



聯策科技 - 自動化再進化

SYNPOWER -THE BEST AUTOMATION RE-ENGINEERING

From Auto Line Gauge to DES line monitor system

Outline

1 Why—DES line quality enhancing

2 Goal

3 The operation of the system

4 Comparison

5 Specification of the machine

6 The process of the system

7 Operation

8 Characteristic of the machine

9 Benefit

10 Future advancing plan

1. Why—DES line quality enhancing

■ Human factors—
Reduce issues caused by human factors

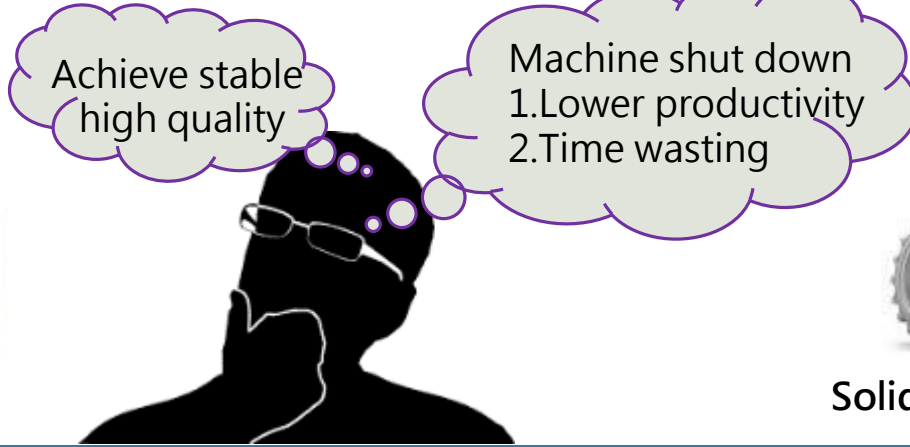
■ Parameter adjustment—
Reduce the issues caused by production condition or parameter change

■ Abnormality detection—
Reflect the abnormal situation in time

- 
- Quality enhancing
 - Instant correction
 - Defect judgement
 - Human factors reduction



Enhance DES line quality



Solid hardware/software ability

2. Goal



From **Auto Line Gauge**
To **DES line monitor system**

Record the know-how of the engineer



✓ QA management

Set up PCB inspection standard and ensure PCB quality management to achieve high quality mass production

✓ Production management

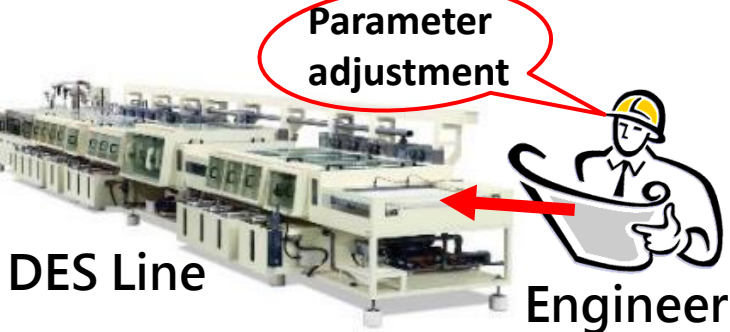
Record the parameter and data to assist in analyzing how machine maintenance, parameter adjustment, and human factors affect the production to create stable production line

