

CARTRIDGE CHIP REVOLUTION

ASiC™ Smartchips™

POWERED BY U.I. Technologies



CARTRIDGE CHIP REVOLUTION INTRODUCTION TO ASICS™

- **CIRCUITS**
 - ✓ *Definitions*
 - ✓ *Developments*
- **TRADITIONAL CIRCUITS VS ASICS™**
 - ✓ *Construction*
 - ✓ *Features*
- **ASICS™**
 - ✓ *Advantages*
 - ✓ *Benefits*
- **Q & A**



CARTRIDGE CHIP REVOLUTION DEFINITIONS

- **INTEGRATED CIRCUITS (IC)**

- ✓ *Miniaturized circuits to perform specific functions*
- ✓ *Combined functions reduce components and board size*
- ✓ *Combinations of these provide desired functions*



- **SURFACE MOUNT TECHNOLOGY (SMT)**

- ✓ *Components are mounted directly to the surface of the circuit board*
- ✓ *Provides space and cost savings*
- ✓ *Allows greater use of ICs for more complexity in smaller space*

- **APPLICATION SPECIFIC INTEGRATED CIRCUITS**

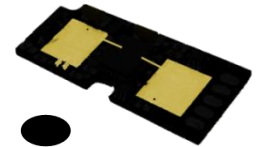
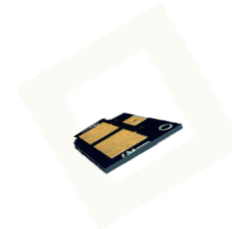
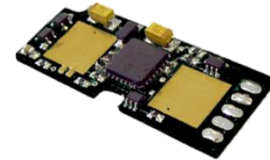
- ✓ *Series of combined ICs designed on microscopic scale*
- ✓ *Functions built directly into circuit as hardware*



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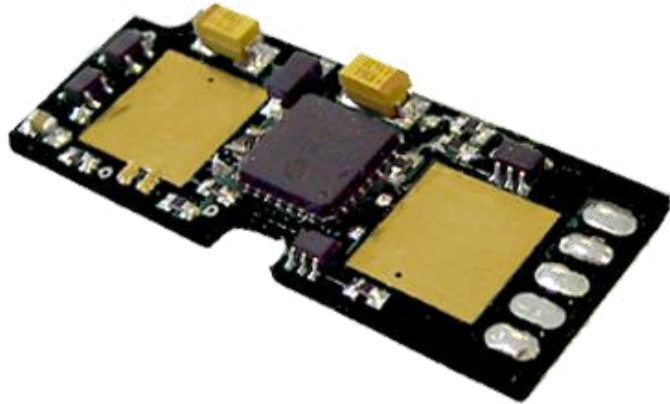
CARTRIDGE CHIP REVOLUTION CIRCUIT DEVELOPMENTS

- **EARLY SOLUTIONS**
 - ✓ *Discrete components hard wired to circuit board*
 - ✓ *Basic function, simple circuit*
 - ✓ *Size not a premium*
- **INCREASED SOPHISTICATION**
 - ✓ *Complex circuits required for functionality*
 - ✓ *Space and board size becoming restricted*
 - ✓ *Use of Surface Mount (SMT) to manage size*
- **STEPPING UP TO THE CHALLENGE**
 - ✓ *Matching OEM size and performance constraints*
 - ✓ *Reducing cost and increasing reliability*
 - ✓ *Using ASICs*

