

工厂自动化与RFID

Factory automation with RFID

Product & Marketing Manager
Kobe TONG

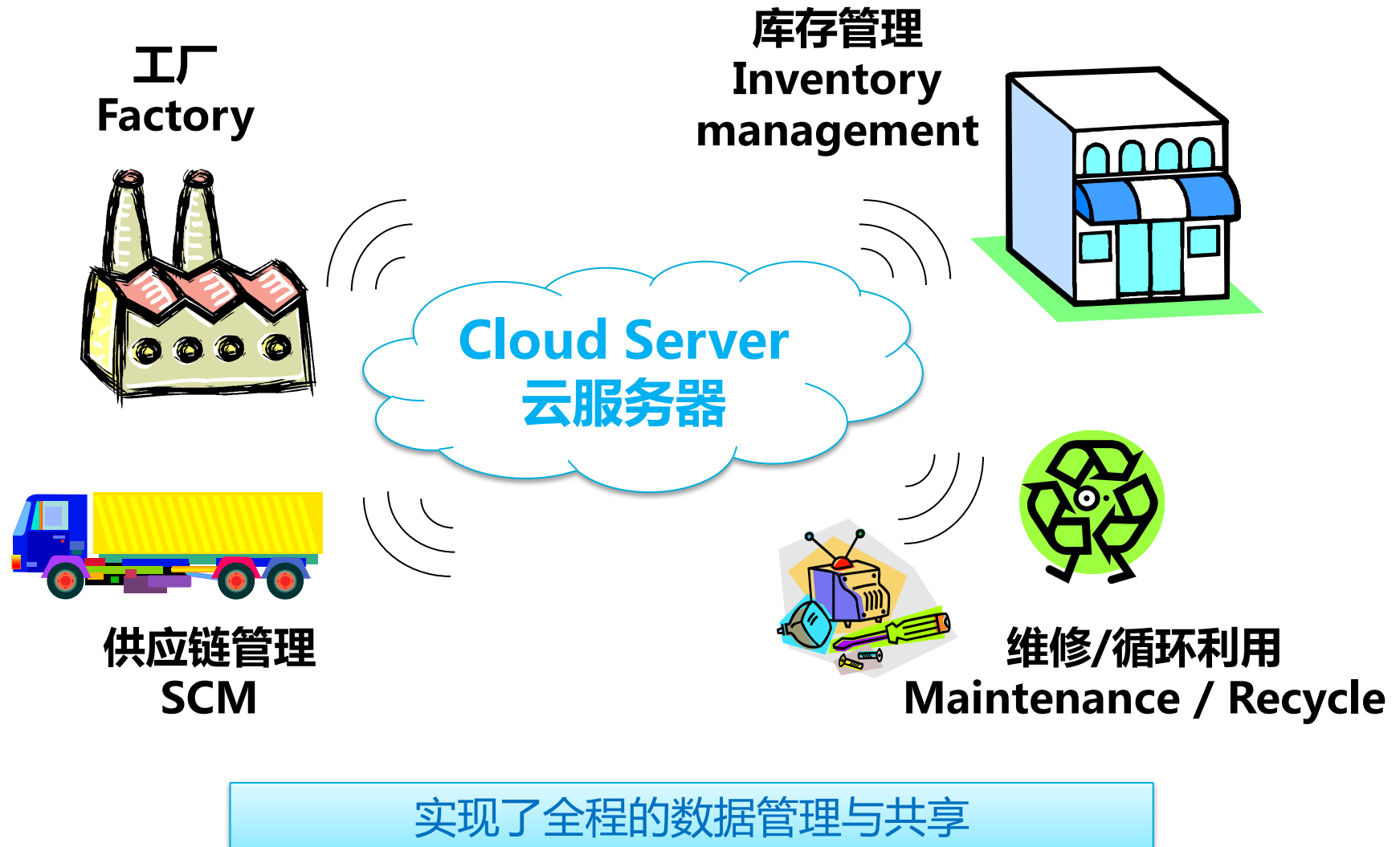
Murata Electornics Trading
(shenzhen) Co., Ltd.
20th August 2015



- RFID在工业领域的作用
- RFID标签-MAGICSTRAP®
- MAGICSTRAP®的应用案例
- MAGICSTRAP®与I²C接口
- 总结

RFID与工业4.0

RFID for Industry 4.0 RFID



工厂的解决方案

Current solution in factory



<p>Laser marking 激光打标</p>		<ul style="list-style-type: none"> - 人为错误 - 封装后不能确认 - 污垢的影响 - 不可重写
<p>Sticker 贴纸二维条码</p>		<ul style="list-style-type: none"> - 不能用回流焊 - 尺寸大
<p>RFID tag RFID标签</p>		<ul style="list-style-type: none"> - 不能用回流焊 - 尺寸大

现存问题

MAGICSTRAP® 多功能性

MAGICSTRAP® Possibility

Before

PCB 识别:激光打标 (Laser marking)



Laser:
✓ Expensive
✓ Slow



PCB 安装和测试: 贴纸二维条码 (Sticker)



2D matrix code sticker:
✓ High definition cameras
✓ Manual work (attachment)
✓ Need to be always located at the same area to be read in line.
✓ Inefficient



组装和测试: HF RFID标签 (HF RFID Tag)



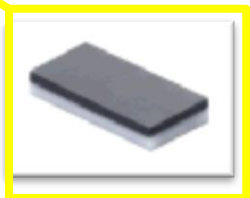
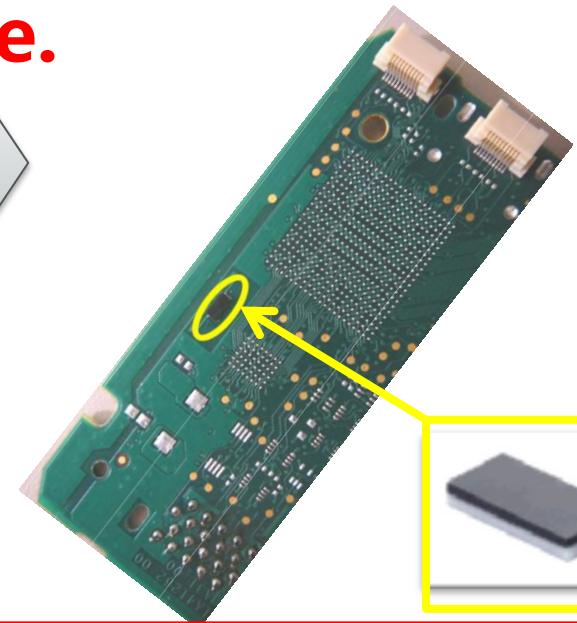
HF RFID tag:
Manual work
(attachment and removing)

After



MAGICSTRAP®

同时拥有三种功能。
Replaces 3 kinds of ID in production Line.

