of a junction under the physical vibration
- **ULTRA-VIOLET LIGHT & MARKING PEN**
- **MULTI-PURPOSE GEARED SCREWDRIVER** Provides screwdriver function as well as small drill for use with Borescope
- **MISCELLANEOUS TOOLS:** Pliers, wire cutters, Leatherman® (multi-purpose tool), Inspection mirrors, measuring tape, flashlight, drill bits for walls.

For more information or a quote, contact *sales@reiusa.net*

2010 REI TRAINING CALENDAR

TCC-110
Telephone Security Countermeasures Course
May 11-14

TSE-101
Technical Security Equipment Course
May 11 - 14

DTC-210
Digital Telephony Course
May 17 - 21

TSCM-201
Technical Security Countermeasures Course
May 17 -21

TCC-110
Telephone Security Countermeasures Course
June 8 - 11

TSE-101
Technical Security Equipment Course
June 8 - 11

DTC-210
Digital Telephony Course
June 14 -18

TSCM-201
Technical Security Countermeasures Course
June 14 - 18

TEC-250
TALAN Certification Course
June 21 - 25

TCC-110
Telephone Security Countermeasures Course
July 13 - 16

TSE-101
Technical Security Equipment Course
July 13 -16

DTC-210
Digital Telephony Course
July 19 - 23

TSCM-201
Technical Security Countermeasures Course
July 19 - 23

NEW OBC-120
OSCOR Blue Course
July 20 - 22
NEW

ECC-240
Equipment Certification Course
July 26 - 30

Questions, comments, or to add someone to the REI Quarterly Newsletter mailing list, e-mail:
sales@reiusa.net
Visit our online calendar

REI Manufacturing

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PRODUCING RELIABLE PRODUCTS MAKES IT EASIER TO BE A RELIABLE PARTNER.

Probably the most visible side of REI, aside from Training Instructors, is the Sales team. When you call REI, you won't get a call center, you will likely speak directly to a member of the Sales team because customer service is personal. The sales team is part of the REI service team, which includes every member of the company. REI's manufacturing methods allows every department in the company to be involved in supporting the customer and the products on which they depend.

An OSCOR 5000E receives a factory upgrade.

New Training Course

A new OSCOR Blue course is now available at REI's Center for Technical Security. The OBC-120 is a 3 day course designed to familiarize students with the operation and functions of the OSCOR Blue spectrum analyzer. Students must have attended the TSE-101 and must also provide proof of U.S. citizenship. Click here for more information on the OBC-120 and the Center for Technical Security.

Due to U.S. DDTC ITAR regulations, attendees must provide proof of U.S. citizenship or valid Green Card.

IN THE NEWS

PHONES OF PAWAR, DIGVIJAY TAPPED BY UPA GOVT
April 23, 2010
Source: Samachar.com
Article: http://tinyurl.com/PhonesTappedByUPA

INTELLECTUAL PROPERTY PROTECTION: THE BASICS
May 8, 2008
Source: www.csoonline.com
Article: *http://tinyurl.com/IPP-TheBasics*

ENGLAND STEP UP SECURITY AFTER HOTEL WAS BUGGED
March 9, 2010
Source: www.independent.co.uk
Article: http://tinyurl.com/EnglandHotelBugged

DUPONT EMPLOYEE SENTENCED IN INDUSTRIAL ESPIONAGE CASE
March 18, 2010
Source: www2.timesdispatch.com
Article: *http://tinyurl.com/IndustrialEspionageCase*

GPS JAMMERS ILLEGAL, DANGEROUS, AND VERY EASY TO BUY
April 21, 2010
Source: www.foxnews.com
Article: *http://tinyurl.com/GPSJammer-article*

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