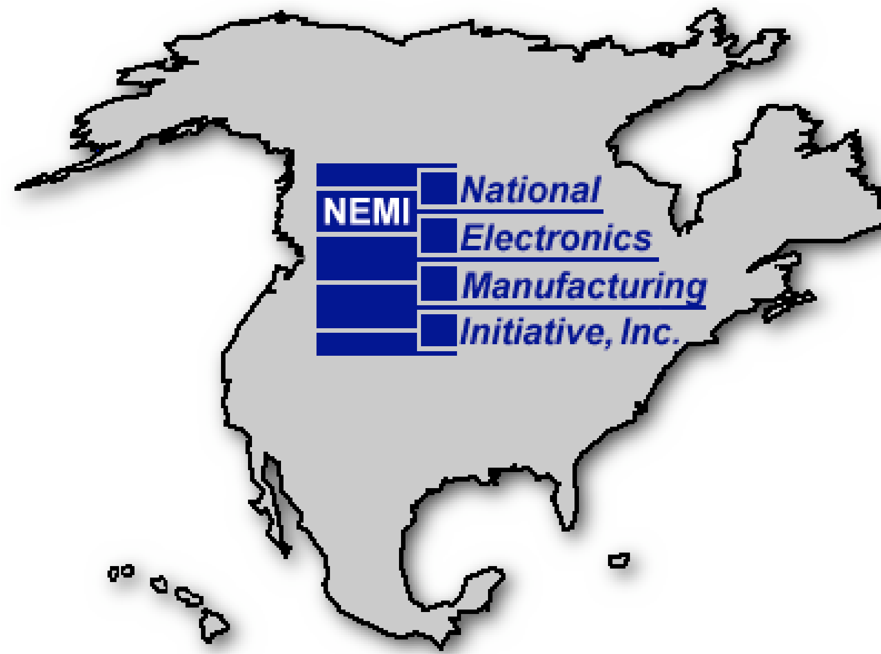
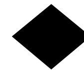
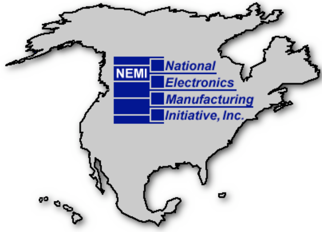



# Marking and Part Numbering Team
# NEMI RoHS Transition Task Group Forum
# APEX 2004
# February 2004

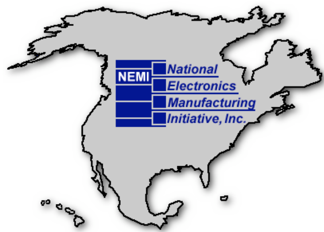


*Vivek Gupta, Intel*
*Alan Ater, Sanmina-SCI*



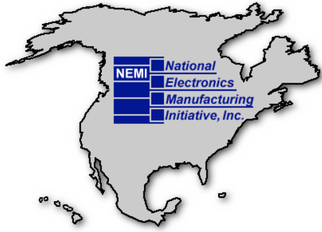

# Agenda

| | | |
|---|---|---|
| • Introductions | All | 5 min |
| • Team Deliverables and Process | Vivek Gupta | 5 min |
| • Pb-free Marking Review | Jack McCullen | 10 min |
| • Part Numbering Brainstorming | Vivek Gupta | 25 min |
| • Pb-free Vocabulary Brainstorming | Vivek Gupta | 20 min |
| • RoHS Marking Brainstorming | Alan Ater | 25 min |
| • Open Discussion | | 10 min |




# Meeting Objective

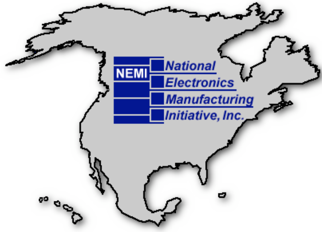
- **Discuss and improve initial Pb-free marking and part numbering proposals for further discussion in the team meetings**




# Brainstorming Process

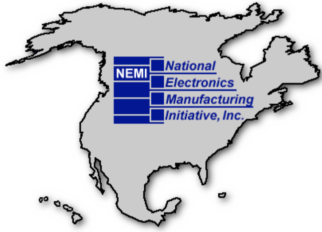
| | | |
|---|---|---|
| Problem Statement/ Proposal Details | 5 min | 1 slide |
| Round-robin collect Issues/ inputs | 10 min | |
| Modify Proposal | 5 min | |
| Summarize/ Next Steps | 5 min | |

Need a scribe, timekeeper, gatekeeper!