Data storage & Production analysis



3. The operation of the system

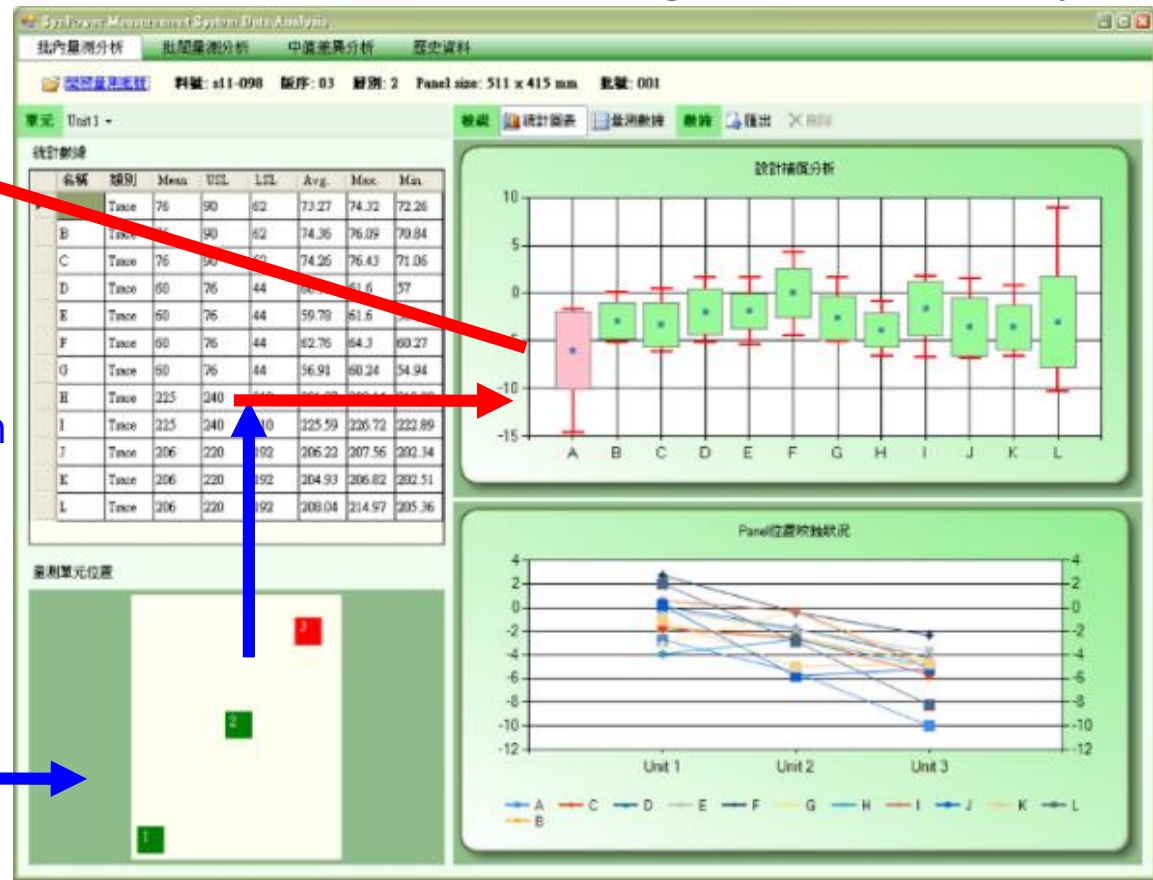
Data storage and result analysis



- ✓ Instant online monitor
- ✓ Defect warning
- ✓ Parameter adjustment assistance



- ✓ Auto alignment
- ✓ Vision inspection application
- ✓ Data collection & storage
- ✓ Manufacturing process improvement

