

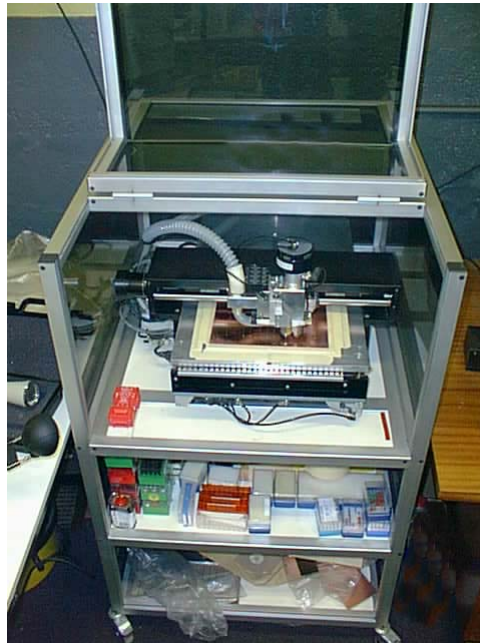


SEIL Production, Manufacturing & Inspection Plant & Equipment

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Production Equipment

LPKF Protomat 95s Engraving Machine



The LPKF Protomat 95s is a computer controlled mill/drill unit that is used primarily for producing PCBs. Following circuit design, the resultant Gerber data is input to the machine via the attached PC, and isolated ready for milling. Isolation is the process of computing the tool paths to remove copper as the negative of the Gerber data. The machine then drills the holes, mills the tracks and can route cut outs or shaped boards.

The unit is housed in an environmentally and acoustically friendly cabinet and all milled or drilled swarf is collected by a vacuum system.

Specification

Working Area:	420 mm x 380 mm (16.5" x 15")
Resolution:	5 μ m (0.197 mil)
Spindle Motor:	3-phase motor. 10.000 to 60.000 rpm. adjustable
Toolholder:	1/8" pneumatic collet
Drilling Speed:	120 strokes/minute
Travel Speed:	(maximum) 60 mm/s (2.4"/s)
Milling Depth Sensing:	air-cushioned contactless sensing
X/Y Drive:	stepper motors. precision recirculating ball spindle. linear guides
Z Drive:	pneumatic
Machine Table:	aluminium milled flat. 15 mm thick
Dimensions (W/H/D):	600/430/750 mm (25.6" x 17" x 29.5") (without cabinet)
Weight:	50 kg (without cabinet)
Power consumption:	240 VA
Minimum Sizes:	Track: 0.1mm (4mil). Gap: 0.1mm (4mil). Hole: 0.2mm (8mil)

Production Equipment

ABC PL904S Copper Plating Line



The ABC Copper Plating Line is used for producing prototype and production runs of Plated Through Hole (PTH) PCBs. The line is self-contained with 5 process tanks and 3 associated spray wash facilities. The first 4 tanks are used to prepare a panel prior to being electrolytically plated in the fifth tank. The line is fitted with controllers that have membrane touch pads and digital read out meters to set and display volts, current, plating time and amp hours.

Processing Sequence:

Cleaner / condition (4 mins.) - Spray rinse (1/2 min.) - Immersion rinse (1/2 min.)
 Catalyst (4 mins.) - Spray rinse (1/2 min.)
 Salt remover (1 min.) - Spray rinse (1/2 min.)
 Electrolytic cu (36 mins.)

Specifications

Max. Panel Size:	18" x 12" (457 x 305mm)
Max.finished PCB:	18" x 11" (457 x 280mm)
Tank capacity:	Process 10 Litres, Plating 50 Litres
Rectifier:	1 x 100A
Agitation:	Mechanical to all process stages & air to plating
Dimensions:	1500 x 620 x 910mm.
Electrics:	Single phase 220/240V 50Hz.
Heaters:	500W Silica sheath.
Water in:	Standard washing machine hose fittings supplied.
Water out:	36mm push fit polypropylene drain.

Production Equipment

DEK 248 Screen Printer



The DEK248 is a flexible, semi-auto, surface mount screen printer that is used to accurately and repeatedly apply solder paste onto a PCB prior to population and soldering.