# Component and Board Marking Project – Overview

## Chair, Vivek Gupta, Intel Corporation
## Co-chair, Alan Ater, Sanmina Corporation

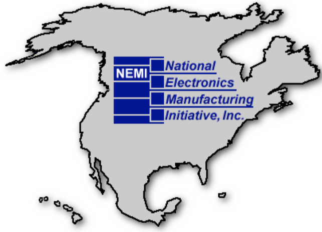



# Component and Board Marking Project

**Objective:**

**Develop a proposal for an industry accepted identification scheme for Pb-free parts**

- Pb-free component and board-marking standard by February 2004 (Primary Goal).
- RoHS compliant component and board-marking standard by mid-2004 (Secondary Goal).
- Part numbering guideline to manage Pb-free change management
- Pb-free vocabulary guideline

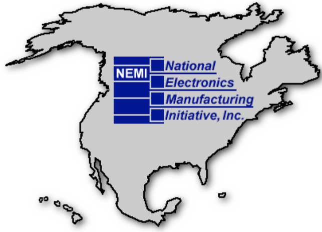





## Background

**One of the issues surrounding the transition of electronics industry to Pb-free assembly (RoHS compliant products) is the clear and consistent identification of components, boards and end products.**

- Several different Pb-free marking schemes are being used in the industry and are increasing with the proliferation of Pb-free manufacturing
- JEDEC marking proposal on the ballot since June, 2003 has not yet been approved yet
- An IPC Blue Ribbon group is reviewing the JEDEC specification to close gaps
- Soldertech-UK/ JEITA also have a labeling proposal



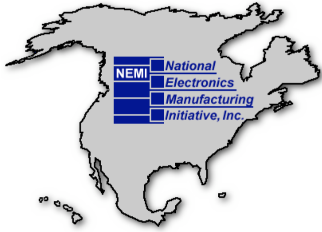



## Scope

Develop Recommendations For Common Industry Standards Related To Pb-Free Component and board Identification

- Labeling and Marking
  - Electronics Components, Cards & Motherboards (Feb 2004)
  - Raw Material AND Finished Product Forms (June 2004)
- Part Identification “Best Practices”
  - Part Number Nomenclatures & Change Management
  - Visual Identification

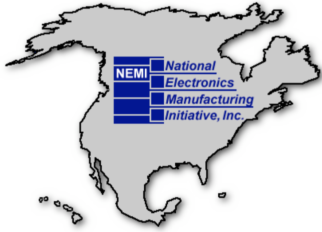
- Secondary Recommendation For a RoHS Compliant Standard
- Propose a “Pb-free” vocabulary




# Component and Board Marking Project

## Time Line

| | |
|---|---|
| • Current situation on marking schemes | Dec ’03 |
| • Define a minimum set of requirements | Jan ‘04 |
| • Recommendation for gap closing | Jan ‘04 |
| • Calibrate With NEMI Sub-Teams | Feb ’04 |
| • NEMI ECE TIG buy-in | Feb ’04 |
| • Publicize the standard – IPC, JEDEC | Mar ‘04 |
| • Part Identification Recommendations | May ’04 |
| • RoHS Compliance Roadmap Proposal | June ’04 |
| • Pb-free Vocabulary Final Proposal | June ’04 |



