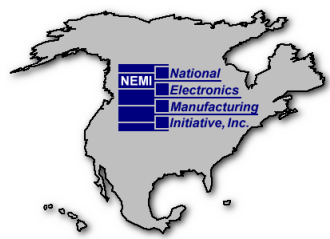


# **NEMI Component Supply Chain Readiness Project**

**Ty Bolenbaugh (Intel), Chair - Alan Ater (Sanmina-SCI), Co-Chair**



NEMI Council Meeting  
September 15, 2004  
NEMI Headquarters – Herndon, Virginia



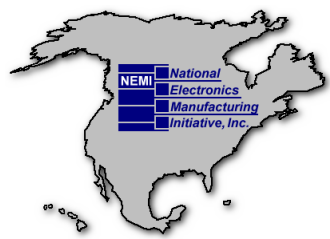
## Background . . .

---

**RoHS compliance and increased lead free processing temperatures are impacting material selection for many board mounted components.**

**While most component manufacturers are actively preparing, many are lagging due to lack of formal compliance definitions and product demand.**

*Connect with and Strengthen your Supply Chain*

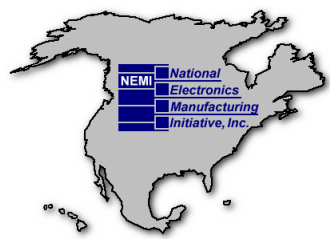


## Objective . . .

---

**The objective of this team  
is to assess and influence readiness  
of the component supply chain  
to support RoHS product conversions.**

*Connect with and Strengthen your Supply Chain*



# Project Scope . . .

---

## **Scope is:**

- **Both RoHS content compliance and lead-free process compatibility**
- **Both mainstream electronic and high reliability applications**
- **Board mounted components and PCB**

## **Scope is not:**

- **Lead-free assembly process**
- **Lead-free part identification**
- **Material Declaration**
- **Non-board mounted components, software or packaging**

*Connect with and Strengthen your Supply Chain*



# Primary Deliverables . . .

- **Define RoHS Materials Compliance Criteria:**
  - Lead <0.1% by weight at raw homogeneous material level
  - Cadmium <0.01% by weight at raw homogeneous material level
  - Hexavalent Chromium <0.01% by weight at raw homogeneous material level
  - Mercury - Not intentionally added
  - PBB & PBDE - Not intentionally added
  - Inquire which surface finish (matte Sn) is being used? BGA/lead frame? What's been done for Tin Whisker evaluation?

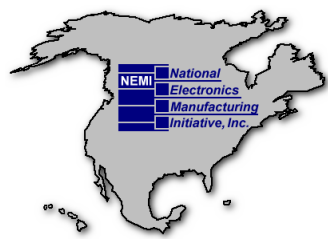
*Connect with and Strengthen your Supply Chain*



# Primary Deliverables . . .

- **Assess Lead-free Process Compatibility:**
  - Surface mount components compatible with size dependent peak temperatures defined in JEDEC J-STD-020
  - Components to be rated with same MSL levels as current SnPb products
  - Wave soldered components capable of surviving one pass 270°C solder bath for 5 seconds
  - Non-board mounted components do not have a temperature requirement
  - Solderability J-STD-002

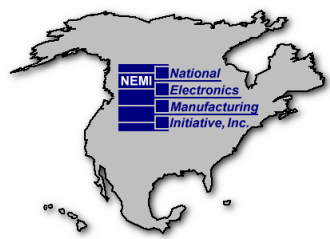
*Connect with and Strengthen your Supply Chain*



# Summary of Responses . . .

Type	# of Responses	Conversion			Temp Compatible			Plating												
		100% Compliance	90% Compliance	Dual SKU's	Yes	No	Sn/Bi Compatible Now	ImAg	ImSn	ImSp	Lf HASL	NiAu	NiPdAu	OSP	Other	Sa	SnAg	SnAgCu	SnCu	SnBi
					100% Crossover															
Active, Other	2	1	0	2	1	1	1	0	0	0	0	0	0	0	2	2	0	0	0	
IC	6	3	2	4	3	3	3	0	0	0	0	0	3	0	4	1	4	2	0	
Memory	2	1	0	2	1	1	1	0	0	0	0	0	1	0	2	0	2	0	0	
Oscillator	1	1	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	
Diode	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
FET	2	1	0	2	1	1	2	0	0	0	0	0	0	0	1	0	0	0	0	
Transistor	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
LED	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	