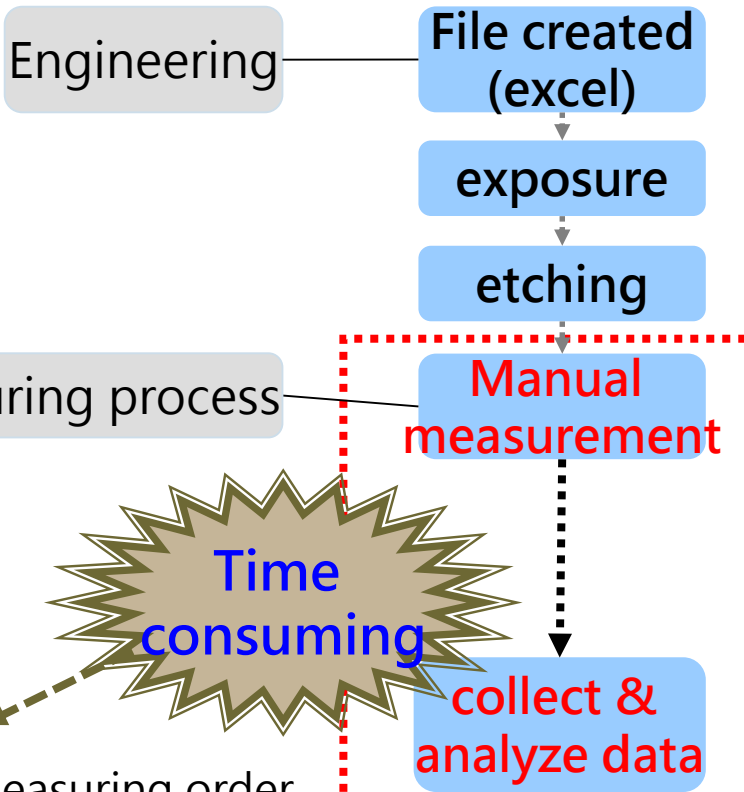


Multi-point measurement
Instant feedback
Precise feedback

4. Comparison

Current method

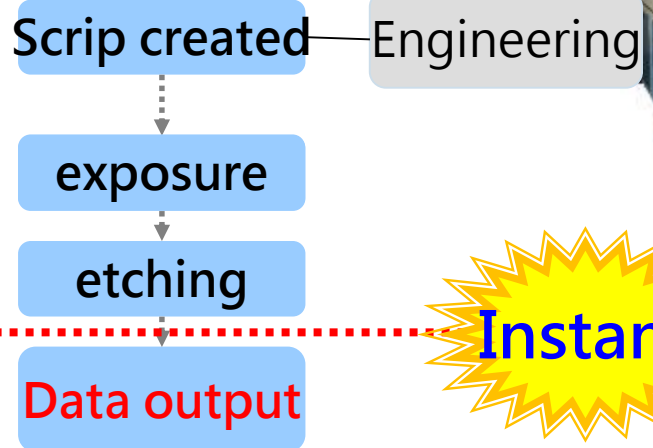
★ DES line monitor system



Time consuming

Auto

Instant



DES quality instant monitor

Manufacturing process instant monitor

PPK

CPK

Impedance Control

Machine/chemicals

Manufacturing / Engineering/ QA

Engineering

- ① Re-confirm measuring order
- ② Re-fix the point for each pnl

5. Specification (ALWM-650E)

Item	Specification
Product type	BGA / Flip Chip / PCB / FPC
Measurement size	650 (X) mm x 600 (Y)mm
Scan table	Movable side pin positioning tool and the vacuum hold down
Camera	5 M pixels color CCD (0.7x-4.5x) (Changeable on customers' demands)
Lens	Auto focus and programmable zoom function
Resolution	0.7um~2.8um (Please see the FOV table for details)
Lighting system	Dual lighting system上
Repeatability	≤ +/- 2 pixel
Laser Pointer	Measuring point could be displayed immediately
Power	AC220 1φ 15A/ 2.5KVA
Air	5 Kg/cm2
Dimension	1250 (W) * 1400 (D) * 1850 (H) (lamp and keyboard holder excluded)
Weight	450 Kg

