Interested?
Contact us at 800-201-2011 or solutions@battelle.org to discuss your specific needs and how Barricade can help.

ARE COUNTERFEIT OR CLONE CHIPS IN YOUR SYSTEMS?

Every day, the people of Battelle apply science and technology to solving what matters most. At major technology centers and national laboratories around the world, Battelle conducts research and development, designs and manufactures products, and delivers critical services for government and commercial customers. Headquartered in Columbus, Ohio since its founding in 1929, Battelle serves the national security, health and life sciences, and energy and environmental industries. For more information, visit www.battelle.org.

800.201.2011 | solutions@battelle.org | www.battelle.org

Battelle and its logos are registered trademarks of Battelle Memorial Institute.
© Battelle Memorial Institute 2017. All Rights Reserved.
ID 484 06/17
Introducing Battelle Barricade™, a new technology providing authentication of integrated circuits from both trusted and untrusted sources, and eliminating the risk of counterfeit or clone devices in aerospace and defense systems, critical infrastructure, medical devices and other critical systems.

**Weaponized hardware: a matter of national security**

Imagine these dangerous scenarios: a plane falling from the sky midflight, medical equipment failing while inside a patient’s heart, a missile intercept system missing its target and hitting a densely populated area instead.

While seemingly unrelated, each of these incidents can have the same hazardous source: counterfeit integrated circuits that can threaten the safety, security, quality, reliability and profitability of a product. In addition to national security risks, come a $200 billion semiconductor industry loss*.

**Nondestructive verification**

Barricade provides a nondestructive verification of components at a dramatically lower cost than alternatives. There is no requirement for chip design modification or physical alteration. And there is no requirement for insertion of technology into the manufacturing process of a trusted source.

**Unique solution to a global problem**

Barricade is unlike existing and emerging technologies. Emerging technologies require each and every device to originate from a trusted source and be tagged, serialized, and tracked.

Existing commercial testing services are costly and destructive lot sampling testing of the devices in inventory must be done since conventional nondestructive authentication methods do not reliably detect counterfeits.

**Avoid tagging, serializing and tracking all chips**

Barricade is applicable to both analog and digital devices. The technology uses a method that creates feature vectors for each class of devices from their power consumption waveforms. Developed algorithms process the waveforms into lower dimensionality feature vectors. The feature vectors are input to the Barricade classifier algorithm that performs the electronic component classification and only a few authentic chips are necessary to enroll an entire class of chips into Barricade. This eliminates the need to tag, serialize and track all chips and provides the ability to enroll chips from untrusted sources.

Once a chip is enrolled, all chips in that class can be authenticated regardless of the source in a matter of seconds per part. Battelle is planning to expand this capability to electronic components beyond digital integrated circuits in the near future.

### Barricade Signal Acquisition Hardware Specification

- **Device Socket**: Compatible with Xeltek SUPERPRO 5000/5004GP series sockets
- **Device Configuration**: Up to 48 user defined pin connections per component configuration
- **Data Acquisition**: 500MS @ 12-bit sampling, 200MHz bandwidth
- **Push Button Switch**: User control to initiate scan of inserted device
- **Multi-color LED**: User indicator for system status
- **Connection to PC**: USB 2.0
- **Input Power**: 120VAC-60Hz
- **Enclosure Size**: 13” H x 9” W x 4.5” H
- **Enclosure Weight**: 14 lbs
- **Operational Temperature**: 20 deg C to 30 deg C

### Barricade User Interface Requirements

- **Computer**: Microsoft Windows 7/10 TBD processor and RAM
- **Connection to Hardware**: USB 2.0
- **Part Configuration Library and Waveform Data Storage**: Authorized network connection to remote database via VPN (provided)
- **Software**: Barricade Data Client Application with multiple user accounts (provided)

Weaponized hardware: a matter of national security

Imagine these dangerous scenarios: a plane falling from the sky midflight, medical equipment failing while inside a patient’s heart, a missile intercept system missing its target and hitting a densely populated area instead.

While seemingly unrelated, each of these incidents can have the same hazardous source: counterfeit integrated circuits that can threaten the safety, security, quality, reliability and profitability of a product. In addition to national security risks, come a $200 billion semiconductor industry loss*.

Nondestructive verification

Barricade provides a nondestructive verification of components at a dramatically lower cost than alternatives. There is no requirement for chip design modification or physical alteration. And there is no requirement for insertion of technology into the manufacturing process of a trusted source.

Unique solution to a global problem

Barricade is unlike existing and emerging technologies. Emerging technologies require each and every device to originate from a trusted source and be tagged, serialized, and tracked.

Existing commercial testing services are costly and destructive lot sampling testing of the devices in inventory must be done since conventional nondestructive authentication methods do not reliably detect counterfeits.

Avoid tagging, serializing and tracking all chips

Barricade is applicable to both analog and digital devices. The technology uses a method that creates feature vectors for each class of devices from their power consumption waveforms. Developed algorithms process the waveforms into lower dimensionality feature vectors. The feature vectors are input to the Barricade classifier algorithm that performs the electronic component classification and only a few authentic chips are necessary to enroll an entire class of chips into Barricade. This eliminates the need to tag, serialize and track all chips and provides the ability to enroll chips from untrusted sources.

Once a chip is enrolled, all chips in that class can be authenticated regardless of the source in a matter of seconds per part. Battelle is planning to expand this capability to electronic components beyond digital integrated circuits in the near future.

Introducing Battelle Barricade™, a new technology providing authentication of integrated circuits from both trusted and untrusted sources, and eliminating the risk of counterfeit or clone devices in aerospace and defense systems, critical infrastructure, medical devices and other critical systems.

Barricade Signal Acquisition Hardware Specification

- Device Socket: Compatible with Xeltek SUPERPRO 5000/5004GP series sockets
- Device Configuration: Up to 48 user-defined pin connections per component configuration
- Data Acquisition: 502MS/s 12-bit sampling, 200MHz bandwidth
- Push Button Switch: User control to initiate scan of inserted device
- Multi-color LED: User indicator for system status
- Connection to PC: USB 2.0
- Input Power: 120VAC 60Hz
- Enclosure Size: 13” H x 9” W x 4.5” D
- Enclosure Weight: 14 lbs
- Operational Temperature: 20 deg C to 30 deg C

Barricade User Interface Requirements

- Computer: Microsoft Windows 7/10 64-bit processor and RAM
- Connection to Hardware: USB 2.0
- Part Configuration Library and Waveform Data Storage: Authorized network connection to remote database via VPN (provided)
- Software: Barricade Data Client Application with multiple user accounts (provided)

How It Works:

Barricade™ is comprised of signal acquisition hardware and software installed at customer sites.

The system collects and transmits a user component fingerprint to a remote, authenticated server for classification.

A user report is returned to the system with the results of the authentication classifier.

Features:

- Nondestructive
- Nonintrusive
- High confidence/reliability
- Simple to use graphical user interface
- Low cost per part (pennies per part)
- High throughput rate (seconds per part)
- Easily integrated with automated pick and place machines

Nonastrategic parts bulletin, May 2011, Vol 3, Issue 1
Interested?

Contact us at 800-201-2011 or solutions@battelle.org to discuss your specific needs and how Barricade can help.

ARE COUNTERFEIT OR CLONE CHIPS IN YOUR SYSTEMS?