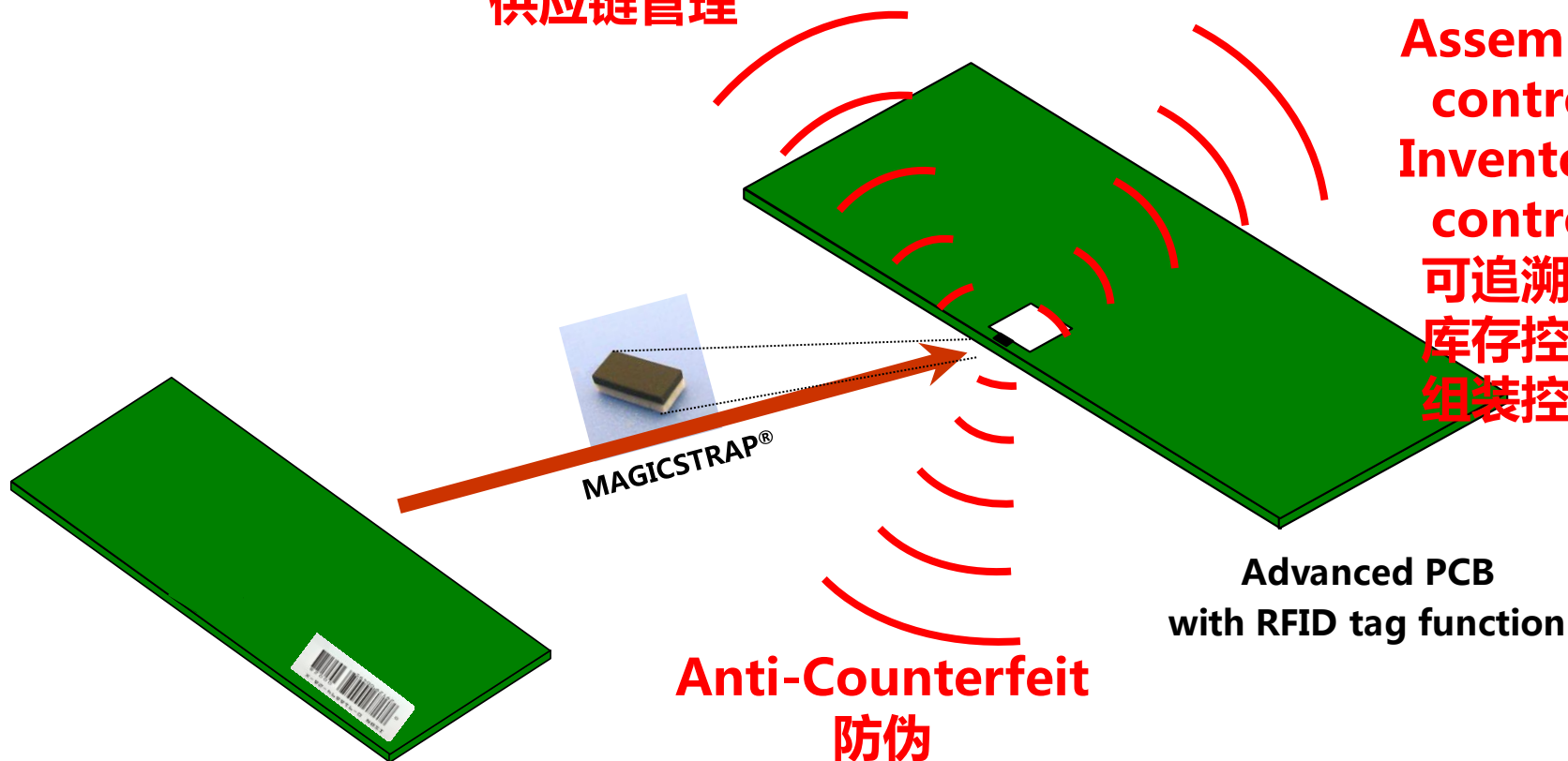


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在你的PCB上安装MAGICSTRAP® Mounting MAGICSTRAP® on your PCB