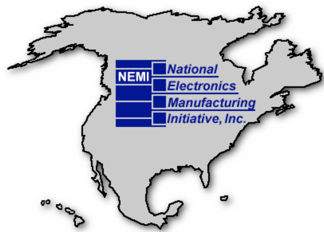

# JEDEC Component and Board Marking Spec
# - Components and Boards –

**Objective:**

- **Develop an industry standard for marking components and boards**

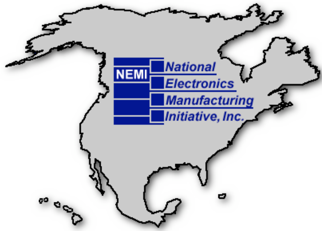
**Status**

- **Currently in JEDEC BOD Ballot process**

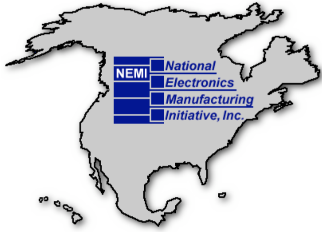



# Current Proposal

- **e1 – SnAgCu (not included in ‘e2’)**
- **e2 –Sn alloys with no Bi or Zn (excluding SnAgCu)**
- **e3 – Sn**
- **e4 – Preplated (ie. Ag, Au, NiPd, NiPdAu)**
- **e5 – SnZn, SnZnx (no Bi)**
- **e6 - contains Bi**
- **e7 - Low temperature alloy (<=150C containing In), but no Bi**




# Discussion



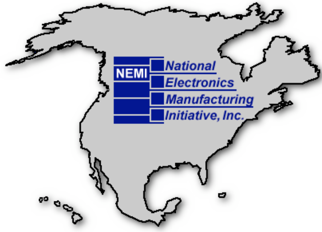

# Part Numbering Proposal

**Objective:**

- **Define a guideline for managing part numbers during the Pb-free transition phase**

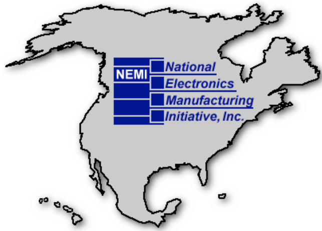
**Status**

- **Rev. 0 Proposal reviewed in a sub-team meeting**

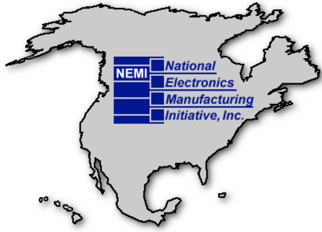



# Part Numbering Rev. 0 Proposal

- Issue new and/or unique part number (MPN) if:
  - The fit, form or function of the component or PCB is altered
    - E.g. the component or PCB Is NOT "backwards compatible".
- Follow current PCN practices
  - Changes from existing parts to lead-free documented by a PCN per JESD46-B
  - Discontinuation of existing parts/assemblies published per standard JESD48A
  - Manufacturers to provide a product roadmap to their customers indicating the planned changes, and timeframe for availability of lead-free products
  - Sample devices and qualification data available to customers prior to release of PCN or introduction of new product
- Exceptions to be negotiated between customer/ supplier




# Discussion



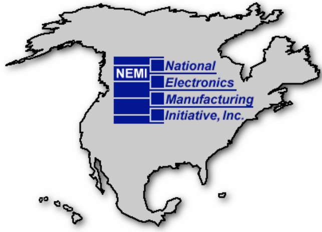

# Pb-free Vocabulary

**Objective:**

- **Develop a common terminology that can be used in the industry to improve communication**
- **Publish the terminology in an “Industry Dictionary of Terms” e.g. Rosettanet or JEDEC/ IPC documents**

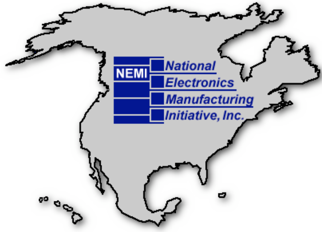
**Status**

- **Rev. 0 Proposal reviewed in Marking Team meeting**




# Vocabulary Problem Statement

- Implementation of Pb-free and RoHS compliant product is occurring in phases.
  - Solder paste, followed by 2nd level interconnect, 1st level interconnect and then high-end products and peripherals
- In the meanwhile, several terms are being used to describe these various stages
  - Pb-free, Pb-light, Green, RoHS ready, RoHS compliant, Pb-free compatible, Environmentally friendly, etc..
- This is creating a lot of confusion in the industry




# Vocabulary Initial Proposal

THREE DIFFERENT LEVELS OF LEAD-FREE READINESS

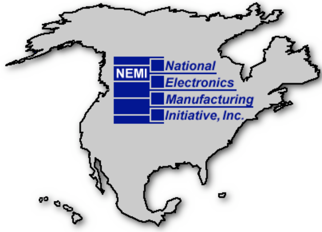
- Sn=Tin; Pb=Lead

- Pb-free SLI (second level interconnect)

  Components
  - J-Std-020 pre-conditioning
  - Leadframe finish or BGA balls are Pb-free

