



If it was this easy to spot **bad parts** it might be safe to buy from an **unauthorised source.**



Unfortunately it's not. Even parts that look good may be bad inside. But when you buy from a supplier authorised distributor, you don't have to worry about component quality.



To get the genuine parts you specified, handled and delivered with care, and fully warranted by the best manufacturers in the business, look for a supplier authorised distributor.



An Introduction to.....

Counterfeit Electronic Components.....

Presented by:

IDEA



International Distribution of Electronics Association

Counterfeit – Some Definitions...

- Dictionary Definitions...
 - “Something counterfeit is not genuine but has been made to look genuine to deceive people.”
 - “An exact imitation of something valuable with the intention to defraud.”
- Legal Definition... Intellectual Property Theft
 - “Wilful **Trademark** Infringement” (Hard)
 - Piracy is similar but different – “Wilful **Copyright** Infringement” (Soft)
- Primary and Secondary Markets...
 - **Primary** – “Infiltration of Counterfeit Goods into the Supply Network to be purchased without Knowledge...” (Components)
 - **Secondary** – “Counterfeit goods Purchased with the consumers knowledge and complicity...” (Rolex / DVD’s)



Counterfeit – Some Definitions.....

- Other Terms...
 - **Bootleg** – “User is aware of illegal status...” (DVD/CD)
 - **Knockoff** – “Inferior lower price imitation...” (Dynacell Battery)



Other Illegal Activities.....

- Device Remarketing
 - Different Speed Grade – 120ns to 80ns...
 - Improved Performance – LM741 to OP-07...
 - Improved Temperature Specification – Commercial to Automotive
 - Re-branding – Samsung to Toshiba
- Document Falsification
 - Forged Certificates of Conformance / Tracking Documents

Other Activities...

- Pulls
 - Reuse of memory and other components



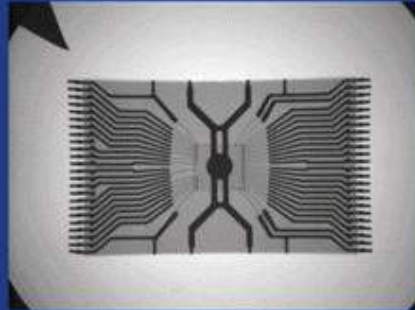
Pulls and Reuse...



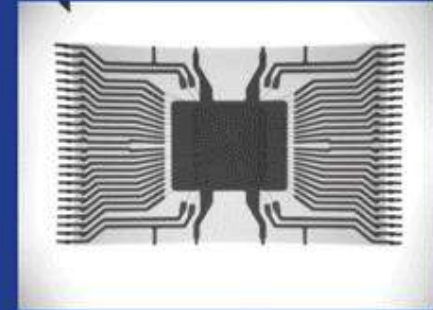
Examples... Memory 16Gb Flash



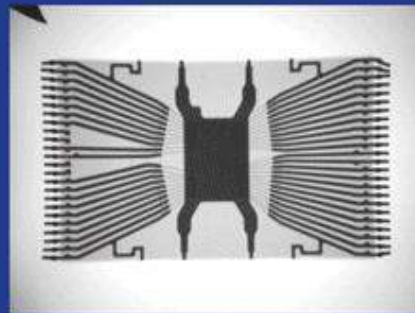
Counterfeit Samsung Part
Package Marking K9GA08U0M



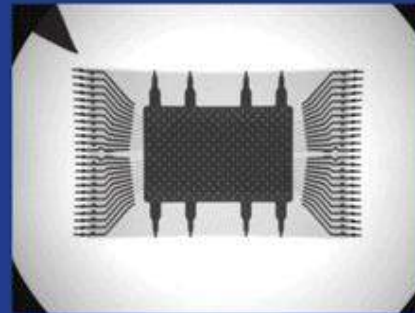
Counterfeit Samsung Part
X-ray of the second part



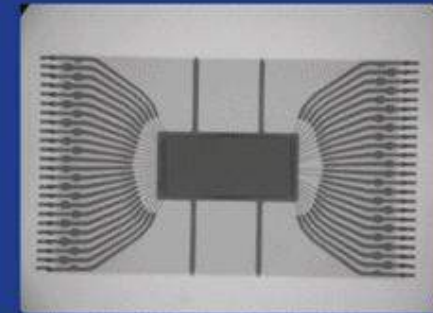
Counterfeit Samsung Part
X-ray of the fourth part



Counterfeit Samsung Part
X-ray of the first part



Counterfeit Samsung Part
X-ray of the third part



Counterfeit Samsung Part
X-ray of the fifth part

This counterfeit device had the correct part number on the package but had multiple, different dice inside, as can be seen in the various X-rays.