Applicable to
PCB/FPC/IC Substrate

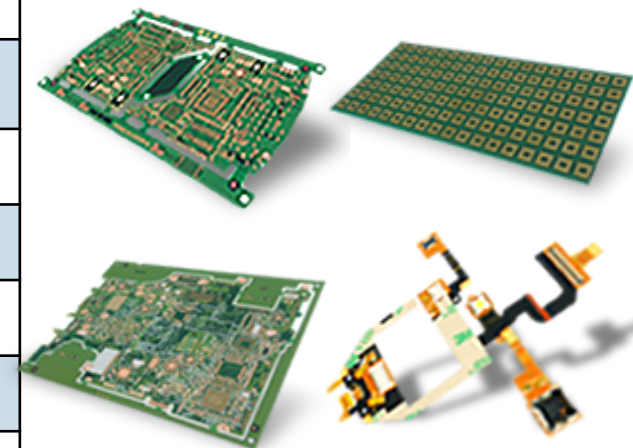


Photo from ZDT website



6. The process of the system

◆ Define the coordinates

Input Gerber, offline editing new part setting up and measuring simultaneously



◆ OP measuring

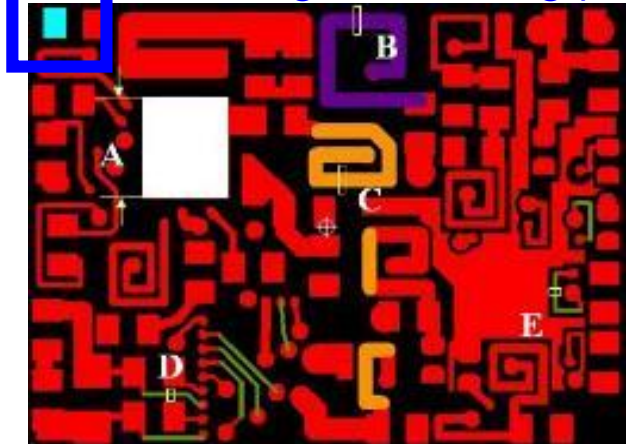
Set up new part only for the first board.
auto measurement from the second board



◆ Data output & analysis

Instant chart output
Online defect alarm

Assign measuring point

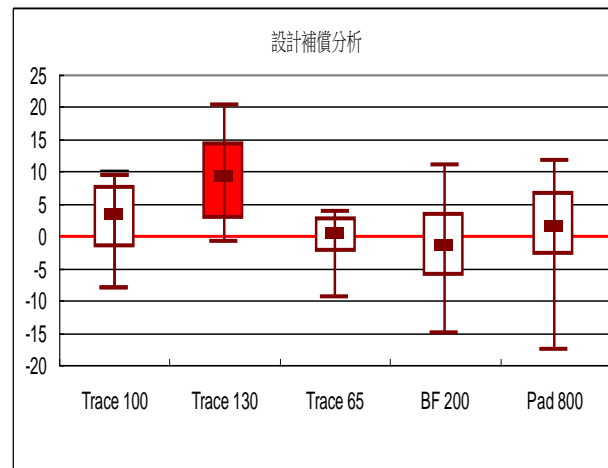


Confirm focus points

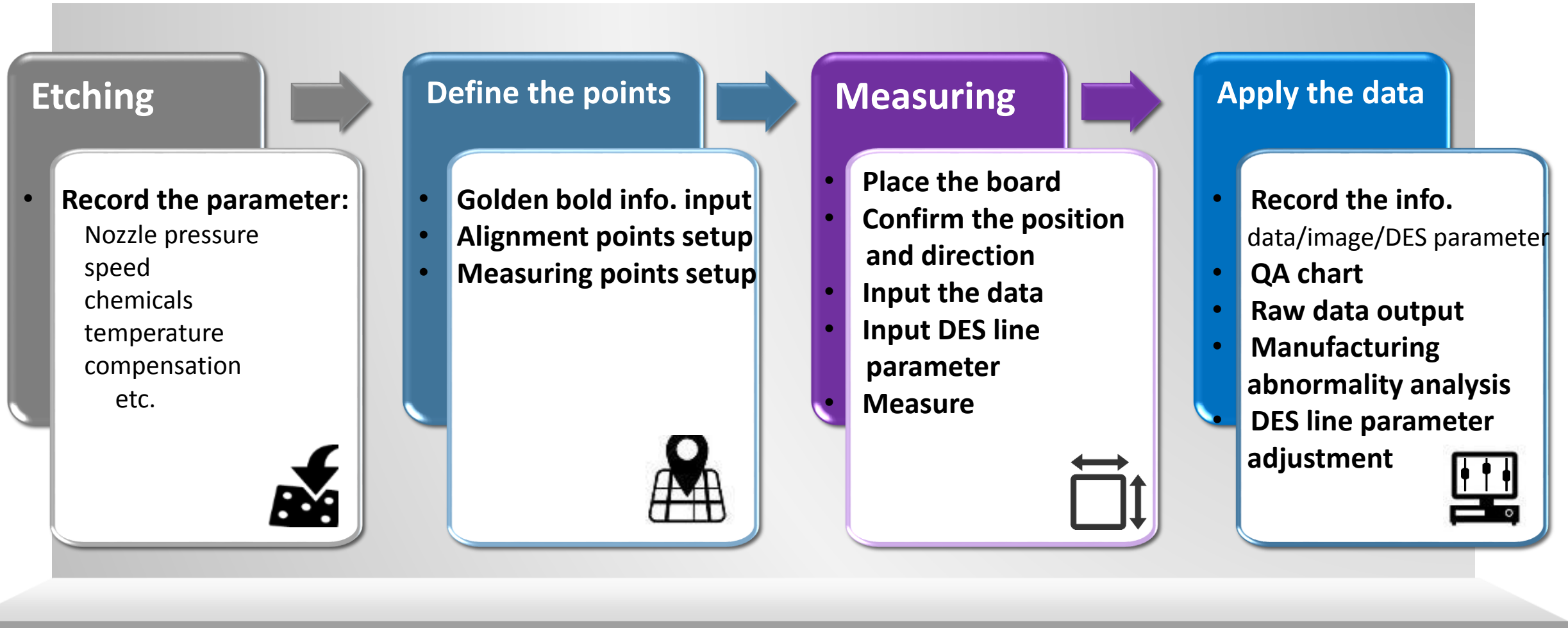
Search for the corresponding measuring points