Supply Chain Management
供应链管理

Traceability
Assembly control
Inventory control
可追溯性
库存控制
组装控制



Anti-Counterfeit
防伪

简易安装，即可让PCB变成RFID标签！

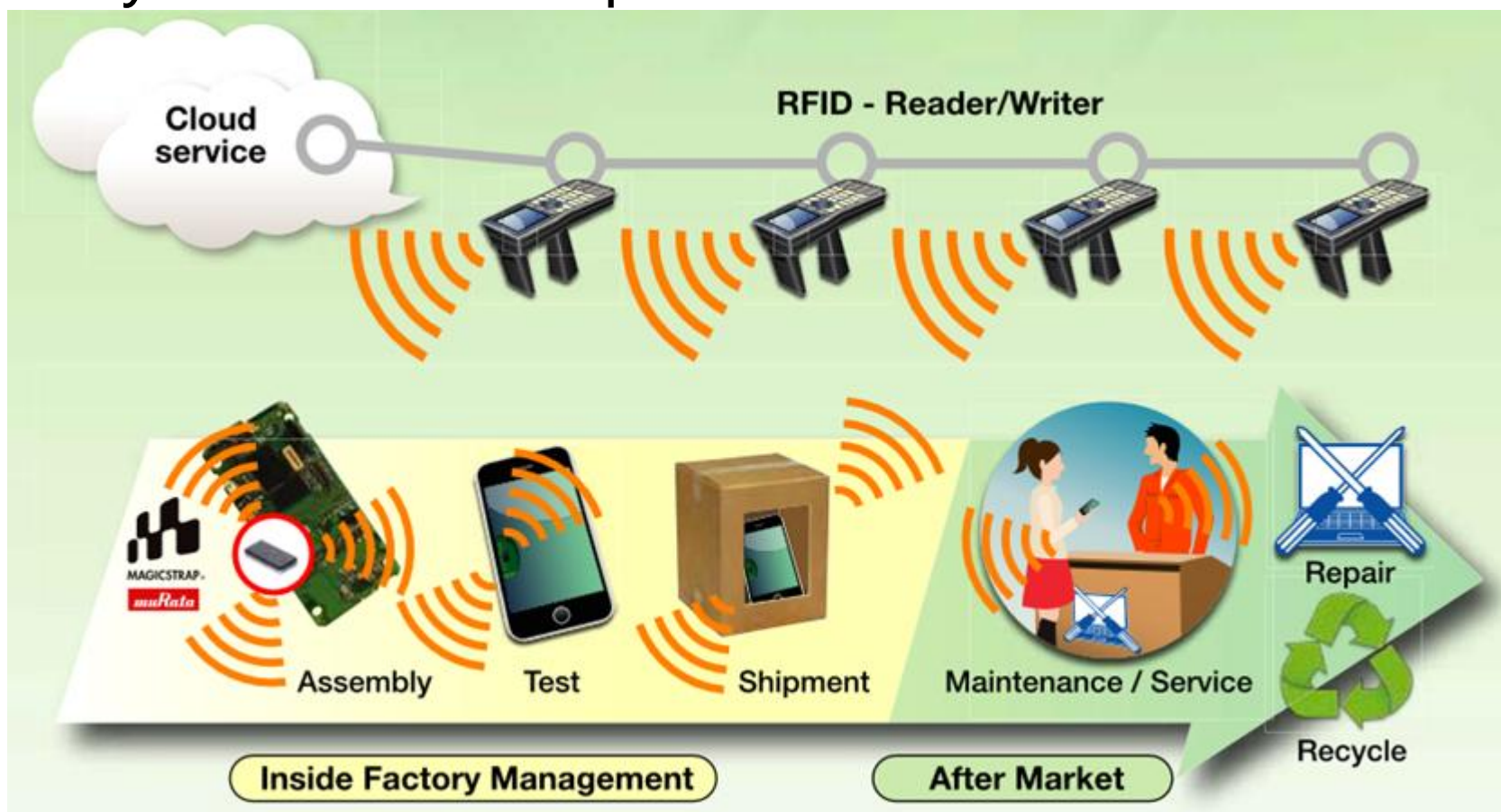
- 仅需很小的空间
- 完成从SMT到出货后的全程追溯

MAGICSTRAP®的主要概念

Key concept of MAGICSTRAP®

~ From cradle to grave ~

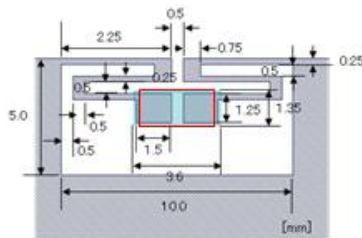
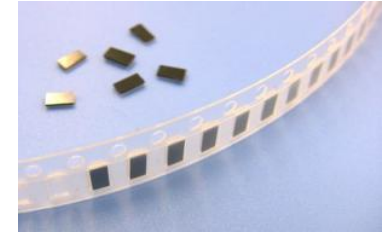
Track & trace PCB with RFID technology throughout the life-cycle of electronic products.



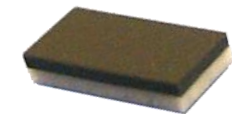
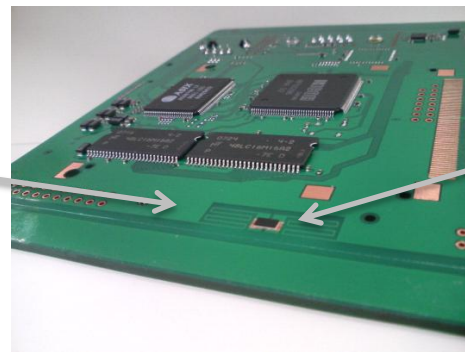
MAGICSTRAP® 是一个组件

MAGICSTRAP® is a device

- ✓ 封装 EPC Gen2* RFID 芯片
- ✓ 3.2 x 1.6 x 0.55 mm
- ✓ 对标准的SMT提供 边带包装和卷盘包装(Tape & Reel)
- ✓ 既简单又微型的天线，并按照客户的PCB layout村田提供天线参考设计



MAGICSTRAP® 天线
参考设计



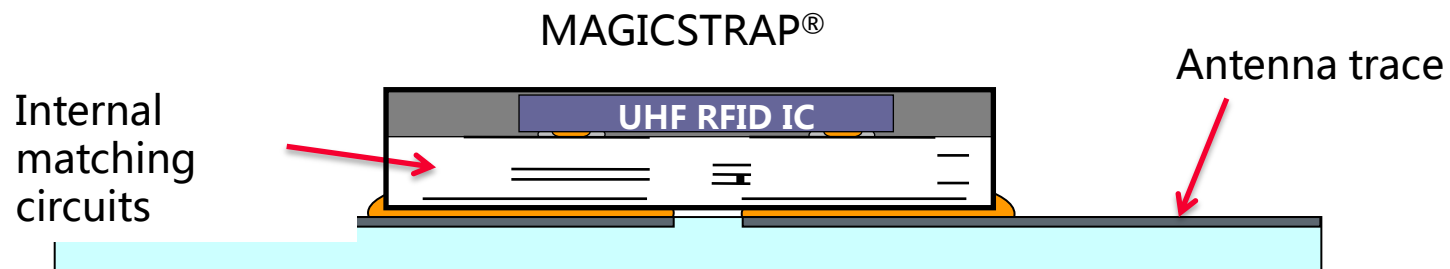
* EPC Gen2 / ISO 18000-6C is the industry standard for UHF RFID – see backup for more information

与其他RFID组件的比较

Comparison with other RFID device

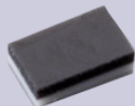
	MAGICSTRAP® + antenna	RFID IC + antenna	RFID tag with Antenna
Size (Device itself)	Small	Small	Big
Size (Antenna)	Small	Big	
Reflow	OK	OK	NG

微型的原因



MAGICSTRAP® UHF频带产品一览

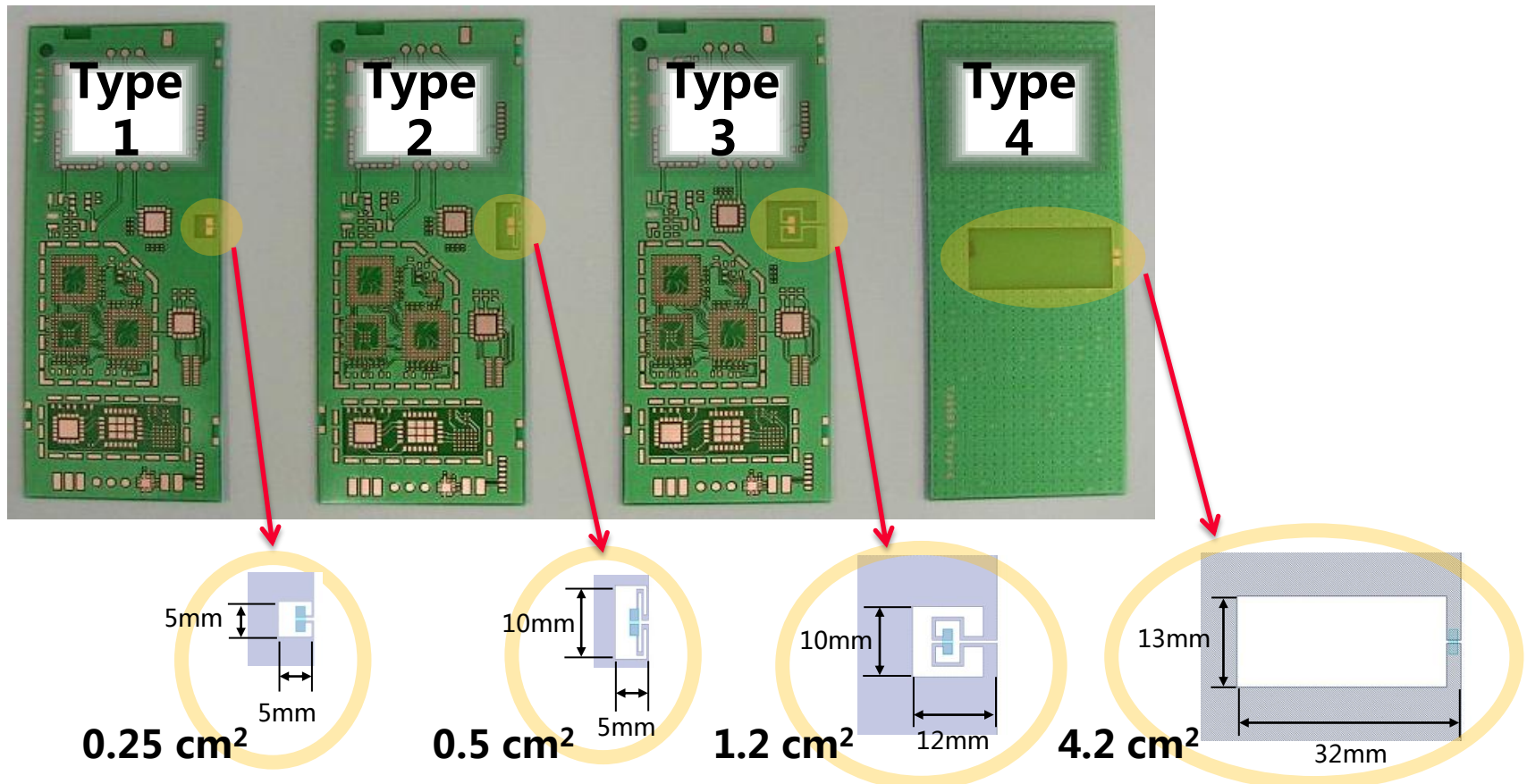
MAGICSTRAP® Product Line Up for UHF band