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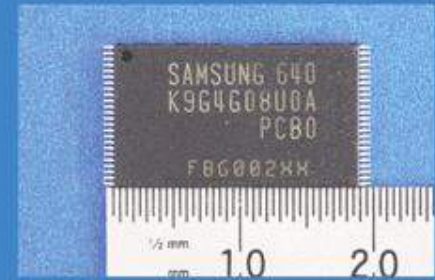
Examples... Memory 16Gb Flash



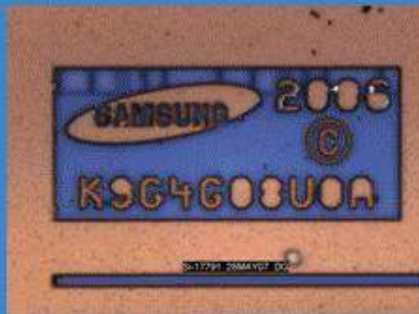
Counterfeit Toshiba Part
Package Marking
TC58NVG4D1DTG00



Toshiba 56nm 16Gb MLC NAND
Flash Part Package Marking
TC58NVG4D1DTG00



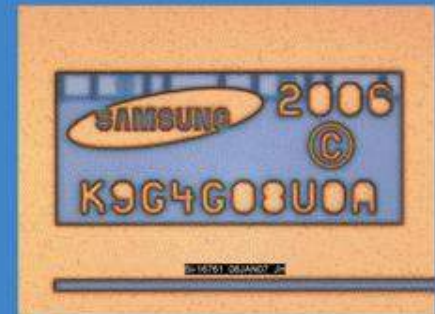
Samsung 65nm 4Gb MLC NAND
Flash Part Package Marking
K9G4G08U0A



Counterfeit Toshiba Part
Die Markings



Toshiba 56nm 16Gb MLC NAND
Flash Part Die Markings



Samsung 65nm 4Gb MLC NAND
Flash Die Markings

One counterfeit device (left) had Toshiba markings but a Samsung die inside. You can see the actual Toshiba device markings on the second device. The Samsung die can be seen in the third image.