Start Auto measuring

NG point remarked in red



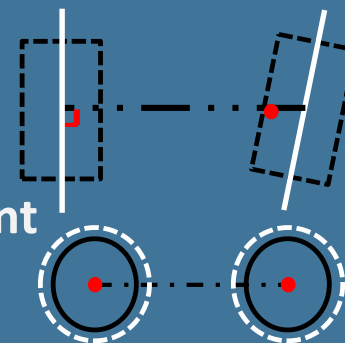
7. Operation



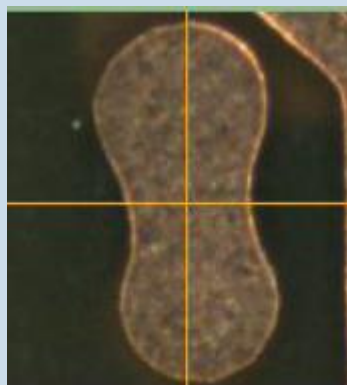
8.1 Characteristic– Auto measurement

Auto measurement

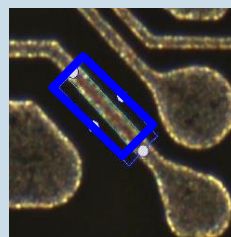
- ☆ Auto alignment
- ☆ Auto searching for edges
- ☆ Various measuring tools
- ☆ Measuring points and spec. defined according to requirement
- ☆ Instant feedback on production issues



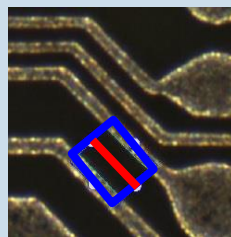
● Auto Alignment



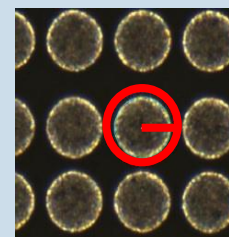
● Measuring tools



↑ 線寬模式

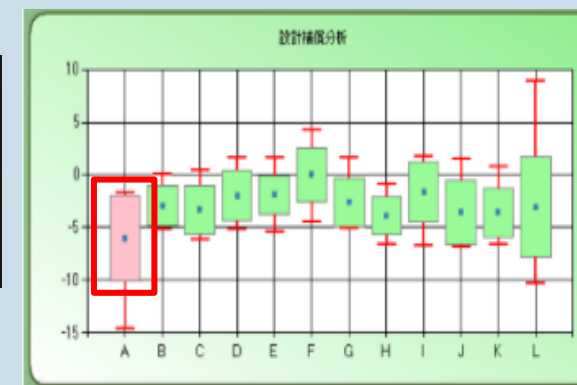


↑ 線距模式



↑ 圓徑模式

● Alarm



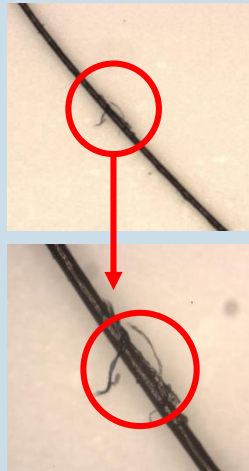
8.2 Characteristic– Optical system

Optical system

- ☆ High resolution optical system
- ☆ Auto focus
- ☆ Programmable zoom function
- ☆ Dual light sources
- ☆ Software Filter



