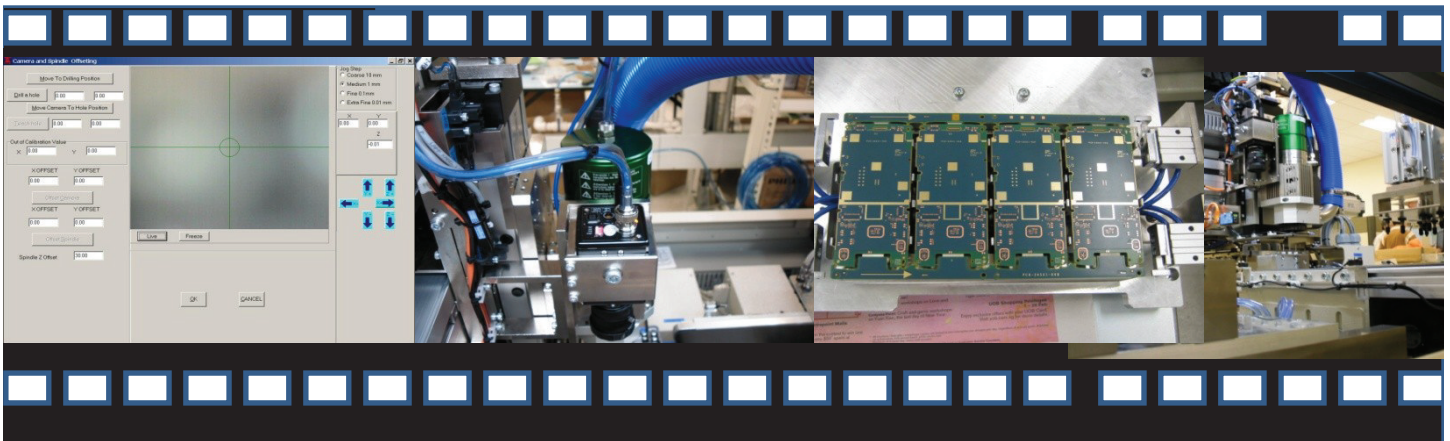


# INLINE ROUTER MACHINE (IRM)



The IRM is an inline router machine specially designed to route (de-panelize) a panel of printed circuit boards (PCB) into individual assemblies (PCBA's). A post routing pick and place board handling facility then provides the link for a fully automated End Of Line (EOL) processing.



# INLINE ROUTER MACHINE (IRM)

## Manipulator

Manipulator motor : 3 axis ac brushless servo motors  
 Manipulator repeatability :  $\pm 0.016$ mm  
 Resolution :  $\pm 0.01$ mm  
 Configuration : X, Y, & Z-axis.

## Panel loading

Loading : Auto adjustable width Single conveyor (servo).  
 : Single axis Front to back Shuttle (servo)  
 : Dedicated gripper fixture

## Unloading

: Single axis vacuum pick and place (servo).

## PCBA panel types

PCBA type : All types with tooling holes/slots for gripping  
 Panel size (mm) : 320 length x 250 width  
 Panel thickness (mm) : 0.6 - 2.0

## Spindle motor

Power : 0.5kw  
 Max. Speed : 50,000 rpm  
 Cooling : Air  
 Chucking : Internal pneumatic collet, auto tool change  
 Router bit : Shank size 3.175mm (1/8 ")  
 Ceramic bearings : Standard

## Programming

On-line : Using "live" image from camera  
 Camera system : Standard (comes) with machine

## Vacuum system

Power : 3 kw rotary vanes with relief valve  
 Filtration : 3-stage filter (first stage is disposable)  
 Consumable filter : Disposable industrial vacuum filter bag (30 micron)

## Utilities

Power supply : 220v, 3 phases, 60Hz , (options available)  
 Machine dimension (mm) : 1250 w x 1300 d x 1800 h  
 Machine weight : 1150kg (approx.)

## •OPERATING SYSTEM

### Spindle

Spindle speed : 5,000 - 50,000 rpm adjustable via frequency converter

### Routing capability

Non routing speed : 1000 mm/sec  
 Routing speed : 100 mm/sec max (depending on panel and set up)  
 Repeatability : <0.1 mm straight lines, curves and interpolated profiles

### Machine safety and warnings

Safety : Door sensors, emergency buttons, spindle stop  
 Red light : Servo overflow, No cutter, Emergency stop, Spindle fault,  
 Enclosure door is open

Amber light : Teach mode

Green light : Normal mode

### Control specifications

System platform : Windows® based pc

Vision system : High resolution video camera

### Programming & Operation monitor

On-line : vision assisted point-to-point manual teaching,  
 Or manual input of data co-ordinates

Editing function : Dry run vision assisted / test run mode  
 Variables functions : Tool bit diameter compensation,

: Filter, change interval (distance) setting,  
 Tool bit wear compensation

: Tool life tracking, PCB board count.

: Tool broken sensor

: Vacuum filter change alarm

: Machine error history

Vacuum

Machine

# INLINE ROUTER MACHINE (IRM)

The IRM only have one work fixture. IRM incorporates 6 high rigidity, linear axis driven by maintenance free AC servomotors. These 6 axis consist of X, Y, W, E, F and Z-axis. The Z-axis motor incorporates a power off brake to prevent the axis falling under its own weight on power down. The linear guides used for the entire axis are heavy-duty pre-loaded re-circulating ball guides.

The whole system is mounted on a welded steel base structure powder coated in beige color, providing a stable framework. The canopy has raising doors fitted with ESD safe Perspex windows, provides for a safe, fully enclosed machine.

A PC based controller controls the manipulator with automatic back up of program files. The operating software provides system monitoring. It tracks and provides automatic notification of other details such as tool breakage, aberrations in the air cooled system and definable distance routed for filter bag change.

Creating cutting tool path programs is made user friendly with the use of a camera to view and verify the cutting path without actually cutting a single board.

Router Manipulator: All axis manipulators are linear, AC servo driven, precision ground. Pre-loaded ball screw axis with re-circulating, high rigidity linear motion guides.

Spindle and Camera Module: The IRM uses a high-speed 60,000-rpm spindle. Its temperature is maintained at safe level by a air cooled system incorporated into the machine.

Input Shuttle Conveyor Module: The input conveyor receives panels from the previous SMT machine, e.g. an oven or label placer. Once a panel has been received, the shuttle unit moves the conveyor and panel to the worktable ready for routing.

Work Station Module: After the receiving PCB conveyor has been shuttled to a worktable engaging position, ready engage with the dedicated fixture, which is attached to the worktable

Lifter Module: During the routing process, the Lifter moves to the workstation to standby ready for the process. A Pneumatic cylinder is used to lower the head down to the workstation and vacuum pad suck PCBA's off the fixture and place them onto the outgoing conveyor.

Outgoing Module: The output conveyor is fitted to the IRM as an option.

