SOUTHERN MACHINERY

S-4545DT

Automatic PCB Laser Marking Machine

Inline / offline PCB marking solution for 1D codes, QR codes, characters and traceability applications.

- CCD Positioning
- MES / SAP Ready
- SMEMA Interface
- 450 × 510 mm

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Product Overview

Designed for PCB traceability

- Automatic PCB laser marking machine for PCB production and SMT line integration.
- Supports QR code, DataMatrix, 1D barcode, text and graphic marking applications.
- CCD positioning, automatic code reading and optional code grade recognition.
- Suitable for online use with SMT lines or offline operation with board handling equipment.
- Can connect with ERP / MES / SAP systems for intelligent traceability.

Consumable-Free

Laser marking eliminates paper labels, ribbon and label handling.

Data Traceability

Mark, read and store codes directly on PCB surfaces.

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Why Laser Marking Instead of Labels

Laser marking replaces label-based identification with direct surface marking.

No Consumables

No label paper, ribbon or adhesive inventory.

Higher Durability

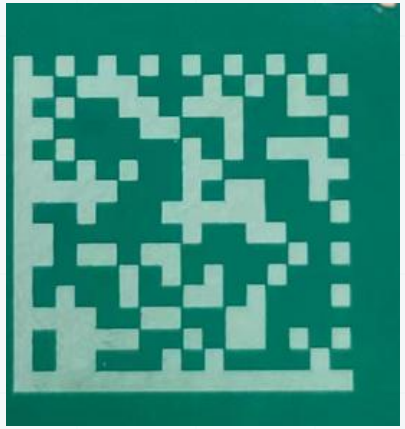
Direct marking avoids label peeling, tearing or loss.

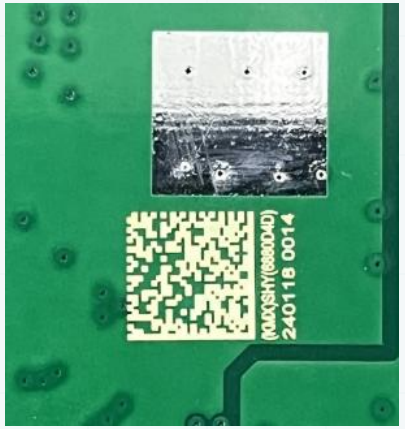
Finer Precision

Micron-level laser marking supports smaller code sizes.

Less Pollution

Reduces label waste and consumable-related waste.





Direct PCB marking keeps identification attached to the product surface.

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Application Scope

PCB Surface Colors

White, green, black, blue and red solder mask surfaces.

Code Types

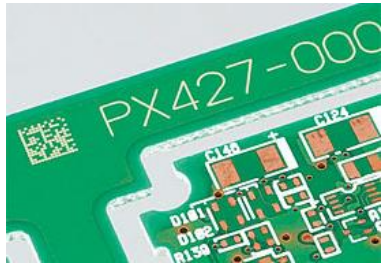
QR Code, DataMatrix, Micro QR, PDF417 and standard 1D barcodes.

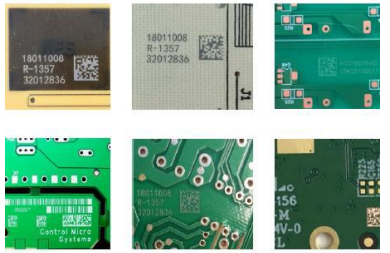
Marking Content

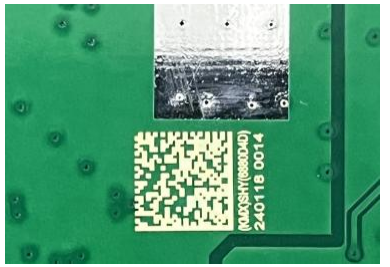
Traceability code, serial number, batch code, product information and characters.

Inspection Logic

Code reading, duplicate-code detection and wrong-board alarm support.







Production Line Integration & Traceability Flow

PCB Infeed → CCD Positioning → Laser Marking → Code Reading → MES Upload → Outfeed

The equipment can be placed at the front of the production line for incoming-board marking, then connected with downstream SMT operations and MES traceability.

Machine Structure & Function Modules

Laser Marking Head

UV / CO2 / fiber / green laser options for different marking requirements.

CCD Vision

MARK point positioning and automatic code reading / verification.

Auto Conveyor

Automatic belt-width adjustment with SMEMA interface for line integration.

Traceability Software

ERP / MES / SAP connection for work-order and batch-code data.

Anti-Duplication Logic

Local database duplicate-code detection and initial-code checking.

Safety & Exhaust

Optional odor-filtering cleaning system and enclosed marking chamber.

Modular structure supports both standalone operation and automated line integration.

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Laser Source Options

UV 5W Reference

355 nm wavelength, small spot diameter, suitable for fine marking applications. Reference minimum code size: 0.8 × 0.8 mm.

CO2 10W Reference

10.6 µm wavelength, stable output, suitable for selected PCB ink and surface marking requirements.

Configurable Platform

The platform supports UV, fiber, green and CO2 laser configurations according to material and process requirements.

Final laser source selection should be verified using real PCB samples, target code size, solder mask color and traceability requirements.

Software, Data & Traceability Functions

Auto Positioning
MARK point positioning and CCD visual positioning.

Duplicate-Code Check
Local database anti-duplication prevents repeated code content.