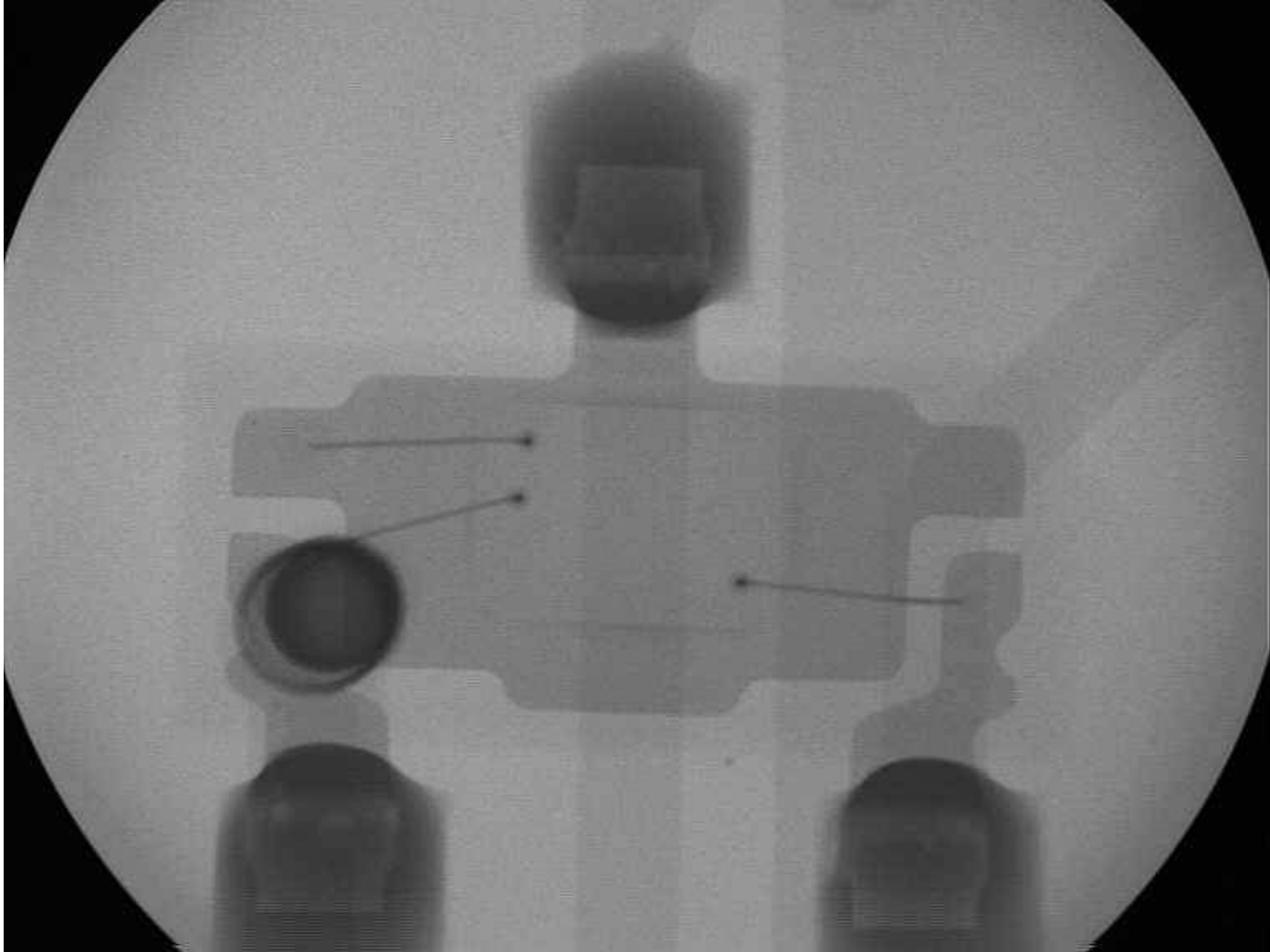
Examples...Voltage Reference



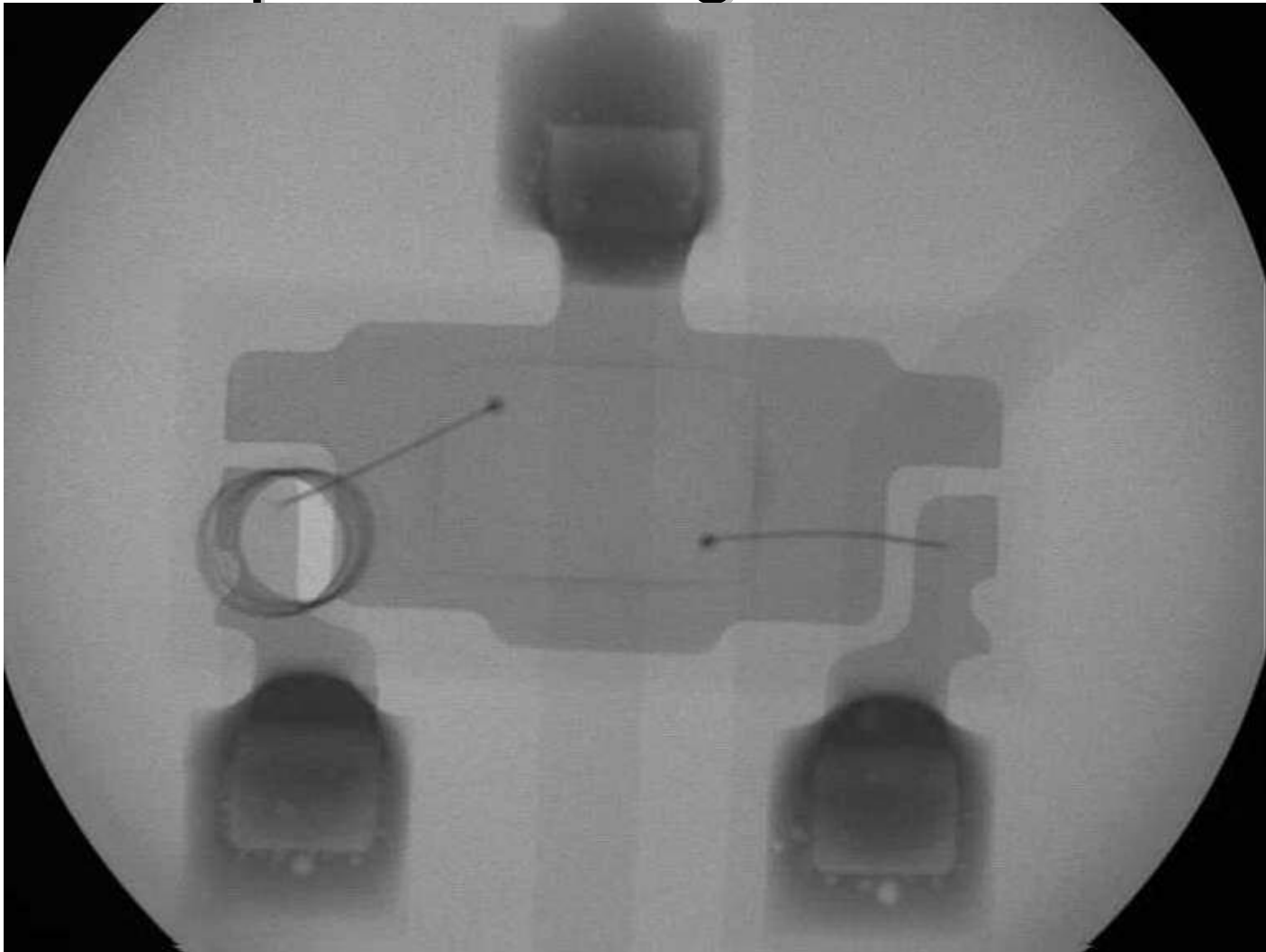
