



# The Revolution: How Synchronous Motion Outshines Traditional Selective Soldering



Synchronous motion technology reduces conveyance time and boosts throughput by 20-40% for most applications!

[Learn more.](#)



# SELECT Synchro is changing the selective soldering game.

With its groundbreaking new synchronous motion technology, the SELECT Synchro system is profoundly transforming traditional selective soldering processes. What makes it so different?

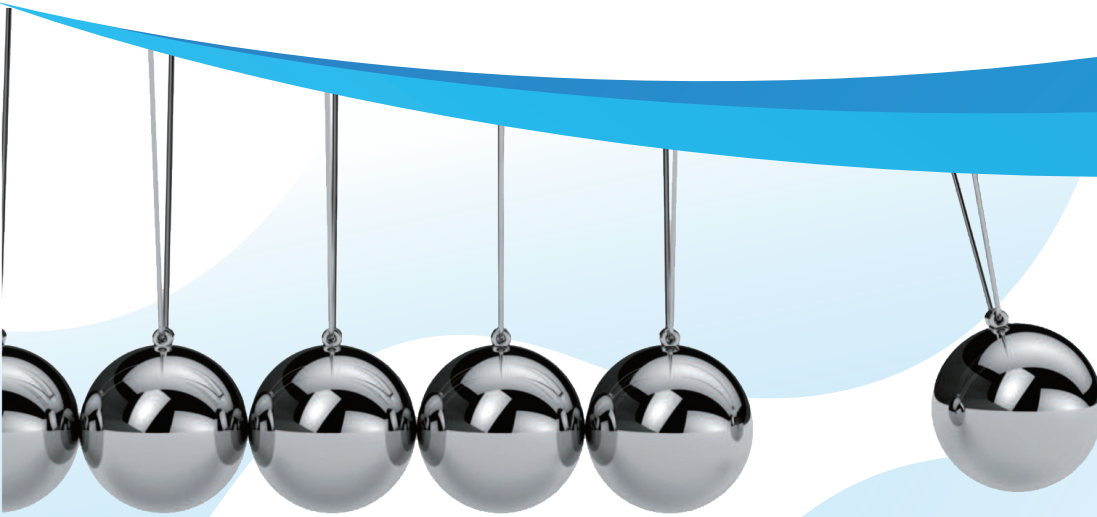
In a traditional selective soldering process, boards are stopped intermittently during processing, limiting the ability to improve cycle time and throughput. Conversely, the SELECT Synchro continuously conveys multiple boards simultaneously through the system to boost throughput by 20-40% for most applications.

SELECT Synchro's unique, patent-pending design for high-volume through-hole and mixed-technology surface mount soldering applications accommodates a range of board lengths. It offers greater throughput, a compact footprint, and a lower cost of ownership.

Synchronous-Motion Selective Soldering



The Synchro system easily flexes to support various soldering applications, including single- and double-sided through-hole and mixed-technology surface mount assemblies.



### Synchro Base Model:

- Synchro 3 – 3 solder pots
- Synchro 5 and 5 XL – 5 solder pots
- SMEMA conveyor with positive board location
- Automatic conveyor-width adjustment
- MicroDrop drop-jet fluxer
- Flux-level sensing system
- All titanium solder pot and pump assembly
- Quick-change magnetically coupled solder nozzle
- SolderWorks Editor and machine control software



### Synchro Features:



#### Non-Stop Soldering

Boards continuously travel through the system, boosting throughput by 20-40% for most applications, with more gain possible if conveyance and soldering times are comparable.



#### Space-Saving Footprint and Dedicated System Software

Due to the minimal pot and fluxer motion in the conveyor direction, all Synchro systems reduce the system footprint, with the Synchro 5 reducing footprint by as much as 60% compared to traditional multi-station systems.



#### High-Volume Selectivity

Process single- and double-sided through-hole and mixed-technology applications. Choose the Synchro 3 or 5 for boards up to 2500 mm long and up to 460 mm wide or the Synchro 5 XL for boards up to 2500 mm long and up to 680 mm wide.