P/N	LXMS2HACNF -165	LXMS31ACNA- 009/010/011/012	LXMS31ACMD -141/142/143/144	LXMS21ACNE -132	LXMS21NCNH -147
Appearance 外形	<i>I2C i/f</i> 			<i>Small</i> 	
Frequency 频率	UHF (865~928MHz)				
Standard 标准	EPC global C1G2, ISO/IEC18000-6 type-C				
TID memory TID 内存	96 bits	64 bits	96 bits	64 bits	96 bits
User memory 用户内存	3.3 kbits	512 bits		n/a	512 bits
EPC memory EPC 内存	160 bits	240 bits	128 bits	Non tested	256bits
Size (mm) 尺寸	2.5 x 2.0	3.2 x 1.6		2.0 x 1.2	2.0 x 1.2
Thickness 厚度	1.0mm Max.	0.7mm Max		0.55mm Max	0.6mm Max
Read range 读写距离	2m Max.*	5m Max.*		1.5m Max.*	12mm
IC 芯片	NXP UCODE I2C	NXP G2XM	Impinj Monza4 QT	NXP G2iL	NXP G2iM

* With booster antenna

四个参考设计 Four Reference Designs...

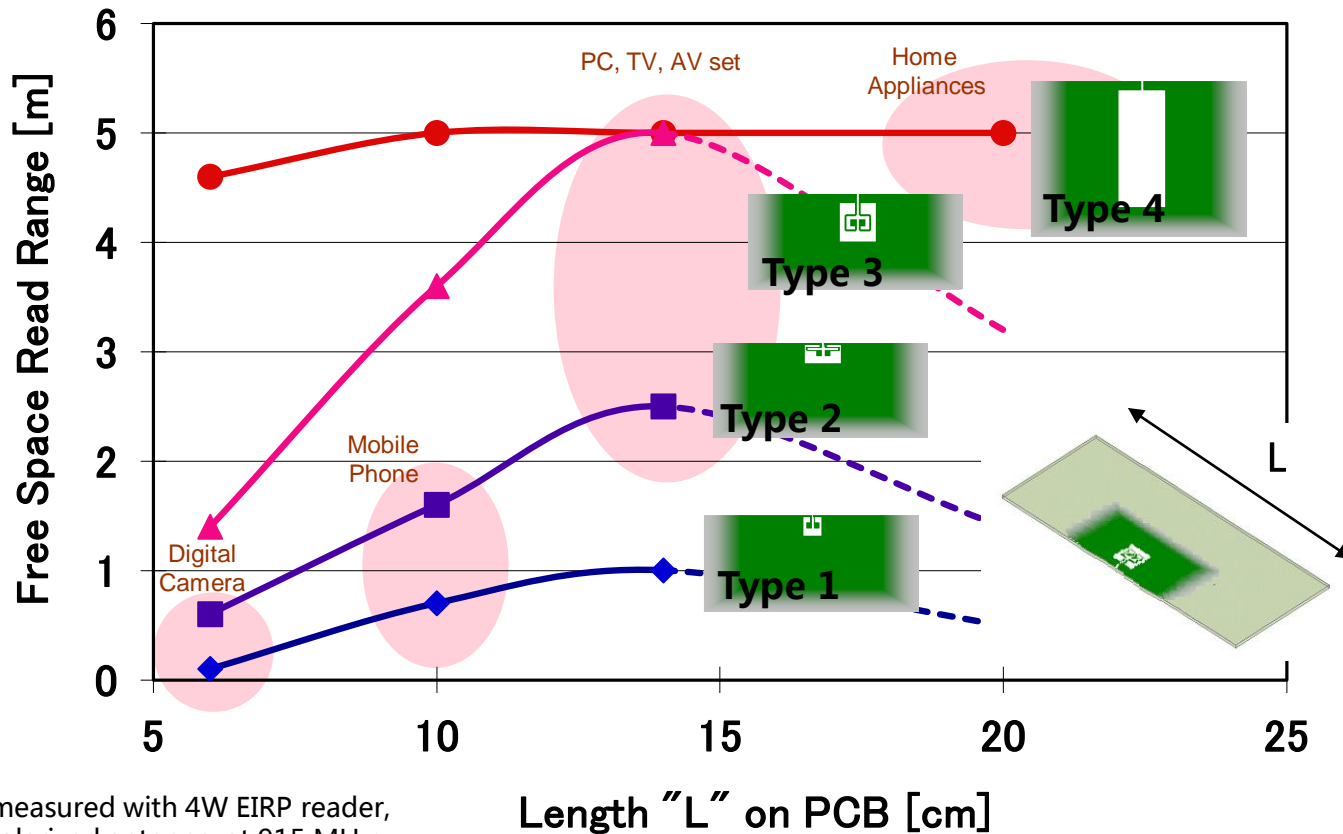
- ✓ 基于PCB的空间与读写距离选择设计
- ✓ 仅需很小的空间



 http://www.murata.com/products/rfid/tech_guide/index.html

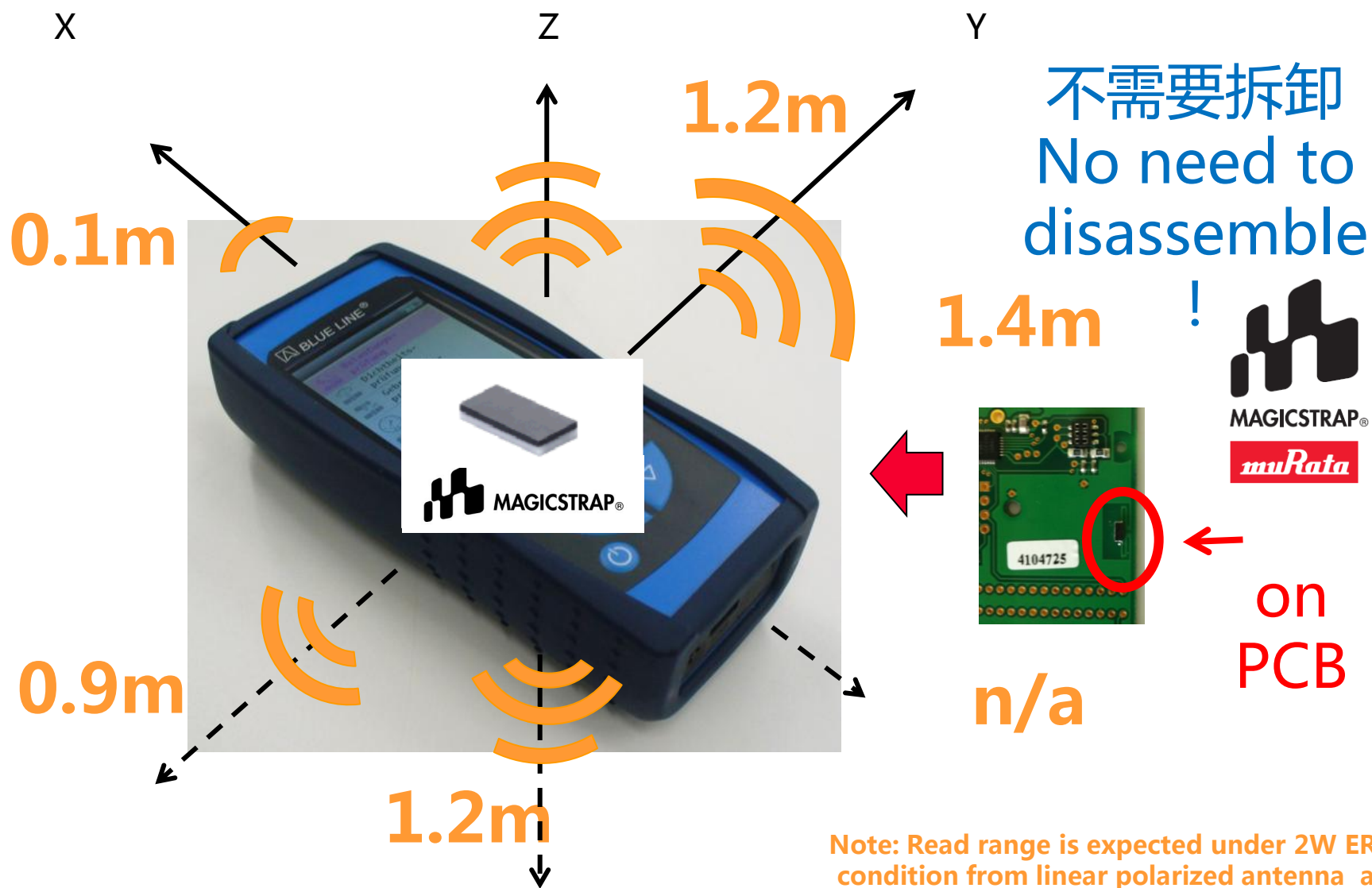