  Boards
  - Assembled using Pb-free solder paste

- Pb-Free
  - Pb is not used in components or Boards. Pb impurities meet the threshold levels established by the European Union.
- RoHS compliant Components & Boards
  - Pb and other banned materials contained in components and subsystems are covered under a Legislative Exemption (or Clarification)




# Discussion

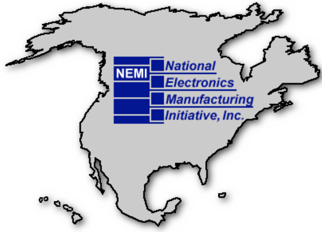
## Need

## Scope

## Approach

Develop a poster/ reference guide for common use by industry and legislation

## Definition of Next Steps



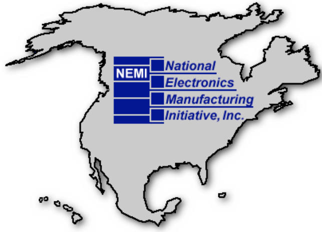

# RoHS Compliance Proposal

## Objective:

- Develop a proposal for an industry accepted scheme for identification of RoHS compliant component and board-marking standard by mid-2004
  - Supplement JEDEC marking spec by adding requirements for RoHS compliance
  - Identifying the stages of conversion

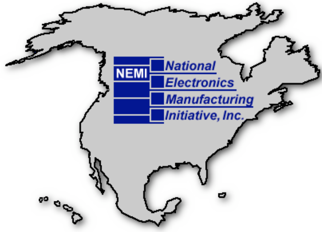
## Status

- Rev. 0 Proposal developed in a sub-team meeting



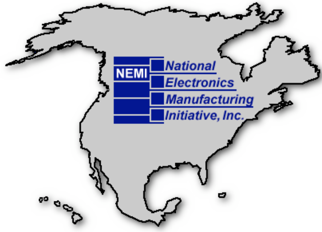

# Current Situation

- **Need to distinguish SnPb and Pb-Free during transition**
  - **Prevent product mixing in manufacturing / inventory**
  - **Identify differences in processing temperatures**
  - **Identify process compatibility**
- **Existing marking schemes are inconsistent**
  - **Multiple standard proposals exist (JEDEC, IPC, JEITA, etc.)**
  - **No standard covers all aspects of marking**
- **Need to create supplemental guidelines that will enhance these standards to cover RoHS compliance**
  - **Expand scope limited to include finished goods level marking or ID**
  - **Ensure a relatively simple marking scheme**
  - **Address "RoHS"Compliance**




# Issues with RoHS Compliance

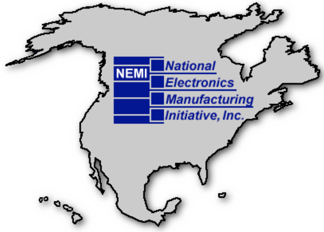
- Does RoHS = Pb/Hg/Cd etc. free?
- How do we define RoHS Compliance?
- Is there consistency in definition across multiple RoHS-like legislations (EU, China, California etc.)
- How would exemptions play into this –if one is taken away or added?
- How will it be interpreted consistently?
- Who will certify RoHS Compliance – self declaration/ stdd bodies?
- Would multiple RoHS bodies accept such certification?



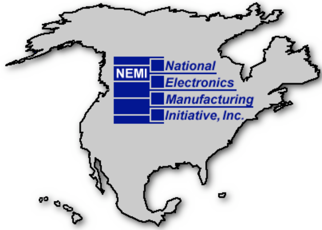

# RoHS Compliance Rev. 0 Proposal

- **Markings to indicate the following:**
  - **Component or PCB assembly is "RoHS compliant"**
  - **Component/PCB assy is "Pb-Free Compliant" - not "RoHS Compliant*"**
  - **Component or PCB assembly is "Pb-Free *Process* compatible"**
- **Facilitate a NEMI, JEDEC, JEITA, EMSF & IPC Blue Ribbon committees dialogue to develop compatible marking guidelines**
  - **Establish Uniform Solder Composition Codes**
    - **JEDEC "2nd Level Interconnect Category" equivalents to be created and crossed to JEITA "Solder Material Codes"**
  - **Simultaneous and/or interchangeable global use of JEDEC & JEITA Symbols**