The printer is micro controlled and menu driven, with machine parameters that are programmable on the 24x2 line LCD panel. Up to 35 separate menu files can be stored within the printer. The programs can control many aspects of operation including the speed of separation of the PCB and stencil for Fine Pitch applications.

The solder paste is applied by a squeegee blade that distributes the paste over the surface of the screen and through the apertures that are pre-cut into the screen and onto the PCB. All aspects of squeegee movement are operator programmable.

Specifications

General Parameters:	Screen Frame 508 x 508 mm (20" x 20") (internal)
Print Speed:	10-70 mm/s (0.4-2.95 in/s)
Menu Storage:	35 separate programmes, recalled alpha-numerically with Menu Protection Keylock protection of menu parameters
Solder Paste/Replenish:	Operator initiated (Paste inspection mode available)
Power supply:	220 V, less than 1.0 kW
Air supply:	Press minimum 4 bar (60 psi), consumption 60 litres/min (2.5 cf/min) at 50 % duty print cycle
Vacuum supply:	Integral vacuum generator
Dimensions:	1200mm x 1150mm x (47.25" x 42.25") nominal height 1200mm (42.25")
Weight:	Base Machine including stand - 355 kg (780 lbs)

Production Equipment

Quad IV Assembler



The Quad IVc Assembler is a computer controlled machine that places surface mount components onto PCBs. The assembler picks up components from feeders and very accurately places them on the PCB at the locations and in the orientation predefined by the operator under software control.

The Quad IVc Assembler is designed for speed and flexibility with a component placement rate of up to 3,400 components per hour depending upon board and component type. It handles components from 0402 to PLCC 84 and up and plastic lead chip carriers (PLCC) measuring 1.00".

The internal alignment system provides precise, non-contact component measurement for placement accuracy. Components are centered at the designated location to within ± 0.001 ".

Specifications

Positioning (x/y): Recirculating ball screws driven by microstepper motors incorporating linear absolute positional feedback
Encoder resolution 0.0005" (0.013mm)
Positioning system resolution 0.00025 (0.006mm)
Accuracy ± 0.001 " (0.025mm) max

Positioning (z): Programmable stroke 1.35" (34.3mm) max
Resolution 0.00025 (0.006mm)

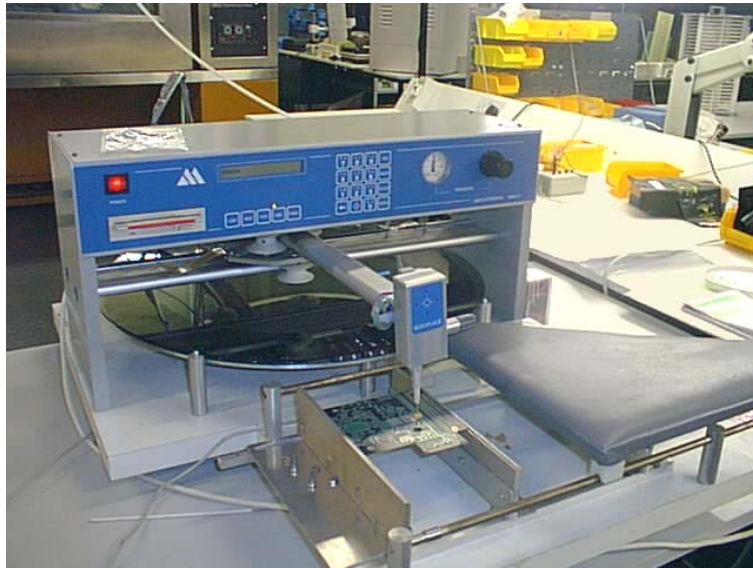
Theta positioning: Microstepper motion control with 0.015° resolution

Dimensions & weight: 42" (L) x 42" (W) x 72" (H). 1100 lbs

Power: 240 VAC, 50 Hz, 1.2 kW max

Production Equipment

Mechatronika MM500 Pick and Place Machine



The Mechatronika MM500 is a semiautomatic pick and place machine that is ideally suited for prototypes and small run production. The MM500 is designed to place SMD components on PCBs and ceramic substrates of hybrid components, and also to dispense solder paste on PCBs.