● High resolution



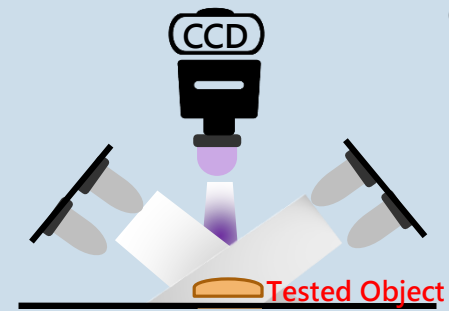
● Auto focus



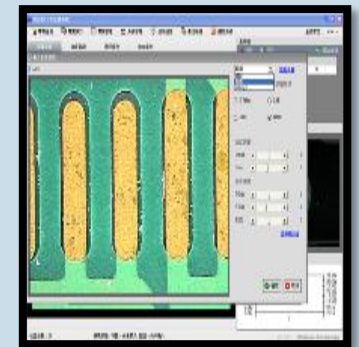
● Zoom function



● Dual lighting system



● Software filter



9. Benefit

- 3 main purposes: QA management, production monitor, analysis assistance to engineers
- 4 auto functions: focus, measuring, light sources adjustment, resolution setting
- CAM software+software professional = 100% solved 解決手動操作上的不可能任務

Intelligence

Stability

Efficiency

- 0 deviation due to personnel shift & machine adjustment
- 0 time difference on data collection and analysis
- 1 setting for a part
- <10 sec for auto alignment, measuring & record for a point
- 6 times less time spent than that of the manual

- ◆ 0 Human factors
- ◆ ±1 um repeatability accuracy
- ◆ 6-Sigma QA management achievable
- ◆ 100% human false measuring judgement eliminated

Automation

10.1 Future advancing plan

Connections with various machines to realize smart production

Expert system :