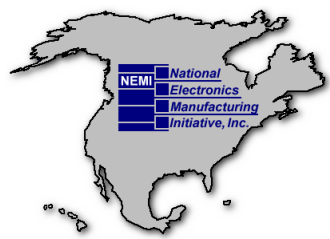
*Connect with and Strengthen your Supply Chain*



# Summary of Responses . . .

Type	# of Responses	RoHS Compliant	Conversion		Temp Compatible			Plating												
			100% Crossover	Dual SKU's	Yes	No	ImAg	ImSn	ImSp	Lf HASL	NiAu	NiPdAu	OSP	Other	Sn	SnAg	SnAgCu	SnCu	SnBi	
Filter	3	2	1	2	2	1	3	0	0	0	0	2	0	0	0	2	0	0	0	
Fuse	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	
Interconnect, Other	1	1	0	1	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0	
Interconnect, Pressfit	3	1	1	2	1	2	3	0	0	0	0	2	1	0	0	3	0	0	1	
Interconnect, SMT	4	1	1	3	1	3	3	0	0	0	0	1	1	0	0	4	0	2	1	1
Interconnect, THM	4	1	1	3	1	3	3	0	0	0	0	1	1	0	0	4	0	0	1	0

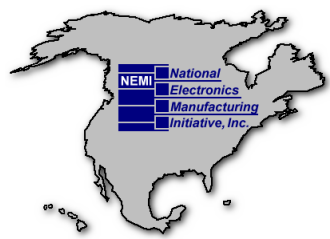
*Connect with and Strengthen your Supply Chain*



# Summary of Responses . . .

Type	# of Respondents	Conversion		Temp Compatible			Plating													
		RoHS Compliant	100% Crossover	Yes	No	Dual SKU's	ImAg	ImSn	ImSp	Lf	HASL	NiAu	NiPdAu	OSP	Other	Sn	SnAg	SnAgCu	SnCu	SnBi
		RoHS Compliant	100% Crossover	Yes	No															
Capacitor, Aluminum	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1
Capacitor, Ceramic	3	3	2	1	3	0	3	0	0	0	0	0	0	0	2	0	0	0	0	
Capacitor, Tantalum	2	2	2	0	2	0	2	0	0	0	0	0	0	0	1	0	0	0	0	
Inductor	4	3	2	2	2	2	2	0	0	0	0	0	0	0	2	0	1	1	0	
Magnetic/Ferrite Bead	3	1	0	3	1	2	2	0	0	0	0	0	0	0	2	0	0	1	0	
Crystal	1	1	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	

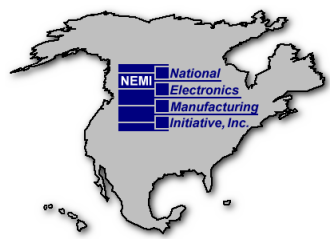
*Connect with and Strengthen your Supply Chain*