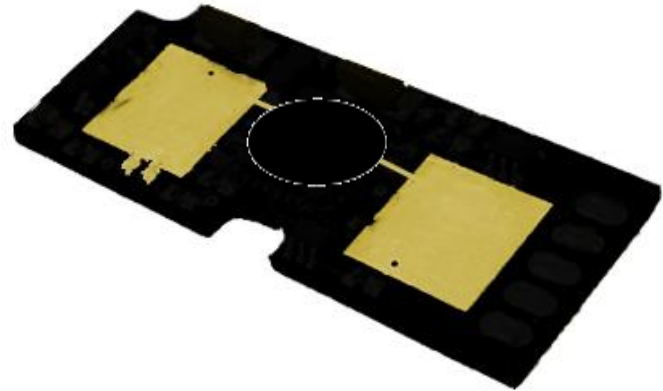


CARTRIDGE CHIP REVOLUTION VISUAL COMPARISON

TYPICAL SMT BOARD

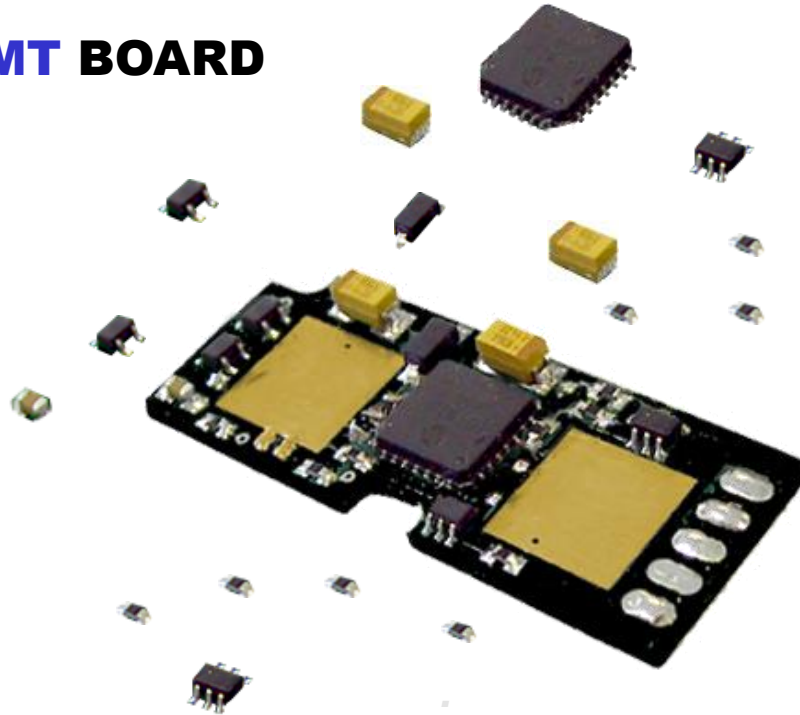


TYPICAL ASiC™ BOARD



CARTRIDGE CHIP REVOLUTION SMT BOARDS

TYPICAL SMT BOARD



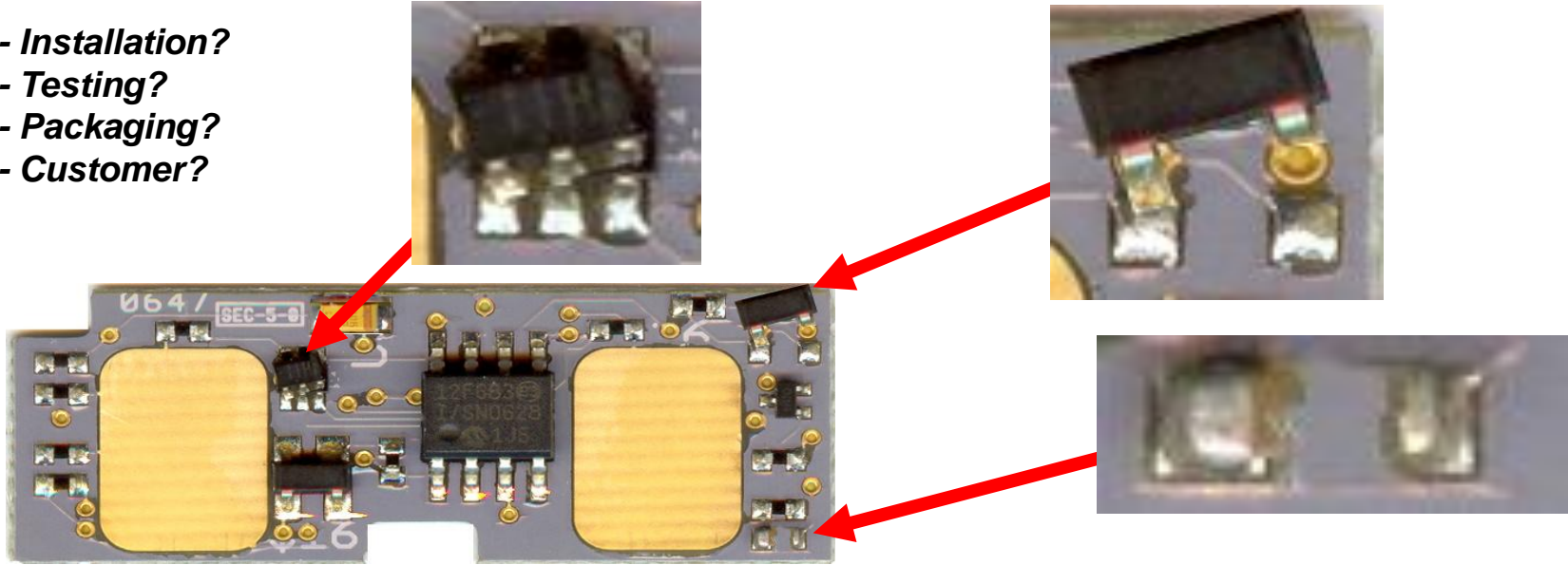
Components

1
1
1
1
1
1
1
1
1
1
1
1
1
1
1

16

CARTRIDGE CHIP REVOLUTION SMT BOARDS

- Installation?
- Testing?
- Packaging?
- Customer?



**80% OF ALL HP CHIP RETURNS ARE DUE TO PHYSICAL DAMAGE
IMPROPER HANDLING**



CARTRIDGE CHIP REVOLUTION SMT BOARDS

- **ISSUES WITH TRADITIONAL BOARDS**
 1. *Damaged when handling or installing*
 - ✓ *Flexing creates microscopic cracks that later fail*
