Robotic Soldering Solutions

Exclusive Distributor in North America for Japan UNIX
Perfect soldering every time with reduced labor costs!
Solutions Offered:

- **Contact Soldering** - most common
  - Ultrasonic Soldering
  - Non-contact Soldering:
    - Laser Soldering
    - Microflame Soldering

Each has its place and price point!
Contact Soldering
How it can help you

- Operators doing difficult hand soldering with high labor costs
- Soldering quality problems, throughput too low or inconsistent results
- An existing robotic system that may need replacing—wearing out, poor results, lack of factory support
- Selective soldering that can’t be easily done with typical bottom side selective soldering systems
- Post wave or reflow hand soldering that is better done with a robot
UNIX Contact System
A very robust platform using the Janome four axis robot
Multi-Articulated Six Axis Robot #700V

• Works like a human arm and hand
• Much larger working area than a desktop
• Ideal for in-line automation
• 5300mm/sec max. velocity
700V Multi-Articulated Soldering Robot
SCARA Robot #700H

• 5 Axis
• Increased reach for large working area
• 7128mm/sec max. velocity
• Three models with max. reach radius of 350, 450 and 550mm
In-Line Contact System
<table>
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<tr>
<th>Features</th>
<th>Advantages</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Soldering head can do point-to-point and line soldering</td>
<td>1.1 No need to purchase two different soldering heads</td>
<td>1.1 Save money and save time with simple changeover</td>
</tr>
<tr>
<td>2. Solid core solder tips retain heat from point to point</td>
<td>2.1 Faster cycle time</td>
<td>2.1 Lower costs of operation per assembly</td>
</tr>
<tr>
<td>3. Scale and tooling pins to accurately realign solder head and feeder</td>
<td>3.1 Changeover from line soldering to point to point is easy and accurate</td>
<td>3.1 Save time in setups and eliminate costly errors</td>
</tr>
<tr>
<td>4. Program up to 63 soldering conditions</td>
<td>4.1 Reduces the need to create separate programs for different conditions on one assembly</td>
<td>4.1 Increased throughput</td>
</tr>
<tr>
<td>5. Standard 200W heater with built-in thermocouple; optional 300W</td>
<td>5.1 Heats up and recovers faster than 100W heaters</td>
<td>5.1 More throughput</td>
</tr>
<tr>
<td>6. Unit section of heater block easily removed to speed up tip and heater replacement times</td>
<td>6.1 Save time</td>
<td>6.1 Save money</td>
</tr>
<tr>
<td>7. Graduated angle setter is standard</td>
<td>7.1 Solder feed position is perfectly reproduced each time you return to a setup</td>
<td>7.1 Saves time; improves consistency</td>
</tr>
<tr>
<td>8. Easy to program soldering profiles on teach pendant</td>
<td>8.1 Only one device needed for all programming</td>
<td>8.1 Simplicity!</td>
</tr>
<tr>
<td>9. Several alarms standard including out of solder, solder jamming and heater alarm</td>
<td>9.1 Prevents mistakes and saves time</td>
<td>9.1 Save money in reduced rework</td>
</tr>
<tr>
<td>10. Three axis tip position correction mechanism</td>
<td>10.1 Automatically corrects misalignment after replacing tip</td>
<td>10.1 Save money in eliminating missed solder joints</td>
</tr>
<tr>
<td>11. Solder wire preheater to reduce heat shocking that results in solder balls</td>
<td>11.1 Maintains consistent solder quality</td>
<td>1.1 Reduce rework; save money</td>
</tr>
<tr>
<td>12. Needle swing mechanism allows solder feeder needle to swing away from tip automatically</td>
<td>12.1 Allows clearance for easier tip cleaning, access to tight areas and easier to program</td>
<td>12.1 Save time, avoid solder errors</td>
</tr>
<tr>
<td>13. Solder tips have 500 microns of iron plating versus competition with 250-300</td>
<td>13.1 Longer life of tips; less changeover time lost</td>
<td>13.1 Save money</td>
</tr>
<tr>
<td>14. Optional nitrogen generator</td>
<td>14.1 Prevents oxidation of tips and produces better flow or wetting</td>
<td>14.1 Higher quality and less maintenance</td>
</tr>
</tbody>
</table>
Point to Point Example of wires soldered to ceramic substrate
Slide Soldering Post Reflow of Connector
Point to Point on LCD
Medical Device Co. Small wires on substrate
LED Through-Hole post Reflow
Two Wires Soldered to Small Piezoelectric Battery
Automotive, Two Areas, Point to Point
Contract Manufacturer with Medical Application

- Twenty up fixture to solder two wires from a battery to pads on a flex circuit
- Used a UNIX414R desktop with N2
Six-up fixture to hold components for soldering four wires into their PCB
Project required preheating this multi-layer PCB in order to solder some ceramic components. Insulator is underneath the heater plate to protect the robot.
Complex Fixture for OEM

• Four step soldering process with four subassemblies
• Rotating member to solder both sides of the PCB
• Order was won from less expensive competitor because of fixture design
Customer had many operators assembling the four components shown on the left. Fancort fixture and robot allowed them to reduce the number of operators and dramatically reduce rework:

1. Plastic housing is placed on the post on the right side of the fixture and first PCB is dropped over four pins. Program one is run to solder these four pins to the PCB
2. Second PCB is inserted into the fixture at right angles to the first PCB and the second program is run to solder one side of the PCB to the second PCB
3. Fixture is rotated so the other side of the second PCB can be soldered to the first side.
4. Two wires are inserted into the fixture under a spring-loaded holder to retain the wires to pads on the second PCB and the fourth program is run.
5. Fixture holds five of these assemblies.
Laser Soldering
Why Laser Soldering?