Picking and placing is carried out by means of a vacuum nozzle mounted on the end of the unit's straight-line mechanism. Interchangeable nozzles allow the machine to handle a wide range of components. Precise placement is assured by the machine's Accuplace targeting system which uses an optical indicator. Bulk material as well as taped components can be processed.

SMD components can be picked from the rotary 45 place carousel or from tape feeders.

Solder paste is applied via a pressurized syringe. Selection of needle diameter, extrusion pressure and process duration allow the operator precise control over paste application.

Specification

PCB placement area:	Max. 240 x 280 mm
Feeders:	Tape-based bulk material Automatically indexed carousel feeder with 45 compartments
Dimensions:	590 x 750 x 350 mm
Weight:	20 kg
Power supply:	220V, 50Hz, 25W
Air supply:	0,6 MPa

Production Equipment

Kerry CRD 450 Ultrasonic Cleaner



The CRD Ultrasonic cleaner is a 3-stage system for the thorough cleaning, rinsing and drying of populated and unpopulated pcbs.

The first stage is immersion in a heated, ultrasonic bath. The bath uses a Safewash fluid and is heated to around 60°C. The bath has 16 ultrasonic transducers.

The second stage is either immersion in a rinse bath or the manual rinsing of the boards with de-ionised water.

The third stage is uses filtered, recirculating hot air to completely dry the boards.

Operator controls allow the pre-set temperatures of the ultrasonic bath and hot air dryer to be monitored.

Specification

Overall dimensions: 1500 x 800 x 975 mm
Electrical Power: 415 Volts, 3 phase, 16 Amps per phase
Ultrasonic generators: 16 at 38 kHz

Production Equipment

Surfair 510 Convection Reflow Oven



The oven is designed to meet the demanding requirements of SMT manufacture. The oven consists of a series of electrically heated zones through which the pcb travels on a conveyor system. The temperature settings and most other oven functions are controlled by an integral PC. Fume and excess heat are removed by an extraction system.

Each heater zone contains a series of foil heating elements that require no maintenance and are self-cleaning.

In order to ensure repeatability and consistency of manufacture, the controlling PC allows temperature profiles to be created, saved and loaded as necessary. A typical profile establishes a pre-heating zone at 50°C, followed by a pre-bake and flux activation zone at 130 - 150°C. This is followed by a full reflow zone running at 205 - 220°C.

When the board emerges from the reflow zone it enters a cooling section. Here fans force cooling downwards onto the hot circuit board bringing the temperature down to a point where the board can be handled at the oven exit point.

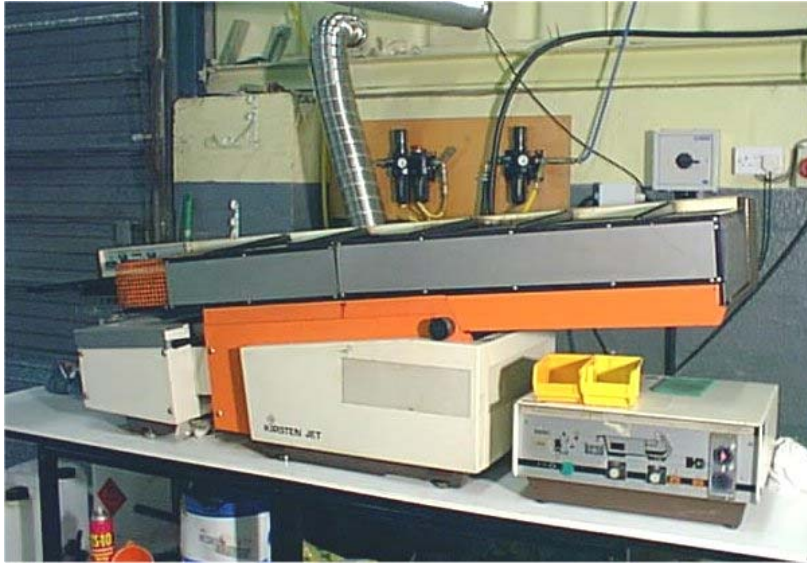
The operation of the oven is a continuous process with the production rate depending upon the conveyor speed, which in turn is dependant upon the temperature profile selected.

Specification

Electrical Power: 415 Volts, 3 phase, 35 kW

Production Equipment

Kirsten 6TF/330 Wave Soldering System



The Kirsten 6TF/330 is a bench-top wave soldering system for the production of printed circuit boards.