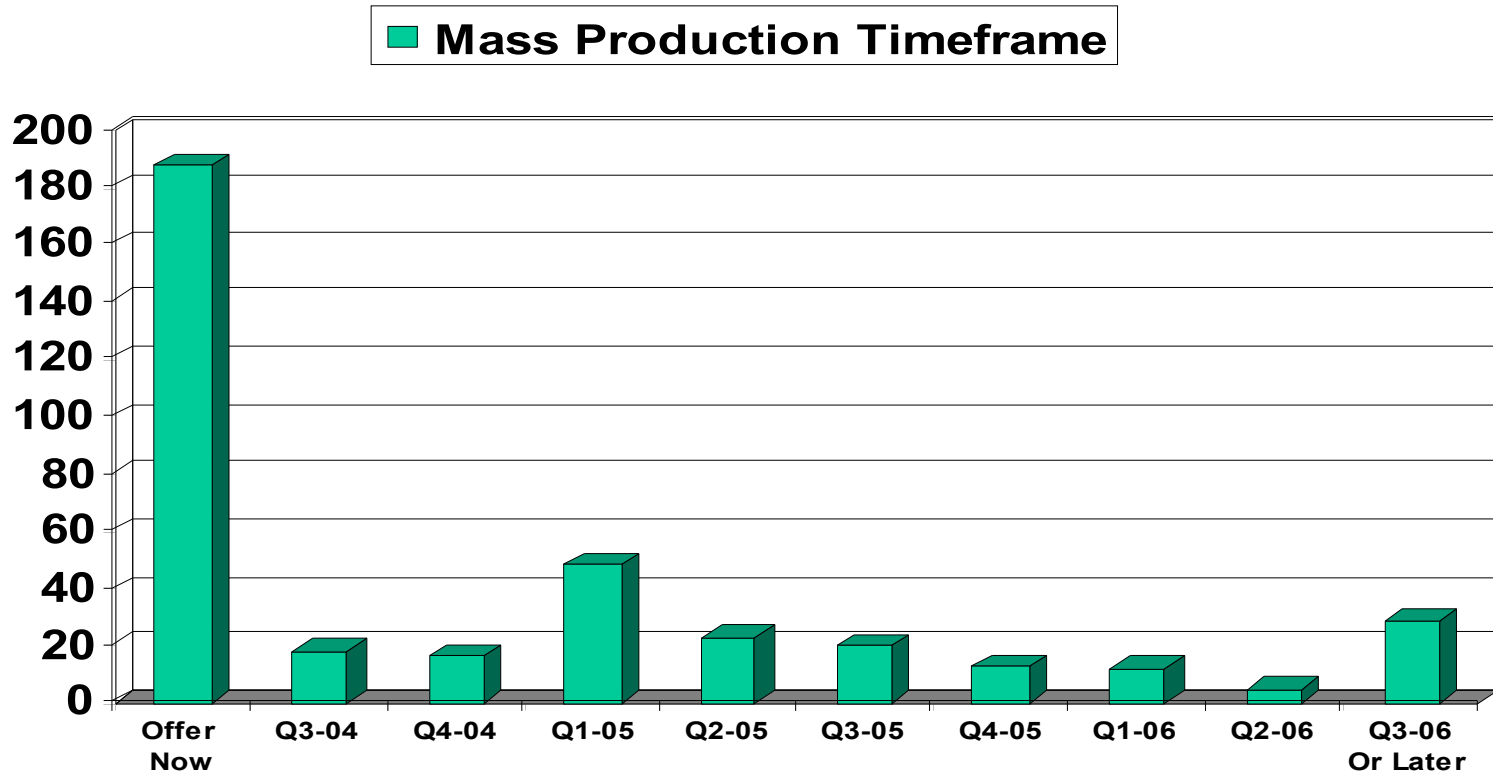
# Summary of Responses . . .

Type	# of Respondents	Conversion			Temp Compatible			Plating												
		RoHS Compliant	100% Crossover	Dual SKU's	Yes	No	Sn/Pb Compatible Now	Imm Ag	Imm Sn	Imm Sp	Lf HASL	NiAu	NiPdAu	OSP	Other	Sn	SnAg	SnAgCu	SnCu	SnBi
Passive, Other	2	2	2	0	2	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0
Resistor	3	3	1	2	2	1	2	0	0	0	0	0	0	2	0	0	0	0	0	
PCB, <12 Layer	1	1	1	0	1	0	1	1	0	1	0	1	0	0	0	0	0	0	0	
PCB, 12+ Layer	2	1	1	1	1	0	2	2	0	2	1	1	0	0	0	0	0	0	0	
PCB, Flex	2	1	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	
PCB, HDI Substrate	2	2	1	1	1	0	2	2	2	0	2	1	0	2	0	0	0	0	0	

*Connect with and Strengthen your Supply Chain*



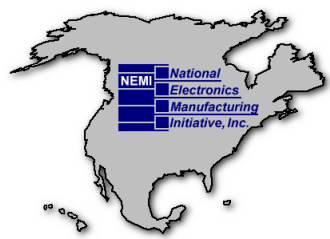
# Component Availability ...