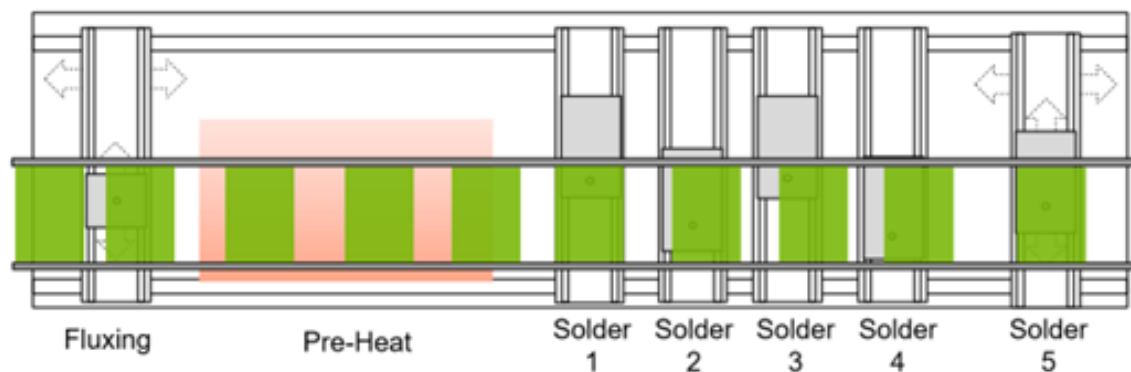
#### Advanced Flexibility

Depending on the system, supports up to three or five solder pots, each with the ability to accommodate different nozzle sizes, eliminating the need to change nozzles.

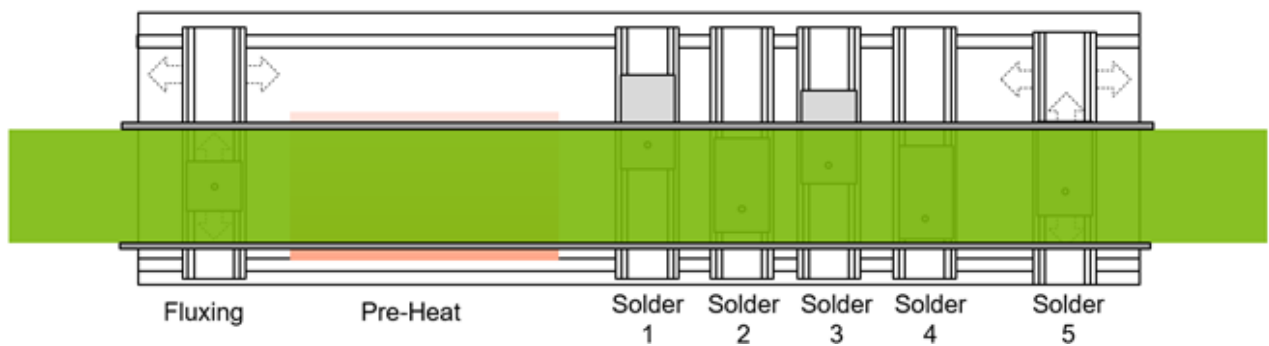


## How It Works:

**Non-Stop Soldering:** The innovative continuous-motion soldering process significantly increases throughput by soldering boards while in motion along the conveyor, eliminating the need for boards to stop at individual stations for fiducial alignment, fluxing, preheating, warpage measurement, and soldering. Solder pot refill, nozzle tinning and identification, and wave height correction are carefully integrated to neutralize cycle-time impact as much as possible. The flexible and adaptable SELECT Synchro system provides fast, efficient processing without sacrificing quality, making it an attractive option for manufacturers handling a range of board sizes.



**Flexible Board Length Capacity:** The continuous motion process does not impose inherent limitations on board length, providing greater production flexibility. While focused on applications up to 2.5 meters for optimal performance, the system design easily accommodates longer-length boards, with program and workload optimization for the most efficient throughput.







## How It Works:

**Space-Saving Footprint:** The SELECT Synchro's compact design reduces floor space usage by up to 60% compared to conventional selective soldering systems by eliminating the stop and position mechanisms. With its streamlined and space-efficient design, the SELECT Synchro maximizes valuable factory floor space, simplifies integration into various production environments, and optimizes facility layout. In most cases, the SELECT Synchro increases throughput over conventional selective soldering systems using the same or fewer number of solder pots.



**Lower Operating Costs:** The combination of increased throughput, space-efficient design, and flexibility across board sizes translates into lower operating costs. Manufacturers can achieve greater efficiency without large, complex equipment, resulting in cost savings in both production and maintenance.

Overall, the SELECT Synchro offers significant advantages when processing small—to medium-sized boards. The system design and its ability to solder while the board moves continuously result in faster throughput in a compact footprint and the flexibility to handle a wide range of board sizes and lengths, making it an ideal solution for a broad spectrum of applications.

[Learn about key features.](#)

## Key Feature Guide:

### In-Motion Fiducial Find and Position Adjustment

The SELECT Synchro employs a unique In-Motion capability that enables real-time fiducial finding and position adjustment as boards travel through the system.

In-Motion capabilities offer several critical benefits:

1. Precise alignment of the flux and soldering nozzles.
2. Significantly minimized risk of defects for highly reliable solder joints.
3. Reduced labor costs and minimal process scrap for better operating and opportunity costs.
4. Continuous monitoring and automatic correction for better quality control.



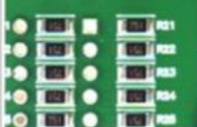
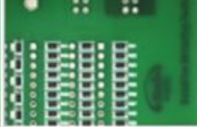
SELECT Synchro is equipped with offline SolderWorks Editor software to customize the fiducial finding program for each process.