可预测的可读范围 Predictable Read Range

- ✓ 读写距离取决于Type和PCB有效接地面积
- ✓ Read range depends on type and length of PCB GND plane available.



Note: distances measured with 4W EIRP reader,
6dBi circularly polarized antenna, at 915 MHz;
MAGICSTRAP® using NXP G2XL/M

组装后的可读范围 Read range through plastic case



Note: Read range is expected under 2W ERP condition from linear polarized antenna at 865MHz.

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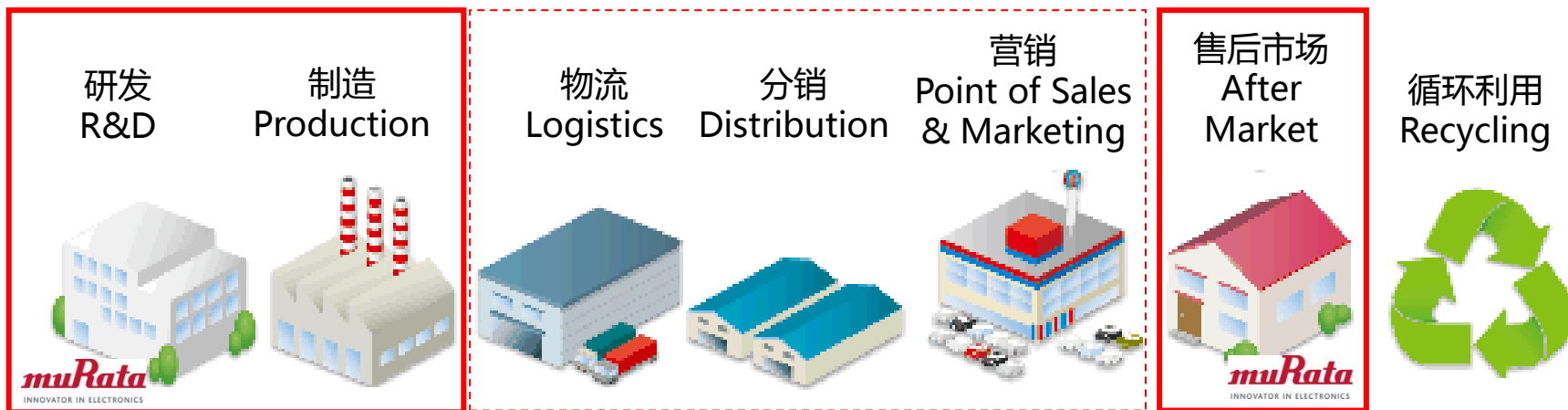
适用于各种PCB For a Variety of PCBs

- ✓ IT : 电脑, 数据服务器, 调制解调器, 手机
 - IT : PC, data server, modem, mobile phone
- ✓ 车载 : 仪表板, 音频设备
 - Automotive : Instrument panel, audio set
- ✓ 工业 : 变频器, PLC
 - Industry : Inverter, PLC
- ✓ 家用电器
 - Home appliances
- ✓ 娱乐
 - Amusement



MAGICSTRAP®的应用范围

Usage example of MAGICSTRAP®



工厂线
Production line

将来的发展??
In the future??

