This application note is designed to provide step-by-step processing recommendations. It covers the popular SMC soldering processes currently in use and provides recommendations and cautions for each step. Since many variations of temperature, time, processes, cleaning agents and board types are found in the electronics industry, you'll want to test and verify your own system.

### Standard Soldering And Cleaning Processes - Trimming Potentiometers

The process steps, recommendations and cautions are based on Bourns® Trimpot® surveys of SMC users, equipment manufacturers and materials suppliers. Also, comments reflect results of Bourns' testing. Our findings suggest the following soldering and cleaning processes:

1. **SOLDERING** - Forced Hot Air, Convection, IR, Wave (Single and Dual)
2. **CLEANING** - Solvent, Aqueous, Semi-Aqueous, No-Clean

#### 1. Solder Paste Printing

**SMC Placement**

**Flux Application**

**Solder**

**Through-hole Trimmers**

**Wash**

**No-Wash**

**CAUTION**

Since solder paste usually contains a high percentage of activators, you must ensure adequate cleaning to remove all residues, unless no-clean (low solids) paste is used.

#### 2. CLEANING - Solvent, Aqueous, Semi-Aqueous, No-Clean

**1. Solder Paste Printing**

**2. Soldering - Forced Hot Air, Convection, IR, Wave**

**3. Flux Application**

**4. Solder**

**5. Wash - Solvent, Aqueous, Semi-Aqueous**

**6. No-Wash**

**GENERAL**

- Use pick-and-place equipment with vacuum nozzle ID size that allows adequate suction to pick the SMC out of the embossed cavity.
- Use 8 to 10 mil thickness for solder paste.

**RECOMMENDED**

- Use Sn 63 % Pb 37 % solder or lead-free solder. Use Sn 63 % Pb 37 % solder or lead-free solder.
- Avoid highly activated fluxes. Consult factory before using OA.
- Use terpene or tetrahydrofuran (THF) as component flux.
- Use any suitable washing solvents that meet ODC requirements.
- Use any suitable cleaning materials:
  - Deionized water
  - Hydrocarbon

**CAUTION**

- Do not exceed 260 °C peak temperature for dual wave solder process with a flow zone totaling 5 seconds.
- Do not exceed 260 °C peak temperature for dual wave solder process with a flow zone totaling 5 seconds.

**GENERAL**

- Use any of these aqueous wash materials:
  - Deionized water
  - Hydrocarbon
- Use any suitable washing solvents that meet ODC requirements.

**CAUTION**

- Limit excess direct spray pressure to 60 psi or below for optimum reliability. Ultrasonics may cause component damage or failure.

### Board Rework Technique

**GENERAL**

- Limit solder iron temperature to 350 °C for 3 seconds.

*Process descriptions 5 through 7 do not apply to open frame trimmers.*
Solder
Flow (Wave)

RECOMMENDED
-Continued from Page 1-

- The belt speed should be adjusted per the solder equipment manufacturer’s recommendations in order to insure a dwell time in the solder wave of 2 to 3 seconds.
- The solder pot temperature should be adjusted to a range of 240 °C to 250 °C.
- The flux station (foam or wave) preheat temperature should be adjusted to a range of 80 °C to 105 °C.
- The preheat temperature must not exceed 100 °C under the solder wave temperature and the preheat rate of 1.5 to 2.5 °C/sec.
- The underside PC board temperature at the last preheat zone should be approximately 150 °C.
- Verify that the difference between the solder temperature and the board is 100 °C or less at the point in time when the PC board leaves the last preheat zone.
- The PC board should be permitted to air-cool at room ambient conditions following exposure to the soldering environment. Forced air-cooling is not recommended.

Use of the following recommended RoHS solder profile should optimize terminal solder wetting:

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Following are the common methods, materials and maximum temperature/time parameters for soldering and cleaning processes.

<table>
<thead>
<tr>
<th>Process Step</th>
<th>REFLOW (SMD Processing)</th>
<th>FLOW (Through-hole Processing)</th>
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<td></td>
<td>Hot Air; Infrared (Solvent)</td>
<td>Wave (Solvent)</td>
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<tr>
<td></td>
<td>Hot Air; Infrared (Semi-Aq)</td>
<td>Wave (Semi-Aq)</td>
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<td></td>
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<td></td>
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<tr>
<td>1. Solder Paste Printing</td>
<td>X</td>
<td>X</td>
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<tr>
<td>2. Component Placement</td>
<td>X</td>
<td>X</td>
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<tr>
<td>3. Flux Application</td>
<td>X</td>
<td>X</td>
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<tr>
<td>4. Solder (Reflow)</td>
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<td>X</td>
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<tr>
<td>5. Wash (Solvent)</td>
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<td>X</td>
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<tr>
<td>6. Wash (Semi-Aqueous)</td>
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<td>7. Wash (Aqueous)</td>
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<tr>
<td>High Pressure Fluids</td>
<td>X</td>
<td>X</td>
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</tbody>
</table>

Max. Temp. (°C)/Time (Secs)

- 235/40
- 235/40
- 235/40
- 235/40
- 260/5
- 260/5
- 260/5

Min. Temp. (°C)

- 215
- 215
- 215
- 215
- 215
- 215
- 215

Vapor Phase Reflow: Limit to 215 °C for 3 minutes max.