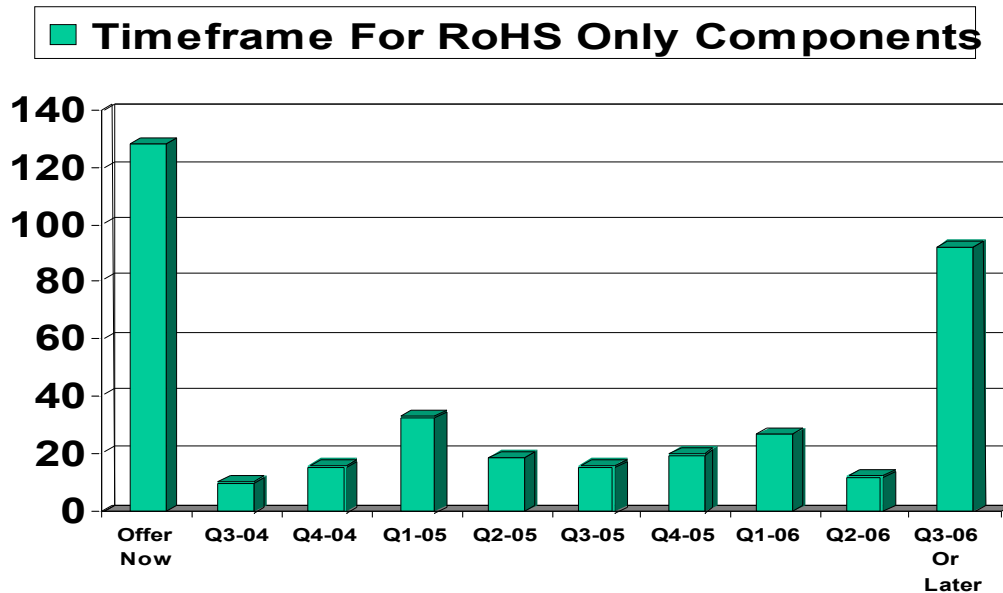
A significant number of components will be converted within the next two (2) quarters.

Majority of passive components are already offered in RoHS Compliant versions.

*Connect with and Strengthen your Supply Chain*



# Component Availability ...



Commodities indicating mid-to-late 2006 include  
Specialty Connectors, Linear & Logic Integrated Circuits

*Connect with and Strengthen your Supply Chain*

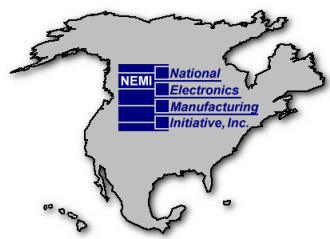


## Differentiation – RoHS Compliant vs. Non-Compliant

---

- **12 - Utilize Unique RoHS P/N's**
- **6 - Utilize On-Part Marking**
- **11 - Utilize On-Packaging Marking**
- **11 - Utilize Product Datasheet For RoHS ID**
  
- **Comments:**
  - Use of Date & Lot Codes
  - Many “Not Determined”
  - Resistance To The Use Of Unique Part Numbers
  - Marking “On-Part” As Size Permits

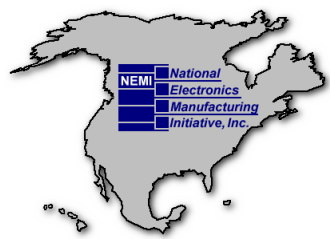
*Connect with and Strengthen your Supply Chain*



# Tin (Sn) Whisker Prevention . . .

- **8 - Using Diffusion Under Plate**
- **7 - Using Heat Treatment / Annealing**
- **4 - Other**
- **3 - N/A**
  
- **Comments:**
  - Hot Dip Tin
  - Evaluations In-Process
  - Internal Testing Shows “No Risk”
  - Nickel Under Plating
  - Tin thickness >7 microns

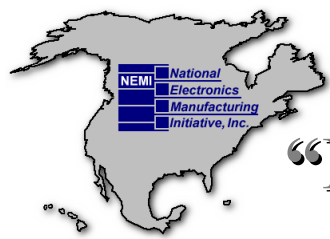
*Connect with and Strengthen your Supply Chain*



## Summary . . .

- **Responses From All Surveyed Commodities Except RF Devices**
- **Every Commodity Has At Least One Supplier Claiming To Be Currently Capable Of Meeting RoHS Compliance**
  - All other suppliers scheduled to be RoHS compliant by Q3'05
- **Conversion Plans Split Between 100% Conversion & Dual SKU Offerings**
- **Tin (Sn) Is The Primary Pb-Free Plating Selection**
- **Component Supplier & OEM Transitions Appear To Be Converging On Q2 / Q3 of 2005**