 - ✓ *Exposed parts can be easily damaged*
 2. *Protruding parts (or thicker board assembly)*
 - ✓ *Parts breakage*
 - ✓ *Board damage*
 3. *Reliability*
 - ✓ *More parts = greater tolerance buildup and failures*
 - ✓ *More solder joints = more points of failure origin*
 4. *Cost*
 - ✓ *More parts = more cost*
 - ✓ *Installation cost per part*



CARTRIDGE CHIP REVOLUTION ASiC™ BOARDS

TYPICAL ASiC™ BOARD



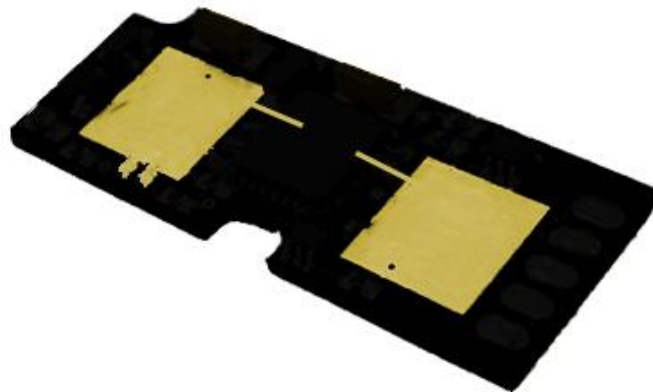
• PROTECTIVE CAP



• ASiC™ CHIP

Components

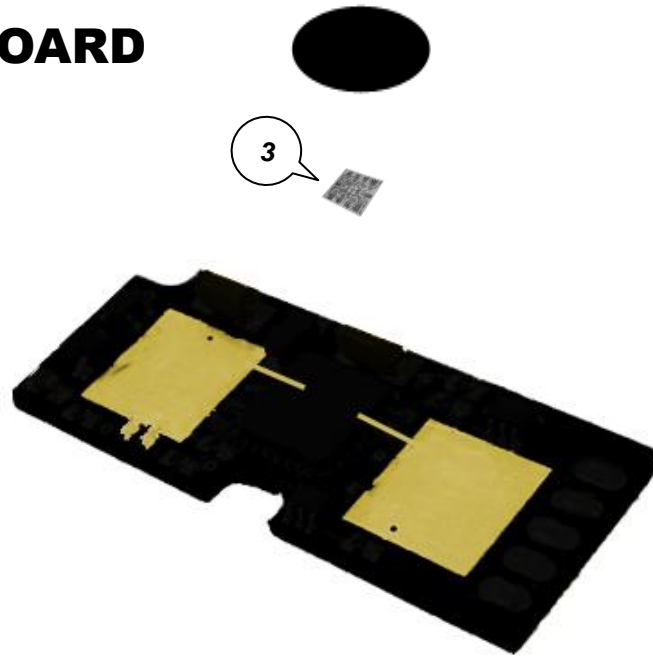
$\frac{1}{1}$



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CARTRIDGE CHIP REVOLUTION ASIC™ BOARDS