The system is housed in a steel cabinet that has a partial hood, which can be raised for access. A conveyor runs through the cabinet. An external Power-Controller provides power and control functions.

The system consists of three zones; fluxer, pre-heater and solder. The fluxer uses an internal air pump to create a head of foam through which the base of the pcb passes.

The pre-heater consists of a hot-air blower and a tunnel formed by electrical IR heaters. As the pcb passes through, the flux is dried and activated in order to remove impurities that may prevent proper soldering.

The solder module creates a solder wave that makes contact with the base of the pcb as it passes on the conveyor. The module consists of a solder pot containing a reservoir of molten solder, and a solder nozzle supplied with solder by an electrodynamic solder pump. The solder is covered by a protective oil film.

An exhaust system vents fume external to the factory.

Specification

Overall dimensions:	2300 x 680 x 730 mm
Electrical Power:	240 V, 10 kW
Solder content	30 kg

Production Equipment

Electrovert EPK-I Wave Soldering System



The Electrovert EPK-I is a completely automated wave soldering system for the production of printed circuit boards. The system is housed in a steel cabinet which has hood that can be raised for access. A titanium 'V' groove finger conveyor runs through the cabinet.

The system consists of three zones; fluxer, pre-heater and solder. The fluxer uses compressed air to creates a head of foam through which the base of the pcb passes.

The pre-heater consists of a tunnel formed by electrical IR heaters. As the pcb passes through, the flux is dried and activated in order to remove impurities that may prevent proper soldering.

The solder module creates a regulated solder wave that makes contact with the base of the pcb as it passes on the conveyor. The module consists of a solder pot that contains a reservoir of molten solder, and a solder nozzle. The solder nozzle can take several forms and is used to produce the various types of solder wave.

An exhaust system vents the fluxer and solder fume external to the factory.

Specification

Overall dimensions: 1400 x 3742 x 1379 mm
Electrical Power: 3 phase, approx 18 kW
Conveyor speed: 0.5 - 12.5 fpm
Flux capacity: 13 litres
Solder pot capacity: 565 kg
Warm-up time to 260°C: 3-4 hours

Production Equipment

Lynx Stereo Microscopes



Lynx Stereo Microscopes are used for precision manufacture and soldering, and for the inspection of PCBs and components prior to despatch.

The eyepieceless viewer enables freedom of head and body position, eliminating operator fatigue. Due to an exit pupil 64x larger than traditional eyepiece microscopes, a high-resolution image is produced over a large viewing area.

A variety of objectives and multipliers can be fitted that complement the 6:6 to 1 zoom-ratio offering a combination of magnification up to 120x and working distances to suit manufacturing or inspection requirements.

A wide range of adjustments provides for an optimum viewing position.

Illumination is provided from an outboard, variable halogen light source.

Optical Information

Magnification	Range	with 1.5x Multipliers	with 2x Multipliers	Working Distance	Field of View at Max. Zoom	Field of View at Min. Zoom
x0.3	x1.8-x12	x2.7-x18	x3.6-x24	312mm	12mm	77mm
x0.5	x3.0-x20	x4.5-x30	x6.0-x40	175mm	7mm	46mm
x0.7	x4.2-x28	x6.3-x42	x8.4-x56	127mm	5mm	33mm
x1.0	x6.0-x40	x9.0-x60	x12-x80	85mm	3.5mm	24mm
x1.5	x9.0-x60	x13.5-x90	x18-x120	45mm	2.5mm	16mm
x2.0	x12-x80	x18-x120	x24-x160	25mm	1.75mm	12mm

Production Equipment

Vision Engineering VS8 Optical Inspection System



The Vision Engineering VS8 Optical Inspection System is based on the Lynx Stereo Microscope, but includes a scanning table and video camera/monitor. The inspection system is designed for the precision examination of PCBs to a minimum of IPC-A-610 standard. In addition to examination, the system enables the population of PCBs to be validated against a component list and the video facilities are also used for video conferencing directly with a client.

The basic optical system is similar to the Lynx Stereo Microscopes but this unit has been specifically designed and optimised for component examination. The VS8 features stereo-zoom magnification to 40x and is fitted with 34° oblique mirrors that are motorised and remotely controlled for efficient 360° viewing around components or solder joints.