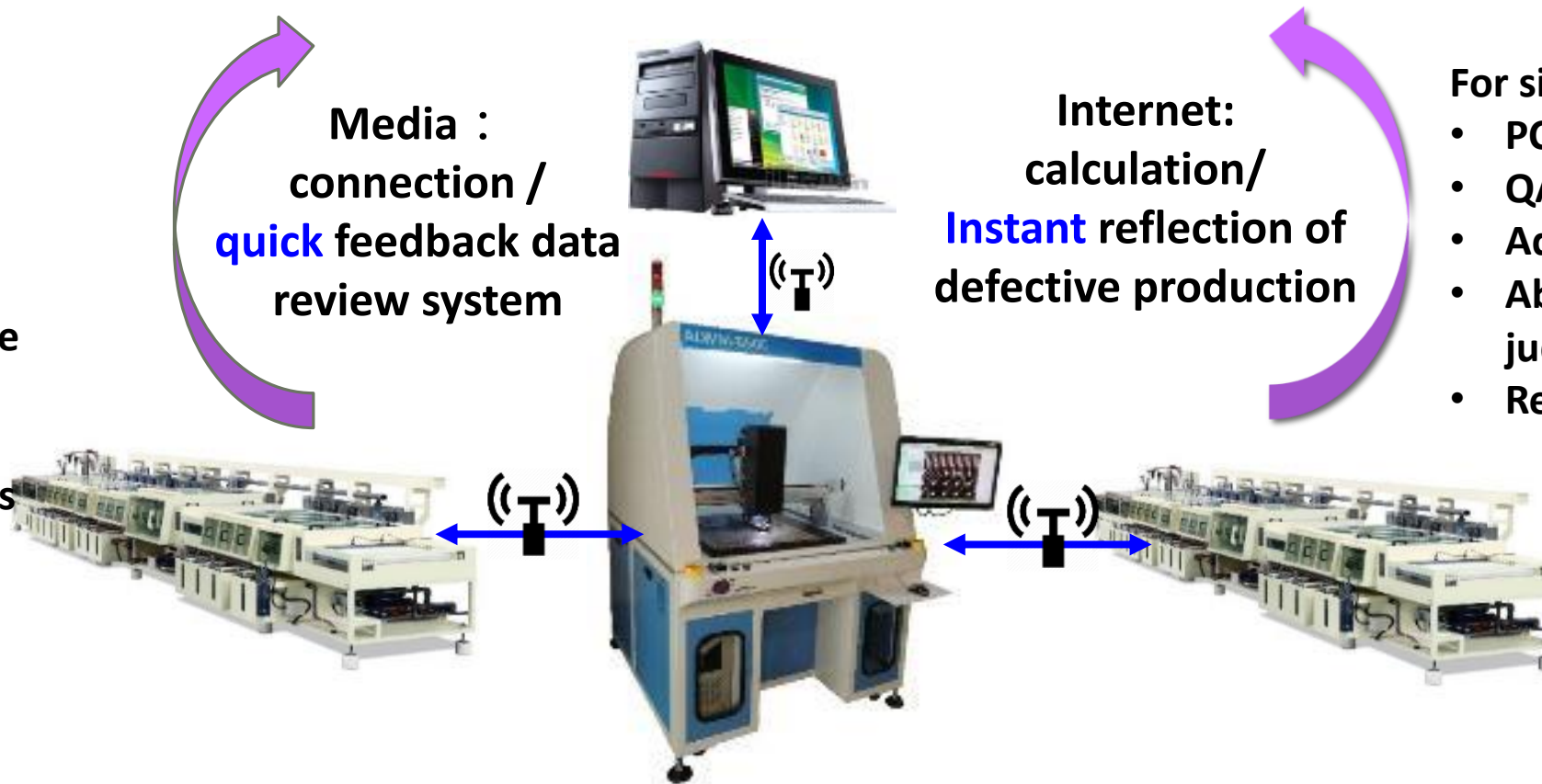
- Gerber
- Multi-points measuring
- Feedback DES line condition & compensation
- Record engineer's know how

Media :
connection /
quick feedback data
review system

Internet:
calculation/
Instant reflection of
defective production

For single process :

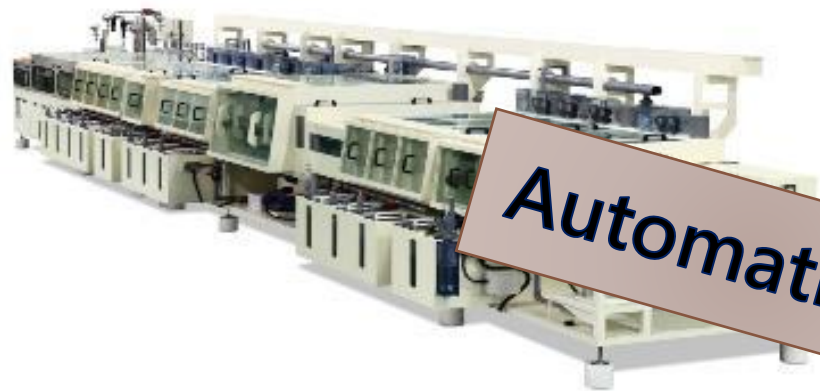
- PCB QA specifications
- QA data analysis
- Adjustment judgement
- Abnormal parameter judgement
- Reduce human factors