***subsequent recommendation to be released after finalization of RoHS definitions.**




# Discussion



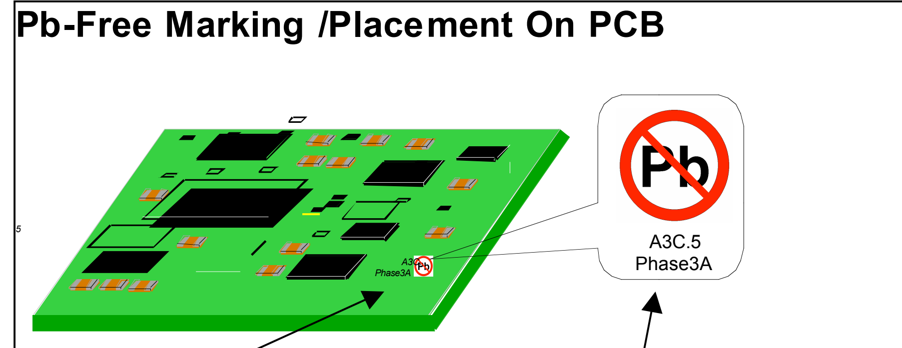

# Establish Uniform Coding For Solder Composition and Symbol Application

JEDEC 2nd level interconnect Categories – "The terminal finish, material of components, and/or the solder paste/solder used in PCB assembly.

- ne1 – SnAgCu
- ne2 – Other Sn Alloys: SnCu, SnAg, SnAgCuX, etc. - No Bi or Zn
- ne3 – Sn
- ne4 – Pre-plated: Ag, Au, NiPd, NiPdAu
- ne5 – SnZn, SnZnx, no Bi
- ne6 - Contains Bi
- ne0, e7, e8, e9 – Unassigned

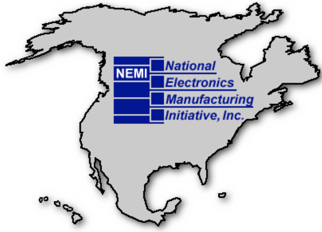
e2 e2

**Pb-Free Marking /Placement On PCB**




**JEITA Composition symbol and code for solder material**

| Solder composition | symbol | code |
|---|---|---|
| Sn96.5Ag3.0Cu0.5 | A30C05 | A3C.5 |
| Sn99.3Cu0.7 | C07 | C.7 |
| Sn89Zn8.0Bi3.0 | Z80B30 | Z8B3 |
| Sn88In8.0Ag3.5Bi0.5 | N80A35B05 | N8A3.5B.5 |





# Uniform Labeling And Marking . . .

## *All JEDEC Markings and a "Phase 1" Symbol Should Be Incorporated Into The Following Framework*

JEITA Component ID Guideline

| | COMPONENTS | | | | ASSEMBLIES | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **PHASE** | **1** | **2** | **3A** | **3** | **1** | **1A** | **2** | **3A** | **3** |
| Terminal Plating is Tin-Lead (SnPb) | X | | | | | | | | |
| Terminal Plating is Pb-Free | | X | X | X | | | | | |
| Terminal Plating & 1st Level Attachment is Tin-Lead (SnPb) | | | | | X | | | | |
| Terminal Plating & 1st Level Attachment is Pb-Free | | | | | | | X | X | X |
| Modular Component Can Still Contain Lead (Pb) | | | | | | X | | | |
| Soldering Materials/Alloy Is Pb-Free | | | | | X | | X | X | X |
| Component Body is Pb-Free Process Compliant | X | X | X | X | | | X | | X |
| Intentionally Added Lead per RoHS Exemption Is In Component | | | X | | | | | X | |
| No Trace Of Lead In Component | | | | X | | | | | X |
| Component is Completely RoHS Compliant | | | | X | | | | | X |

| | LABELING | | | | LABELING | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3A** | **3** | **1** | **1A** | **2** | **3A** | **3** |
| Use of Symbol: Optional → | | | | | | | | | |
| Solder/Materials Composition: Manditory → | S95PB05 | A3C.5 | A3C.5 | A3C.5 | S95PB05 | S95PB05 | A3C.5 | A3C.5 | A3C.5 |
| Phase of Component/Assembly: Optional → | Phase 1 | Phase 2 | Phase 3A | Phase 3 | Phase 1 | Phase 1A | Phase 2 | Phase 3A | Phase 3 |