The indexing table is static safe and has a quick release board holder with locking X and Y-axis.

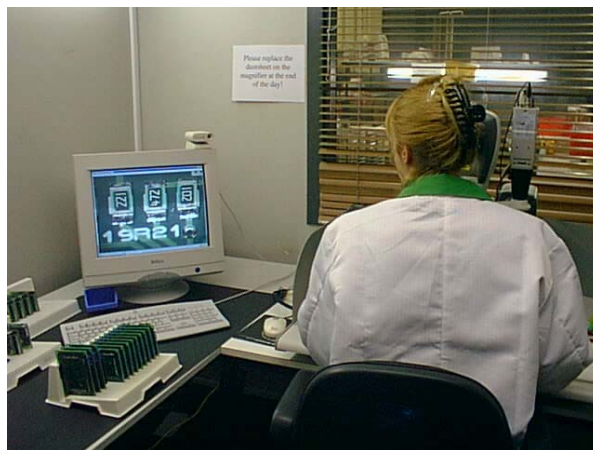
The unit is fitted with a Sony CCTV colour camera with the video being displayed on a 19" monitor. The monitor displays what the inspector sees through the microscope and also allows the inspector to view and annotate component lists. Unique software provides video image capture and conferencing facilities.

Illumination is provided from an adjustable, outboard halogen light source.

Optical Information						
Host Unit	Viewing Angle	Magnifications		Working Distance	Field of View at Max. Zoom	Field of View at Min. Zoom
		Direct	Angled View		Direct	Direct
Lynx	Directly down and 34° from vertical	6-40x	4-28x	28mm	3.5mm	24mm

Production Equipment

Vision Engineering VS8 Optical Inspection System



Production Equipment

ERSA Ersascope Inspection System



The Ersascope combines integrated split fibre optics, and a total of 42 lenses optically coupled to a highly specialized prism with an optical axis tolerance of less than 2° seconds. The resulting image offers up to 700x magnification of the soldered connections under a Flip-Chip even with a stand-off height of less than 0.05 mm (2 mils).

Measurement and Quality Control Software is used to assist in the failure recognition process. In addition to displaying a real time video of those images captured by the optical system, the user can call up good/bad reference pictures as windows or overlays. Component, board, or error-specific reference picture groups can be accessed from the online databank.

With the system optically calibrated distance, angle, radius, and point-to-point measurements can be taken with an accuracy of +/- 0.01 mm. Stand-off height, wetting angle, ball radius, and co-planarity measurements can extend the capability of the visual indicators to ensure a more complete and objective inspection process.

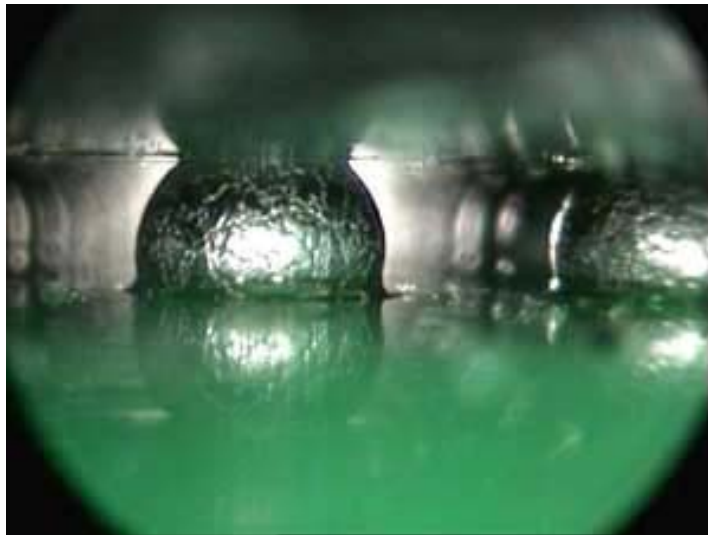
An automatic measure control function provides a “go”/”no go” based on the automatic comparison of actual and target measurement values which can be stored in a separate measure control databank. Images and corresponding measurement values can be stored in the main image databank with sub-files containing all pertinent information about the parameters involved in the process, e.g. type of flux, paste, temperature profile, etc.