售后市场
After Market



客户应用案例

Use case at a customer

UHF RFID in Electronics

Use Cases of SYSTRONIK



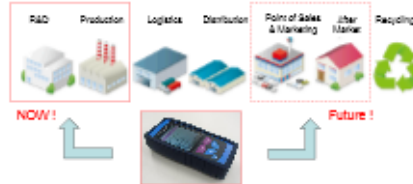
Before



Printed Serial Number on sticker

- Fact:**
- Printed serial number on sticker for traceability
 - In IC1 (in circuit test), serial number was written into memory of controller, by connecting device to IC and then manually typing into memory
- Problems:**
- Human errors
 - Sticker lost or unreadable
 - application of sticker only at end of ICOSA process (reduced traceability data)

Use case of Systronik



- OBM with own production
- Production partially by subcontractor
- BAU: 10 – 50k pcs
- Closed loop (until now) – RFID only used in premises of OBM

After



MAGICSTRAP on PCB

- Today:**
- Magicstrap on PCB
 - IC linked to components in placing process
 - Write calibration data in user memory of IC
- Benefits:**
- Advanced traceability
 - Calibration data available off-line and reusable
 - No more human errors

S2600 Blue Line Series



- Product:
 - Portable Gas Sensor Tightness Checker
 - for regular heating systems check in private houses

Read Range



Screen shot of reader soft



Conclusion



- All use cases primarily located in production
- Subcontractor using even without selling PCB for higher price to end customer
- Further extension of RFID use already planned
- Step by step evolution
- ROI already through improvements in this step of value chain



And this is all just the beginning...



http://www.murata.com/products/rfid/tw/pdf/Magicstrap_RFID_Use_Case_Systronik_1_1.pdf

客户应用案例

Use case at a customer

Cisco-Jabil have been using MAGICSTRAP® for WIP control.
<http://www.rfidjournal.com/article/articleview/9550/1/1/>

RFID JOURNAL

See How We Innovate. **Impinj**
Click to find out more

Home Aerospace Defense CPG Health Care Logistics **Manufacturing** Packaging Pharma Retail

Home / Operations / IT Infrastructure / Manufacturing

MANUFACTURING NEWS Text size: T T T

Electronics Factory Uses RFID to Manage Assembly of Cisco Circuit Boards

The system, which has improved production efficiency, is the result of a combined effort between Cisco Systems and Jabil, the company that assembles its products.

By Claire S.

May 25, 2010
radio frequ
boards as
Systems. A
supply cha
manager, f
process by
companies

In 2008, a
to store da
frequency
boards. Th

as a product's board ID, release version and test results, during the design stage. Jabil attached a **Murata MagicStrap RFID tag** (designed specifically for mounting on PCBs) to a copper-free zone near the circuit board's edge, and coupled it to the board's ground plane. An outside vendor provided software and systems-integration services for the RFID deployment.

- 效率提高了80%
- 识别和解决瓶颈流程
- 避免手动扫描条形码
- 生产远程监控进展
- 可维修与循环利用

What's the value of knowing...
...what's happening?
...what's missing?
...where things are?

Savi
Learn how today's Savi helps you keep track of things that matter

ePix RFID
SD-670 CLASS 2.0

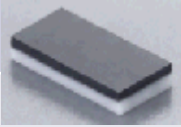
THE LOW-COST SOLUTION TO FIELD PATTERN TESTING AND INSTALLATION

SENDING IT YOUR WAY

MAGICSTRAP®的三个内存范围

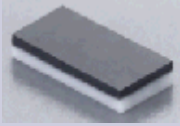
3 memory areas of MAGICSTRAP®



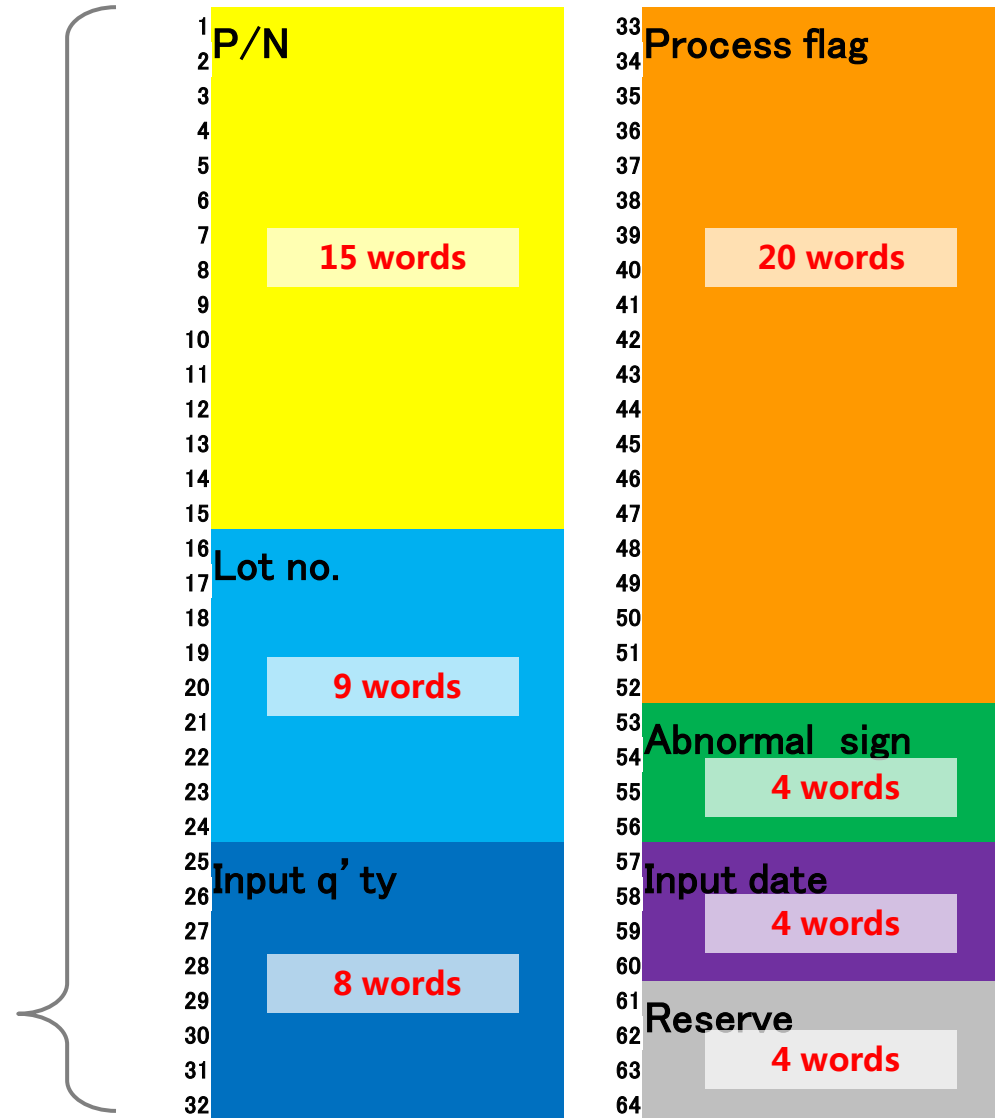
P/N 1		LXMS31ACNA-009/010/011/012	LXMS31ACMD-141/142/143/144	内存类型 Memory Type	内部信息 Information Inside	字数 Number of words by ASCII
Appearance			(865~955MHz)			
Frequency						
Standard	EPC global C1G2 , ISO/IEC18000-6 type-C					
1	TID/UID memory	64 bits	96 bits	ROM	Unique ID	64bits shows 18,446,744,073,709,551,616 kinds of ID.
2	User memory	512 bits		RAM	自己决定	64 Words
3	EPC Memory	240 bits	128 bits	RAM	EPC code	30/16 words
	IC	NXP G2XM	Impinj Monza4QT			