Examples... Voltage Reference



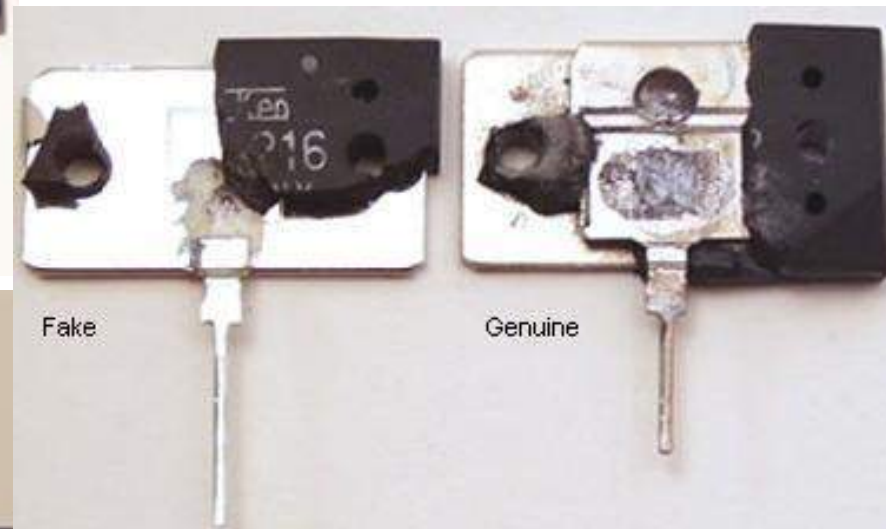