Production Equipment

ERSA Ersascope Inspection System



Optical head and multi-fibre light source



Operator's view of BGA

Production Equipment

ERSA IR 500A / PL 500A BGA Rework Station



The ERSA IR 500A Rework Station facilitates the soldering and desoldering of a wide range of components, including SMT, Fine-Pitch, BGA or MicroBGAs. The aperture system doesn't demand the use of nozzles or stencils, and the use of dark IR radiators avoids overheating.

The ERSA PL 500A placement system provides precise placement of BGAs, Micro-BGAs, as well as fine-pitch components. The ball-bearing PCB holder enables exact placement that is free of vibration and jerking during PCB movement. Defined stops provide for working without interruption. The micrometer table X-Y axis settings allow the fine adjustment of the PCB relative to component pins.

The combination of two-coloured lighting for the PCB and component pins together with the integrated CCD colour camera allows precise observation of the placement process on a separate monitor. The simultaneous view of the PCB and component connections provide for additional visual control when placing a component and for the resulting soldering process. The ERSA PL 500A has an integral vacuum supply that is automatically switched on when a component is picked up and switched off when the component is placed.

ERSA PL 500A recalibration can be carried out at any time by its own calibration tool.

Specification

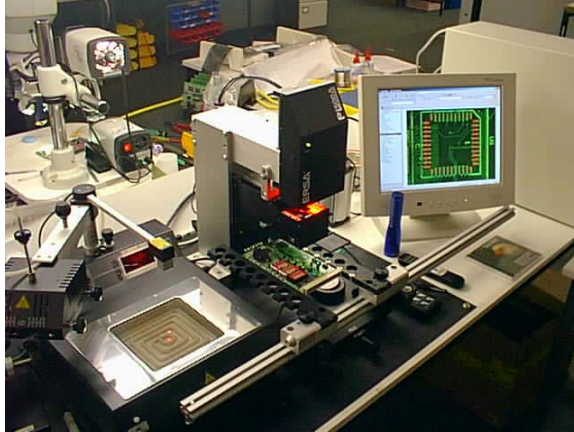
Electrical Power:	240 Volts, 0.42 kW
Top IR radiator	200 W
Bottom IR radiator	400 W
Placement force	1.5 N



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Production Equipment

ERSA IR 500A / PL 500A BGA Rework Station



Production Equipment

ACE FSHV360-SP40-A-09 Environmental Test Chamber



The test chamber is designed to simulate low temperatures, high temperatures and humidity.

The chamber consists of a heavy steel frame into which is constructed a stainless steel liner. The front mounted, stainless steel door provides full access to the chamber and has a heated window.

Chamber cooling is achieved by an expansion coil and rapid cooling using liquid Nitrogen. Heating is by means of electrical air heating elements and a circulating fan. Temperature and humidity profiles can be pre-set by using the built-in Watlow F4 controller, and logged by an external PC.

Four cable ports in the left side of the chamber allow wiring to be connected to components in order that they can be externally monitored.

Chamber parameters are recorded on a 2-pen chart recorder

Specification

Internal dimensions:	(H) 600mm, (W) 1000mm, (D) 600mm
Temperature range:	-60°C to +185°C
Rate of change:	5°C over range 100 - -30°C / min
Humidity range:	10 - 95% RH
Air distribution:	15" axial fan
Heating:	9 x 1100 Watt elements
Power:	Three phase & neutral @ 32 Amps
Distilled water:	50 litres

Production Equipment

Test and Measurement Facilities



SEIL's Engineering Department is equipped with a wide range of modern, calibrated test and measuring equipment to ensure that our products meet specifications and the exacting requirements of ISO 9001. The equipment includes:

- Analogue and Digital Oscilloscopes
- Frequency Counters
- Digital Multimeters
- Logic Analysers
- Spectrum Analysers
- Frequency and Function Generators
- Laptop Computers for test and bespoke software development and implementation
- Low, Medium and High Voltage Power Supplies
- Embedded firmware device programmers
- PAT and ESD Test sets
- Cable connection and continuity test sets.



SCOTLAND ELECTRONICS (INTERNATIONAL) LTD

Production Equipment

Test and Measurement Facilities