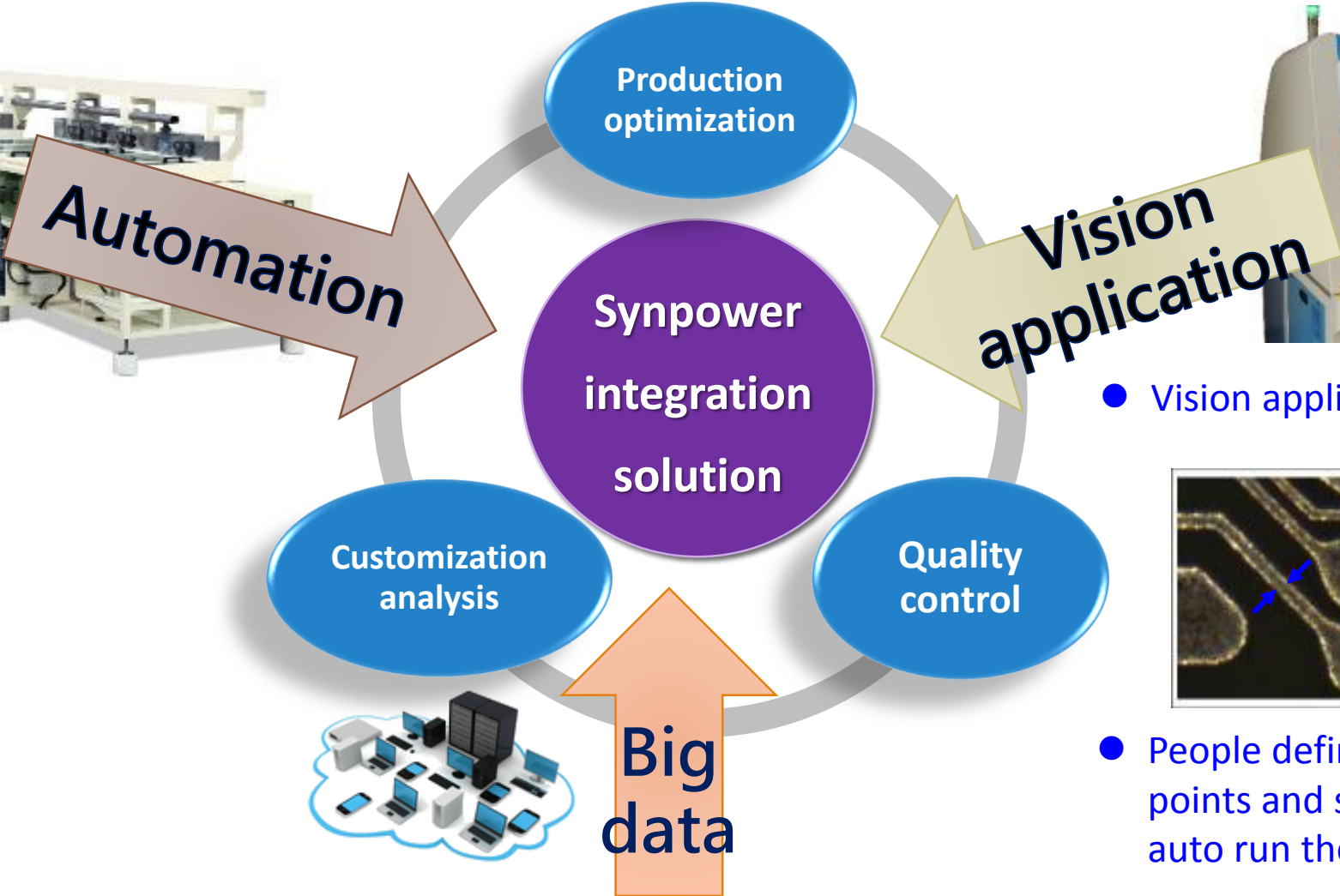
*System with instant data feedback, Manufacturing improvement
Advance automation into smart production, approaching to industry 4.0*

10.2 聯策科技協助客戶導入工業4.0

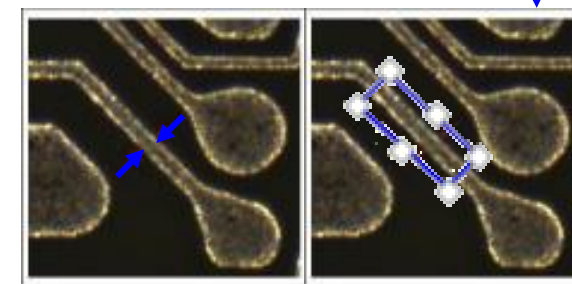
DES Line



Auto DES line monitor system



- Vision application to ensure quality



- People define the measuring points and spec. and software auto run the measurement



*Many thanks for your listening!
We always serve you with our best.*