Auto Code Reading
Automatically reads QR codes and records data; unreadable codes trigger alarm logic.

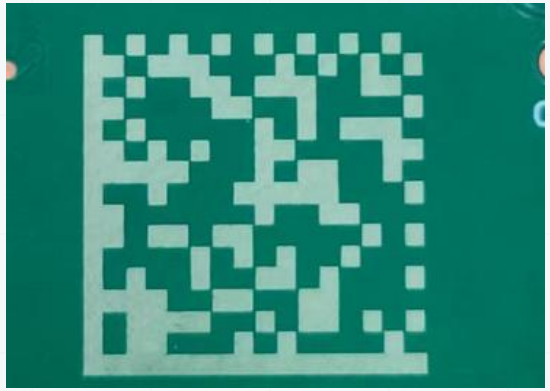
Template Capture
Can grab external frames such as steel sheets or white-oil blocks for precise positioning.

Fool-Proof Detection
Wrong board direction, model or specification can trigger automatic alarm.

Barcode Mapping
Positive / negative barcode contents can be mapped for consistency.

Bad Mark Skip
Automatically identifies Bad Mark points and skips marking when required.

MES / ERP / SAP
Automatically acquires work orders, batch numbers, material codes and product information.



ROI Drivers: Cost Ratio + Labor Reduction

Use local label cost, labor cost and annual production volume to calculate the final payback period.

1.0×
Label + manual labor cost baseline

≈0.44×
Laser marking equipment cost reference vs baseline

≈0.56×
Potential 5-year cost saving ratio vs baseline

No labels
Consumable-free marking process

Reference 5-Year Cost Ratio

Payback Logic

Higher label and labor costs create faster payback potential.

Monthly Benefit = Label Consumable Saving + Labor Saving + Reduced Rework / Traceability Cost − Operating Cost

Technical Specifications — Machine & Marking

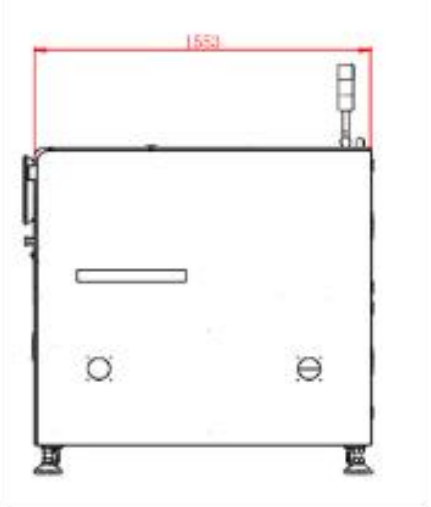
Model	S-4545DT
Machine type	Automatic PCB laser marking machine, no board flipping
Laser type	UV / CO2 configurable reference platform
Laser power	UV 5W or CO2 10W reference configuration
Marking range	50 × 50 mm to 450 × 510 mm
Marking speed	Up to 7000 mm/s
Positioning accuracy	±0.05 mm, optional / configurable
Repeatability	±0.02 mm
Applicable PCB size	Full-area marking under 450 × 510 mm; selected single-position marking up to 450 × 630 mm
PCB thickness	0.5–4 mm, configurable
Upper / lower clearance	<25 mm / <25 mm, configurable
Working height	900 ± 20 mm

Specifications are reference values and should be confirmed according to final laser source, board sample and process requirements.

Technical Specifications — Codes, Interfaces & Utilities

1D barcode types	Code 39, Code 25, Code 93, Code 128, EAN-13, EAN-8, ISBN
2D code types	DataMatrix, QR Code, Micro QR, PDF417, Code 49, Code 16K
Processable QR size	1.5 × 1.5 mm to 20 × 20 mm, depending on code content
Character support	TrueType, JSF single-line, SHX, DMF bitmap fonts
Min character height	0.5 mm
Supported files	DXF, PLT, Excel, TXT
Conveyor width	Automatically adjusts with PCB board
Conveyor speed	30–600 mm/min
Conveyor direction	L-R / R-L / L-L / R-R
Conveyor interface	SMEMA
Network interface	Ethernet
Air source	≥0.5 MPa, 20 L/min max.
Power	220V / 50Hz, total power approx. 3000W
Noise / weight	Max. 65 dB / approx. 800 kg
Machine dimension	833(W) × 1483(D) × 1597(H) mm
Environment	20–28 °C, 30–60% humidity

Overall Dimensions & Installation Reference



Reference overall dimensions

- Front view width: 833 mm
- Side view depth: 1483 mm
- Overall machine height: 1597 mm
- Working height reference: 900 ± 20 mm

Installation note

Overall dimensions are reference values. Please review access space, line layout, operator clearance, utilities and maintenance space during installation planning.

Environmental, Safety & Maintenance Considerations

Consumable-Free Marking

No labels, ribbons or adhesive consumables are required for the marking process.

Less Label Waste

Direct laser marking reduces label-paper and adhesive waste in production.

Enclosed Marking Area

The marking process is contained inside the equipment enclosure.

Optional Odor Filtration

Optional cleaning / filtering system can be used for odor treatment.

Process Responsibility

- Laser source selection should be verified using real samples and target code content.
- Fume extraction / odor filtration should be reviewed according to local EHS requirements.
- Machine operation should follow site laser-safety and electrical-safety procedures.
- Actual marking quality depends on solder mask color, ink type, PCB surface condition and process settings.

Contact Southern Machinery

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