Fiducials are found, and offsets are measured by comparing a known "golden sample image" for each program. The system can reference unique features on a board layout instead of relying solely on standard fiducial marks, making it possible to accommodate pallets even when a fiducial mark is covered, a common scenario in selective soldering.

### Unlocking Process Flexibility for High-Volume Manufacturing

Leave behind the limitations of traditional, parallel-only soldering systems, where fixed pots and nozzles restrict flexibility. With Synchro, every solder pot is mounted on its own dedicated axis, allowing each nozzle to rotate and adjust independently in both the X and Y directions. This enables precise compensation for any flux and soldering position, enhancing efficiency and delivering consistently high-quality solder joints.

When a board or pallet enters the system, the specially designed conveyor clamps and advances it. Before fluxing begins, the SELECT Synchro (3 or 5) system identifies the fiducial. If there is any positional offset, the system automatically compensates for it in the XY axis or rotation. This adjustment occurs as the board or pallet travels on the conveyor. The fiducial system can process single, panelized, or multiple boards in a pallet, measuring and compensating as needed to ensure precise soldering.

Type	Board Number	Mark Number	Position X	Position Y	Offset X	Offset Y	Rotation	Confidence	Result	Fiducial Model	Fiducial Sample
Fiducial	1	1	165.1	216.5	0	-0.072	0	99.8	Success		
Fiducial	1	2	323	296.9	0	0	0.021	60	Success		

### Sustainability Spotlight

The SELECT Synchro system identifies incorrectly inserted boards. If a board is detected as incorrectly inserted, the system will assign an "X Out" status, meaning the board will travel through the machine without being fluxed or soldered. This safeguard prevents incorrectly inserted products from being processed, saving time and reducing cost and waste.

## Key Feature Guide:

### In-Motion Warpage Compensation

Warpage commonly occurs during various manufacturing processes. For example, boards become warped during the reflow soldering process, where uneven thermal cycling can cause the inner copper layers of a board to warp as surface mount devices (SMD) are soldered in a reflow oven.

Similarly, board warpage can occur during the selective soldering process, compromising the quality and functionality of the final product. Several factors contribute to warpage when heat is applied to the PCB. Factors such as:

1. Differing thermal expansion rates across distinct copper mass areas impacting thermal stress.
2. Low-grade PCB materials or varied coefficients of thermal expansion across multiple board layers.
3. Thin PCBs with less structural rigidity.
4. The asymmetric positioning of heavy components.

### Laser Triangulation for Warpage Compensation

The SELECT Synchro employs unique In-Motion capabilities to measure upward and downward warpages. Based on those measurements, Z-axis adjustments are applied in real-time as the board travels continuously through the system. Warpage measurement is selective. Measurement points are taught in the offline SolderWorks Editor software and customized for each process.

When a board or pallet enters the system, the specially designed conveyor clamps and advances it. Laser measurements are taken immediately after preheating and before the first component is soldered. If any warpage is detected, the system automatically adjusts the Z-axis to compensate, ensuring the soldering nozzles maintain the correct distance to the board. This adjustment occurs while the board continues to travel on the conveyor.

The Z-axis adjustments are applied to three or five solder nozzles depending on the SELECT Synchro model (3 or 5). The system can process single, panelized, or multiple boards in a pallet, measuring and compensating to ensure precise soldering despite any warpage.

### Benefits

By integrating advanced warpage measurement and compensation capabilities, the SELECT Synchro delivers a selective soldering process that is efficient and reliable, even when boards are warped. There are several advantageous benefits, including:

1. Solder joints are formed under optimal conditions to enhance overall solder joint quality.
2. Uneven soldering related to warpage is mitigated to reduce defects.
3. Automation, throughput, and efficiency are optimized despite warpage.
4. Easy adaptation to various board types and configurations delivers process flexibility.

### Sustainability Spotlight

The SELECT Synchro system reduces rework and waste. Fewer defective boards mean less rework and waste, leading to cost savings and more efficient material use.

**Nordson Electronics Solutions** offers comprehensive selective soldering solutions for printed circuit board assembly applications. Backed by a global service network, the SELECT product line is recognized throughout the industry for quality and innovation. A full spectrum of solutions, including standalone, in-line, and multi-station high-volume soldering systems, are available for your process.



### **SELECT Synchro**

Boards continuously travel through the system, boosting throughput by 20-40% for most applications.



### **SELECT Integra**

The Integra® 508.3 and 508.4 selective soldering systems offer large board size, maximum throughput, and high-volume solutions.



### **SELECT Cerno**

The Cerno® 508.1 supports in-line prototype, small batch, cell manufacturing, and large board applications.

For more information, visit our website to find your local regional office or representative. We have several global locations to serve you.

**North America**  
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