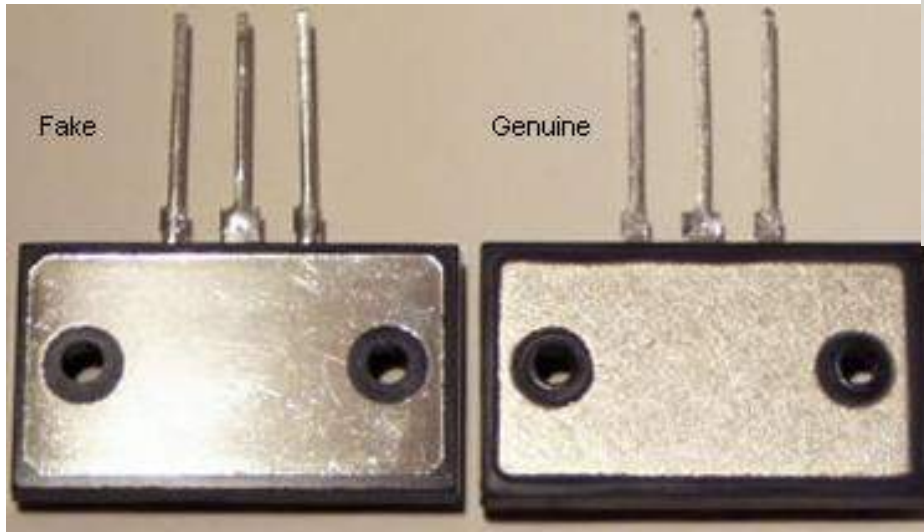
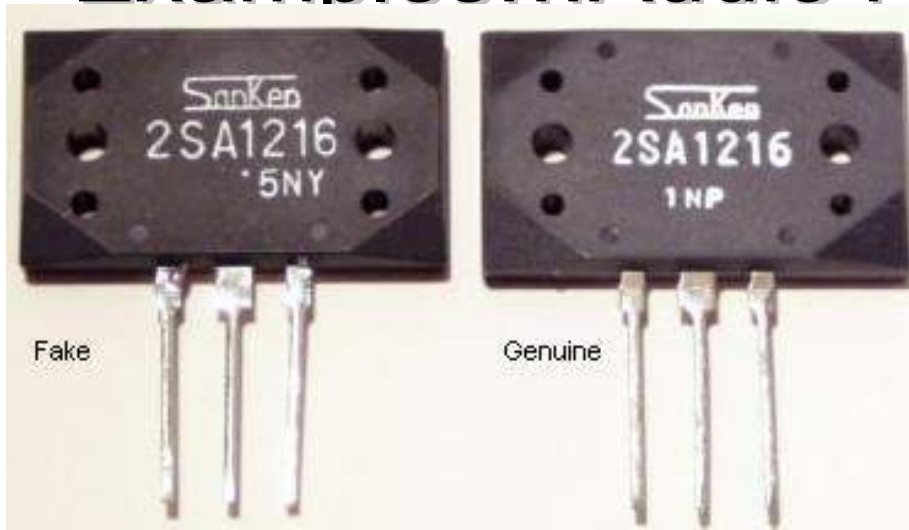
Examples...Voltage Reference