内存为512位的应用案例

Use case of user memory 512 bits

P/N	LXMS31ACNA-009/010/011/01 2	LXMS31ACMD-141/142/143/14 4
Appearance		
Frequency	UHF (865~955MHz)	
Standard	EPC global C1G2 , ISO/IEC18000-6 type-C	
TID / UID memory	TID 64 bits	TID 96 bits
User memory	512 bits	
EPC memory	240 bits	128 bits
IC	NXP G2XM	Impinj Monza4QT

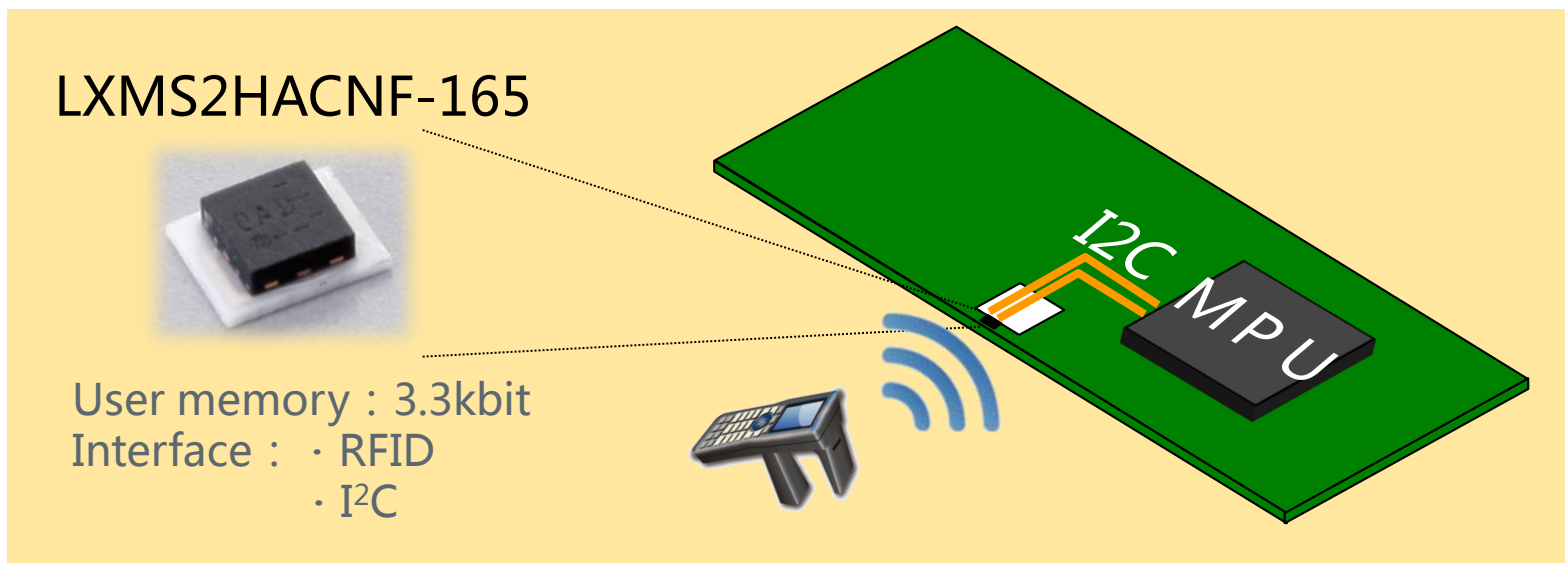
ASCII codes **64 words**



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MAGICSTRAP®与I²C接口

MAGICSTRAP® with I²C interface



RFID reader writer



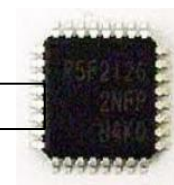
Read
Write

Antenna

User memory I²C i/f MPU



Read
Write



- 1) **用I²C 链接MCU和MAGICSTRAP®的内存**
MPU can access user memory of MAGICSTRAP® via I²C i/f.
- 2) **RFID 读写器也会链接MAGICSTRAP®的内存**
RFID reader writer can access the same memory with RFID.

MAGICSTRAP® 与 I2C 接口

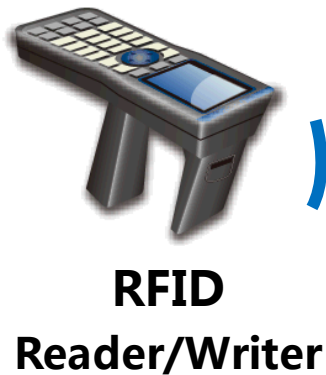
MAGICSTRAP® with I2C interface

无线设置、数据读取、故障记录

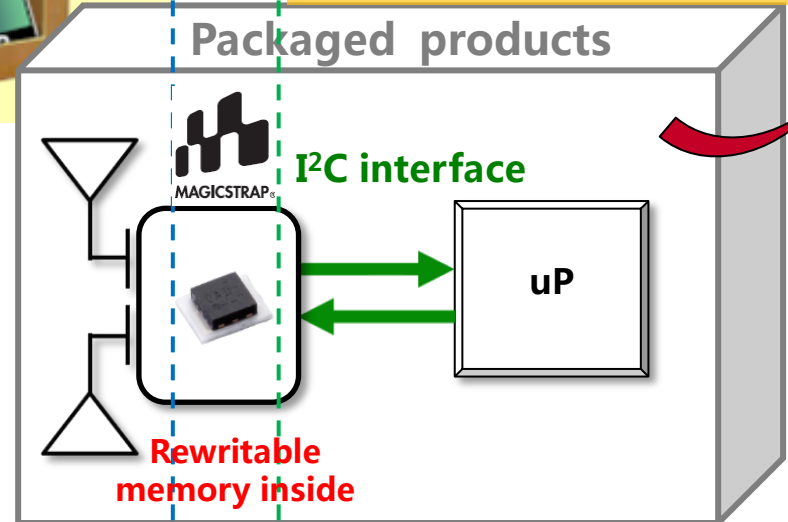
For wireless setting, data logging, failure recording

Fill in "dip switch setting" when products are powered-off in carton box.

Apply "dip switch setting" when products are powered-on.