- Extremely small points of soldering without the need for contact: minimum spot size available is 0.2mm
- Intense heat required that can’t be done with contact soldering; 20W to 75W laser diode
- Cycle time usually shorter than contact
- No consumables
- Typically higher volume applications
- Feed wire as small as 0.2mm or solder using paste
- Less diffuse heat generation than contact soldering
- Heating time is instantaneous
- Develop multiple profiles in one program
- Stand-alone or in-line systems or we can supply modules for you to integrate into your own cell
Laser Diode Soldering
Background Information

- UNIX is the leader in laser soldering systems with the most installations in the world primarily in Asia
- Fancort has a laser system in NJ with different wattage diodes and fibers for sampling your parts including 0.2mm spot size which is the smallest
- Fancort can deliver a turnkey system including fixtures for any application
Stand-Alone Laser System w/Enclosure
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<td>1. CCD camera built into the laser head</td>
<td>1.1 Makes programming much easier and more accurate</td>
<td>1.1 Save money and save time with simple changeover</td>
</tr>
<tr>
<td>2. Custom shapes for more precise spot of heat eg. oval, doughnut, triangle, square, rectangle, etc.</td>
<td>2.1 Heat transfer is reduced to surrounding components</td>
<td>2.1 Less risk to damage nearby components</td>
</tr>
<tr>
<td>3. Spot size to 0.2mm versus 0.4mm for competition</td>
<td>3.1 Tighter area for soldering of smaller components and less heat transfer to other areas</td>
<td>3.1 More accurate; less chance of damaging nearby components</td>
</tr>
<tr>
<td>4. Clear glass over standard lens</td>
<td>4.1 Reduces risk of damaging expensive laser lens</td>
<td>4.1 Saves money and lens life</td>
</tr>
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<td>5. Average mean time of 20,000 hours of life</td>
<td>5.1 Reduces cost of ownership</td>
<td>5.1 Better ROI</td>
</tr>
<tr>
<td>6. Special feeder to handle 0.15mm solder versus 0.3mm for competition</td>
<td>6.1 Solder smaller parts</td>
<td>6.1 More flexibility</td>
</tr>
<tr>
<td>7. Laser built by UNIX and integrated; competition buys and resells</td>
<td>7.1 Better support and newer technologies and features</td>
<td>7.1 Better value for your money</td>
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In-Line Laser System
Interior of In-Line Laser
UNIX Ultrasonic Soldering

- Primary applications are soldering on glass which is used in the solar cell manufacturing industry, soldering on copper, aluminum or other metal surfaces that conventional soldering is not as effective
- The principle behind ultrasonic soldering is high-frequency ultrasonic vibrations that promote removal of the dirt on the base material, or reducing oxide films, diffusing metals, removing air bubbles, etc. This leads to improvement in wettability and spreadability of the solder producing better joints and reducing tack time
- UNIX is ahead of the competition in this technology and can do sampling in Japan.
- The technology is available in a manual station (next slide) and integrated to a robotic system.
- *No need for flux*
Ultrasonic Soldering

- Controller
- Hand Held Iron
Microflame Soldering

- More heat is required to make a connection than conventional contact soldering can achieve
- Extremely small point of contact; flames can be much smaller than the smallest soldering iron tip
- Very fast cycle time; typically 1-2 seconds per solder joint
- Applications can be found in the industrial market as well as electronic manufacturers
- Fancort is an authorized Spirflame integrator, a leader in microflame technology
Fancort Delivered Custom Spirflame System for Soldering Cord Sets

• Processes 260 cord sets per hour
Cord Sets with different gauge wires were done on the same machine. The application required more heat than contact soldering could provide.
Manual Microflame System

- Stand-alone system with generator, flame, solder feeder and controller
- Flame is driven in Z motion by cylinder; solder feeder must be accurately positioned; operator uses a fixture to hold the work and steps on the foot switch, flame comes down, feeder feeds wire to programmed amount, and soldering is done very quickly.
- Ideal for development work or manual soldering where microflame fits the application
- Cost is approximately $25K
- Easy to use and very safe
Microflame or Contact?

Application was to solder two reed switches into this coil with minimal stress to protect glass seals.

Decided on contact soldering w/UNIX

Arrows to point of contact
Thank You

• For further information, or to discuss a specific application, contact Yolanda Figueroa at 973-575-0610 x238 or by email at: yfigueroa@fancort.com

• Please visit our website for other videos and more technical information; www.fancort.com