*Connect with and Strengthen your Supply Chain*

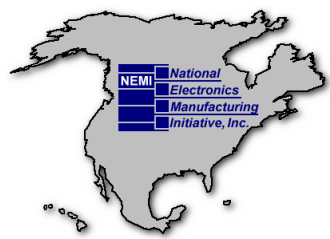


# “Laundry List” For RoHS Conversion . . .

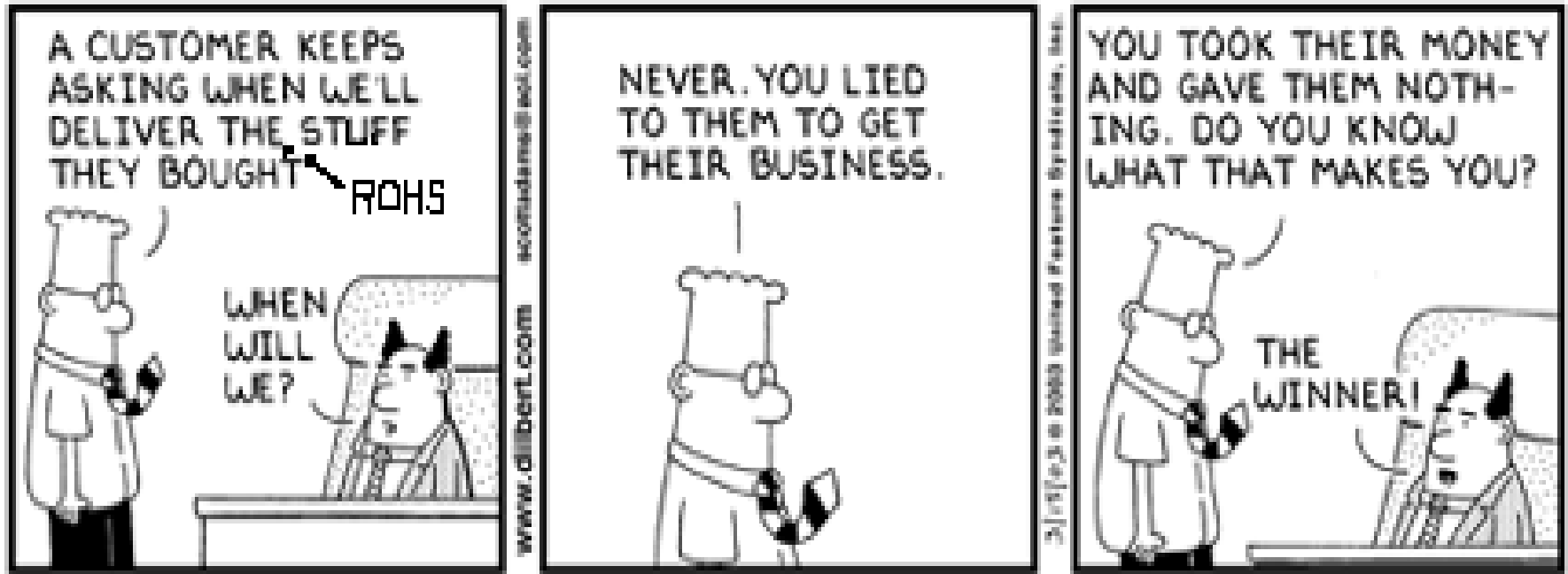
---

- **Secure Management Support**
  - Resource Requirements
  - Hidden Costs (Equipment, Systems, Material Costs, etc.)
- **Increase Communication & Awareness**
  - Impact To All Areas Of Organization
  - SOP’s, Training, BOM Conversions, Materials Identification
  - Establish Supplier Guidelines
- **Validate Transition Timing**
  - Manufacturing Readiness
  - OEM / Client Product Changeovers
  - Survey & Qualify Supply Base - “RoHS Approved”
- **Evaluate Business Requirements**
  - Legal Issues: Liability and Inventory Coverage
- **Posture For Change**
  - Realignment & Opportunities

*Connect with and Strengthen your Supply Chain*



# Next Steps?



- **Task Group Meeting October 27<sup>th</sup> To Determine Future Actions**

*Connect with and Strengthen your Supply Chain*