TYPICAL **ASiC™** BOARD



Solder Joints

$$\frac{3}{3}$$

CARTRIDGE CHIP REVOLUTION ASICTM

- **ASICTM ADVANTAGES***
 - ✓ *Reduced board space*
 - ✓ *Fewer pins on circuit board*
 - ✓ *Reduced power consumption*
 - ✓ *Reduced heat*
 - ✓ *Lower costs*
 - ✓ *Improved performance*
 - ✓ *Improved testability*
 - ✓ *Enhanced reliability*
 - ✓ *Proprietary design implementation*

* - *Courtesy, NASA*



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CARTRIDGE CHIP REVOLUTION SMT RELIABILITY

NON-ASIC, CONVENTIONAL SURFACE MOUNT BOARD					
(Reference) NON-ASIC	(Failure Rate)	(PFTA)	(Cost)	(Section)	(Part)
C1	0.0610705	0	0	Capacitors	Capacitors
DIODE1	0.0006057	0	0	Discrete Semiconductors	Diodes, Low Frequency
MMBT	0.0025048	0	0	Discrete Semiconductors	Transistors, Low Frequency, SI FET
PIC683	2.9748133	0	0	Microcircuits	VHSIC/VHSIC Like
R1	0.0125825	0	0	Resistors	Resistors
R2	0.0125825	0	0	Resistors	Resistors
R3	0.0125825	0	0	Resistors	Resistors
R4	0.0125825	0	0	Resistors	Resistors
R5	0.0125825	0	0	Resistors	Resistors
R6	0.0125825	0	0	Resistors	Resistors
R7	0.0125825	0	0	Resistors	Resistors
R8	0.0125825	0	0	Resistors	Resistors
R9	0.0125825	0	0	Resistors	Resistors
TRANS1	0.0025048	0	0	Discrete Semiconductors	Transistors, Low Frequency, SI FET
The number of components = 14					
MTBF Subtotal = 316983.172251 Hours					
PFTA Subtotal = CUTSET					
FIT Subtotal = 3.1547416					
COST Subtotal = 0					



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CARTRIDGE CHIP REVOLUTION

ASIC™ RELIABILITY

ASIC™BOARD					
(Reference) ASIC	(Failure Rate)	(PFTA)	(Cost)	(Section)	(Part)
ASIC	0.0001122	0	0	Microcircuits	Gate/Logic Arrays and Microprocessors
The number of components = 1					
MTBF Subtotal = 891265971.48 Hours					
PFTA Subtotal = 0					
FIT Subtotal = 0.0001122					
COST Subtotal = 0					

FAILURES IN TIME – (FIT)*

SMT: 3.1547416

ASIC™: .0001122

*** - RELATIVE EXAMPLE**



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CARTRIDGE CHIP REVOLUTION

ASIC™ BENEFITS

1. DURABILITY

- ✓ *Single component board*
- ✓ *Increased production efficiency*
- ✓ *No damage if flexed*
- ✓ *No damage in handling*

2. EXACT OEM STYLE

- ✓ *No protruding parts*
- ✓ *Low profile*
- ✓ *Exact fit*

3. GREATER RELIABILITY

- ✓ *Fewer parts*
- ✓ *Fewer solder joints*
- ✓ *Aero-space quality*
- ✓ *Less tolerance buildup*

4. ECONOMICS

- ✓ *Fewer rejects*
- ✓ *Fewer field failures*
- ✓ *Fewer returns*
- ✓ *Lower cost*

5. ENVIRONMENTALLY FRIENDLY

- ✓ *Minimum material waste*
- ✓ *Recyclable*



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CARTRIDGE CHIP REVOLUTION ASIC™ BOARDS