Examples...Voltage Reference



Examples...Audio Power Transistors



Source: Rod Elliott ESP <http://sound.westhost.com/counterfeit.htm>

Examples...T0-3 Transistors

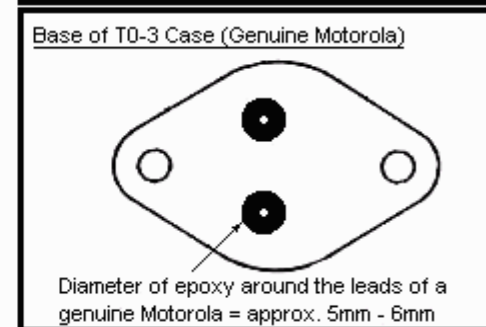
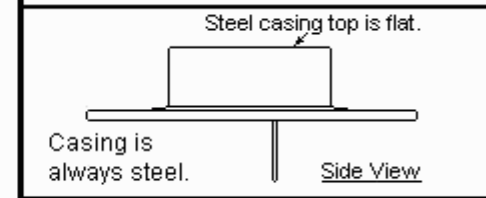
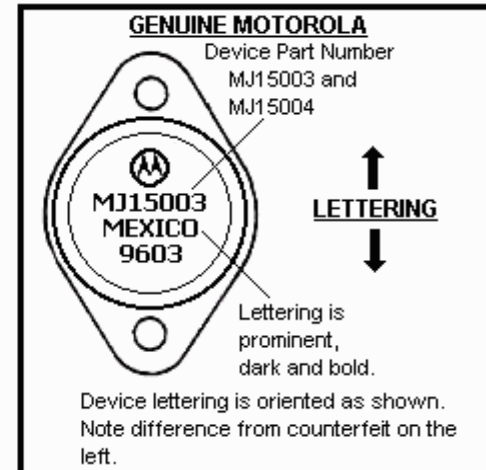
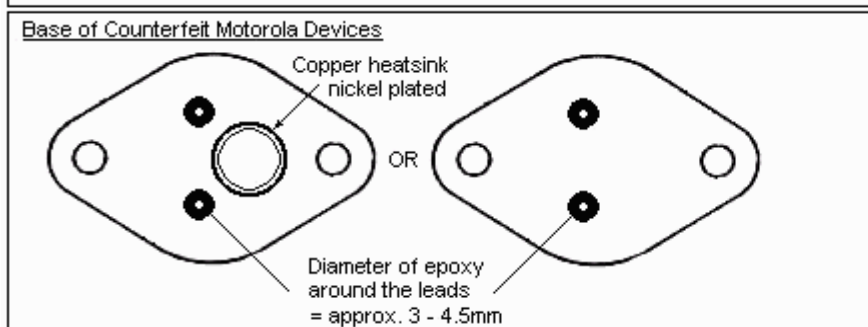
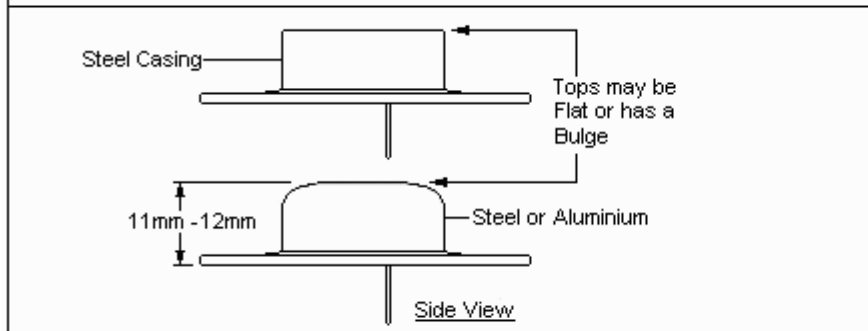
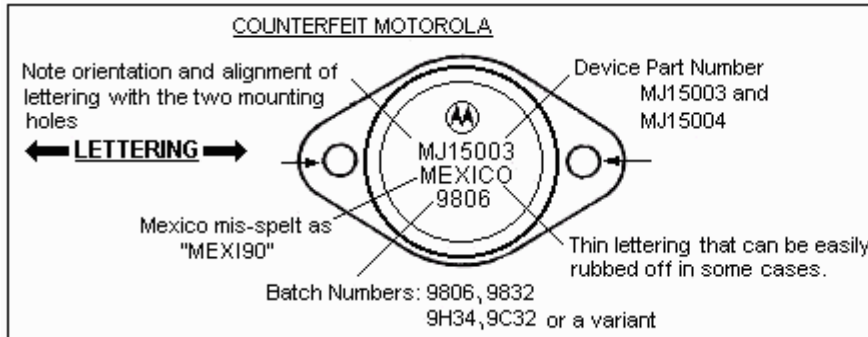


Source: Rod Elliott ESP <http://sound.westhost.com/counterfeit.htm>



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Examples...T0-3 Transistors



Examples...Circuit Breakers



An Increasing Problem.....

- In 2005 (OECD) study estimated that:
 - The international trade in counterfeit goods was \$200Bn...
 - If EU produced goods and internet transactions are included “it could well be several hundred billion dollars more...”
- \$200Bn is larger than the economies of many developing countries...
- US Customs Crackdown in Anchorage discovered \$70M of counterfeit electronic components in one year...
- Over the next 5 years I suggest that Counterfeiting may become the number 1 electronic component industry issue...