Power supply
Command & data



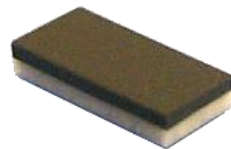
Wireless

**Bi-directional
Communication**

Wired

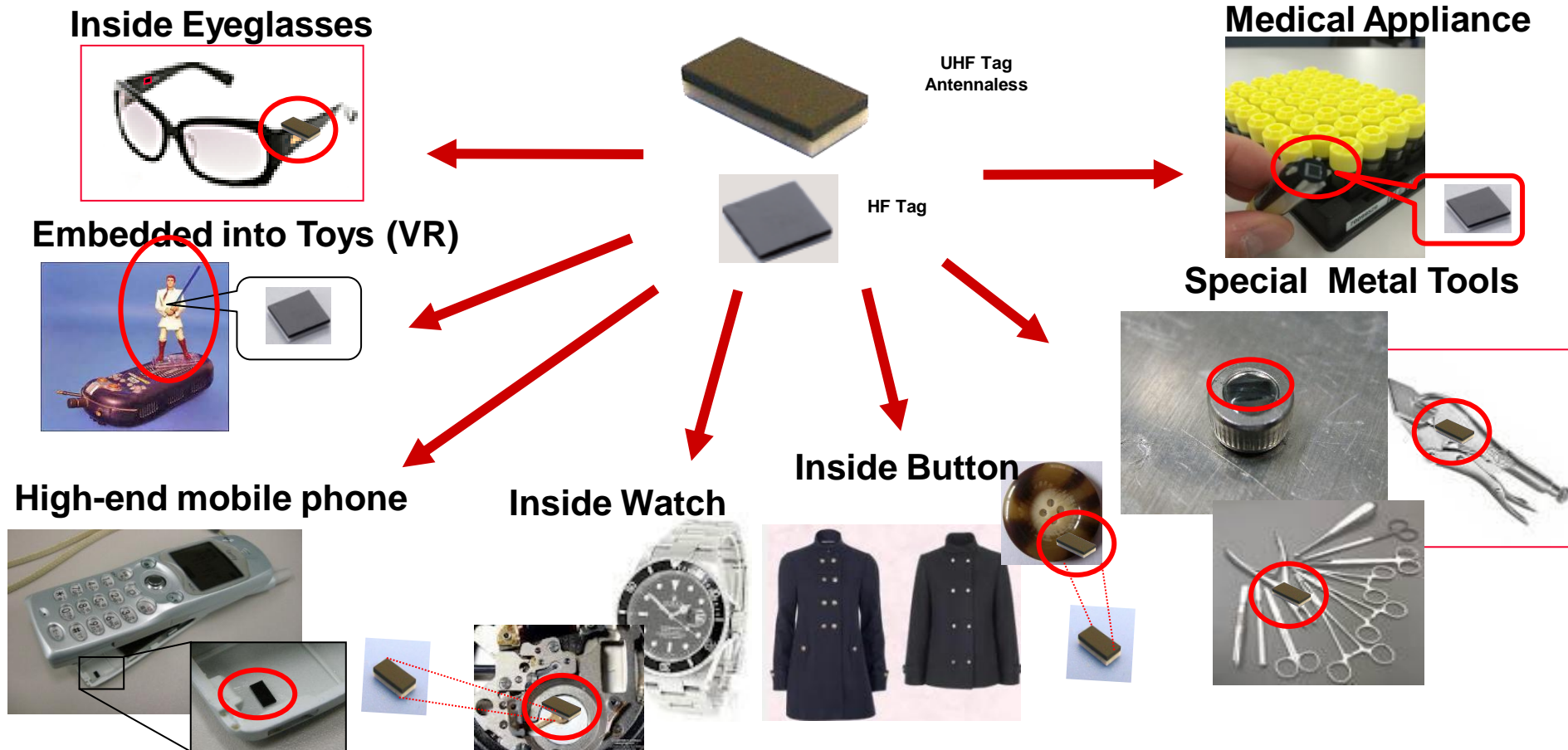
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- MAGICSTRAP[®] is a RFID related device.
- Utilizing Murata ceramic technology, it realizes the smaller size of device itself and antenna.
- It can use GND of PCB as antenna. PCB can be RFID tag if we put MAGICSTRAP[®] on it !
- Best RFID solution for electronic devices with PCB.



近距离 (无需天线) 读取 (UHF and HF) Near Field (Antennaless) Reading(UHF and HF)

UHF and HF Tag Embedded into items for Anti-counterfeit / asset management purpose (for near field 5mm~50mm reading distance)



村田的官网信息

Information on Murata web site

产品系列

Product Pickup



规格书

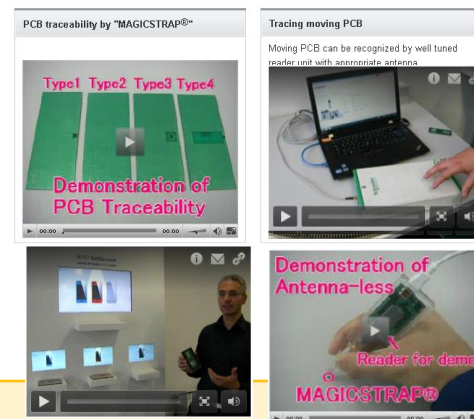
Data Sheets

UHF MAGICSTRAP® 3216 size

- UHF MAGICSTRAP® 3216 size Data Sheet (PDF: 280KB) UPDATE Nov, 2012
- UHF MAGICSTRAP® 3216 size Application Notes (PDF: 580KB) UPDATE Nov, 2012
- UHF MAGICSTRAP® 3216 size for antenna less use (PDF: 330KB) UPDATE Nov, 2012

视频

Videos



技术文章

Technical Articles



合作伙伴

Partners



MAGICSTRAP® Tutorial

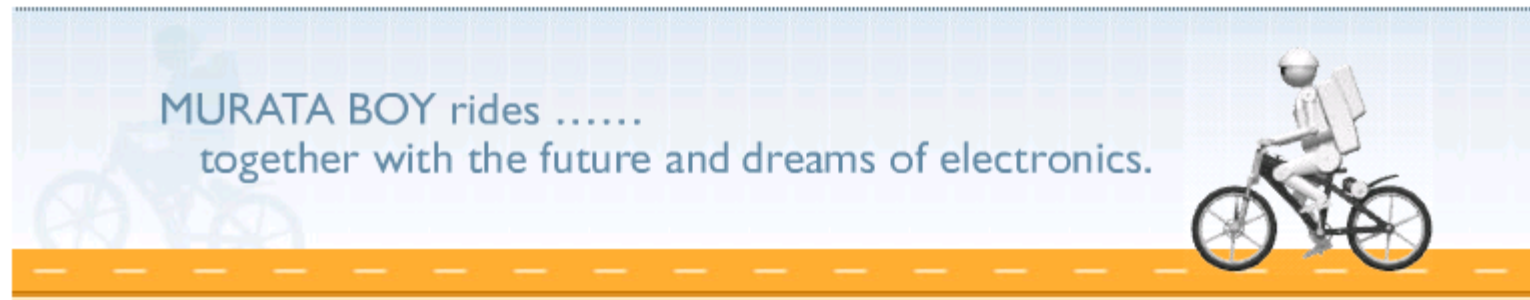


➔ Link to MEA web site



<http://www.murata.com/products/rfid/index.html>

Take a R(F)IDe with me...



<http://www.murata.com/products/rfid/index.html>