- **WHAT THIS MEANS TO YOU:**

- 1. HIGHER MARGINS**

- ✓ *Lower up-front material costs*
- ✓ *Fewer rejects in production*
- ✓ *Reduced labor costs for replacing and retesting*
- ✓ *Lower overall production costs*
- ✓ *Discounts for recycling*

- 2. IMPROVED CUSTOMER RELATIONS**

- ✓ *Reduction in failures*
- ✓ *Lower return rates*
- ✓ *Higher customer satisfaction*
- ✓ *Repeat sales*
- ✓ *Environmentally sound*



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Q & A



ASiC™ PROCESS



CARTRIDGE CHIPS ASIC™ PROCESS



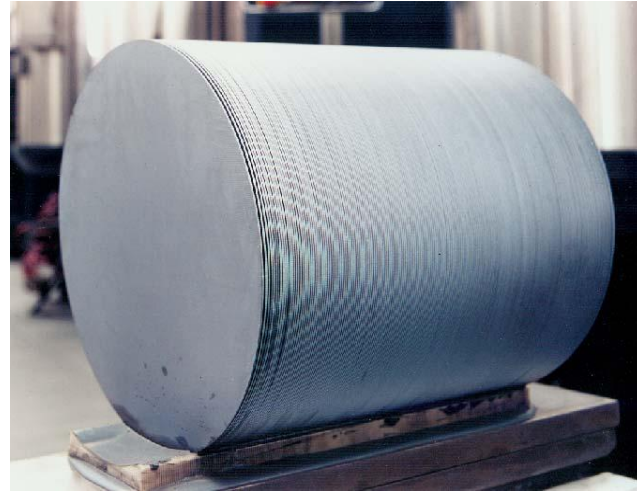
SINGLE CRYSTAL, 100% PURE SILICONE INGOT

MACHINED INGOT IS SLICED



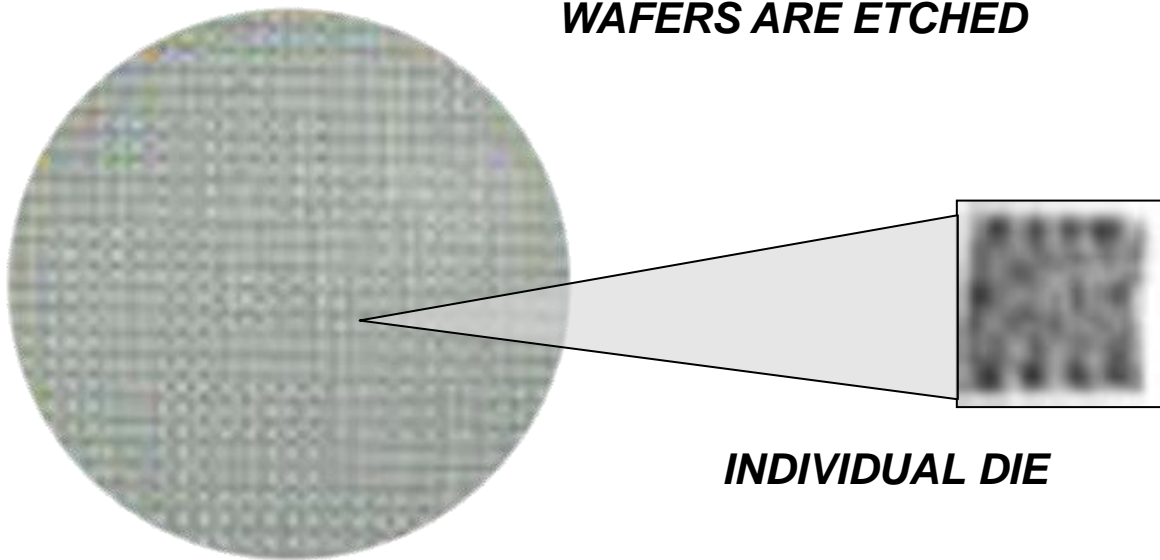
CARTRIDGE CHIPS ASIC™ PROCESS

WAFERS ARE POLISHED AND COATED



CARTRIDGE CHIPS ASIC™ PROCESS

WAFERS ARE ETCHED



INDIVIDUAL DIE



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