Why is Counterfeiting Increasing???

- Strong Demand...
 - Consumers - They don't care...
 - Industrial Users – Little interest yet...
- Weak Legislation...
 - Risk:Reward Ratio = Low Risk:High Reward
 - Penalties for Counterfeiters are low...
 - China – 1:500 chance of successful legal action
 - Improving, lawyers now specialising in IP...
- Cultural Issues
 - IP not recognised in China...
 - Pride in production of good counterfeit products...
 - Massively increased sophisticated production capacity...



Why is Counterfeiting Increasing???

- OEM's Outsourcing / Off Shoring Manufacture
 - Industrial Espionage...
 - New Products / Processes / Know-how Transferring Early
 - Poor Management Control...
 - Process / Procedures...
 - Traceability – Inter-company Transfers
 - Returns to Channel
 - Reselling Components
 - Complex Global Supply Networks
 - Overrun Production
 - Complicity
 - Cost Reduction Pressure...



Why is Counterfeiting Increasing???

- Internet Commerce
 - Arms length transactions...
 - Anonymity / Flexibility / Size & Scope of Market / Deception
- Environmental Legislation – RoHS / WEEE / EUP...
 - Product Rationalisation
 - Shortages of Components



Where are Counterfeit Goods made???

Seizures of imported counterfeit and pirated products from the top 20 source economies

Region of top 20 source economies	Number of source economies in region	Seizures (% of total)
Asia (excl. Middle East)	12	69.7
Middle East	2	4.1
Africa	2	1.8
Europe	2	1.7
North America	1	1.1
South America	1	0.8
Top sources	20	79.2

The seizure percentages are based on trade-weighted data from 19 reporting economies.

Source: OECD 2007



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So What Does Counterfeiting Cost???

Example LM4051 (SOT-23) Failure of a Counterfeit Component purchased via internet broker...

- Device Unit Price = \$0.40 (\$0.05 > Authorised Distributor)
- Assembled PCB Assembly Fails Test = \$40.00
- System Integration PCB Fails Test = \$500
- System Fails at Customer Premises = \$1000 / \$2,500

- 100 defective counterfeit components = \$100K loss
- The \$100K loss does not include...
 - Consequential Loss Liability...
 - Loss of Customer Goodwill / Reputation



How To Avoid Counterfeit Components...



This will not help!!



What Can “The Industry” Do...

- There is no “Silver Bullet” to solve this problem...
- It is going to take long term sustained action across the electronic components industry by:
 - Government
 - OEM Customers
 - Component Manufacturers
 - Authorised Distributors



What Should Governments Do...

- Enforce Existing Laws – Particularly Imported Goods
- Increase Penalties to Offenders
- Common Enforcement Approach with Trading Partners
- Impose Sanctions on Supplying Countries
- Raise Public Awareness of Threat
- Encourage Industry Participation
- Gather Reliable Up To Date Information by Sector



What Can OEM Customer's Do...

- Plan Material Purchases In Advance
- Locate Buffer Inventory with an Authorised Distributor
- Control Shipment of Critical Devices to Sub-Contractors
- Use Multiple Sub-Contractors – Not Turnkey
- Purchase from the Manufacturer or Authorised Distributors
- Desperation sometimes overrules common sense...
- If you have to go to unauthorised source...
 - If an offer sounds “too good to be true” it probably is...
 - Use a broker with an operation in your country
 - Obtain documentary evidence / photographs
 - Pay only on receipt and inspection of goods



What Can Component Manufacturers Do...

- Traceability...
 - Improve Control Documentation
 - Only Ship and Accept Sealed Boxes...
 - Full QA screening of **all** restocked products
 - RFID tags on Shipment Boxes and MSM to track movement
 - Use of unique product identifiers – Serial Coding / Emarking
- Exercise greater control over their sub-contractors...
 - Greater Control of Production / Yields / Scrap Products
 - Test and Pilot runs must be scrapped effectively
- Actively Publicise and Notify Customers of Counterfeit Problems

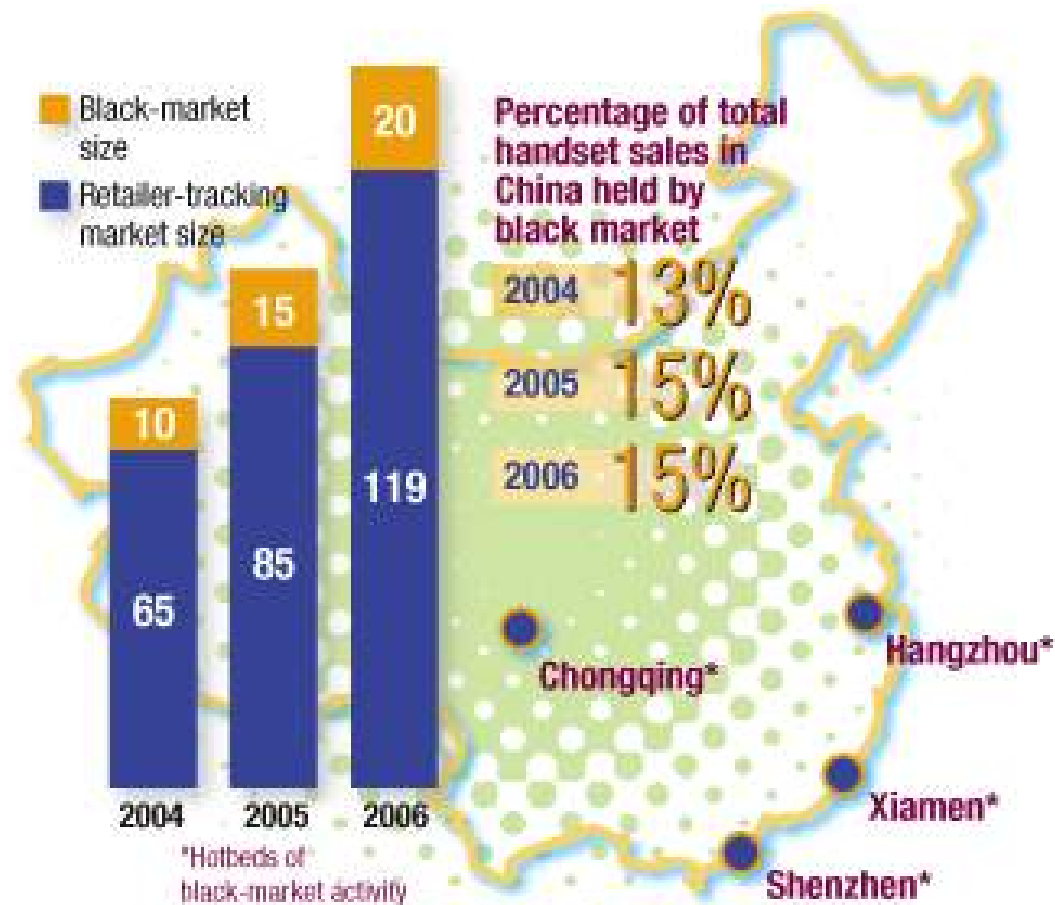


What Can Authorised Distributors Do...

- Maintain and Enhance Manufacturers Traceability
- Disseminate Information
- Enhanced Flexibility – Smaller Reels
- Physically Scrap Written Off Stock
- Avoid supporting Customers Needs via Brokers



Counterfeit Cell Phones...



The Counterfeit Cell Phone...

- The new Apple iPhone is a classic example of counterfeit activity...
- Strong consumer demand has resulted in at least five clones...

<http://www.youtube.com/watch?v=m9skusj906Q>

- Thanks to Semiconductor Insights...



Sources of Additional Information...

- www.afdec.org.uk
- www.nedassoc.org
- www.ideaelectronics.com
- www.semiconductor.com
- www.sia.org
- www.designchainassociates.com
- www.uschamber.com/ncf/initiatives/counterfeiting.htm
- www.icphotos.org
- www.china-outlook.com
- www.iccwbo.org/bascap/id1127/index.html



Thank You...

- Any Questions?





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