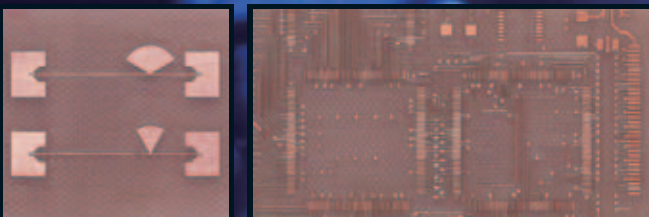


MIT S

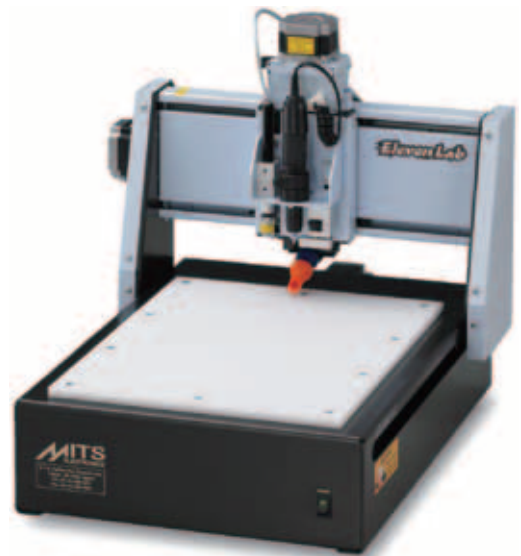
ELECTRONICS

Printed-Circuit Board Prototyping System

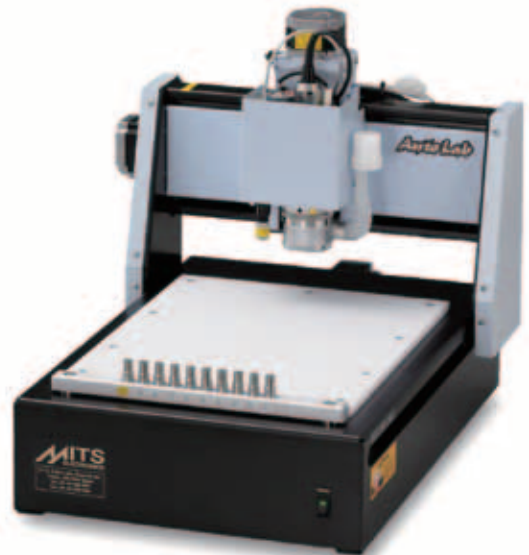
- Time saving of product development.
- Easy trial PCB making in laboratory in your own way.
- Produces boards with the precision expected in a laboratory.
- Ideal for in-house prototyping.



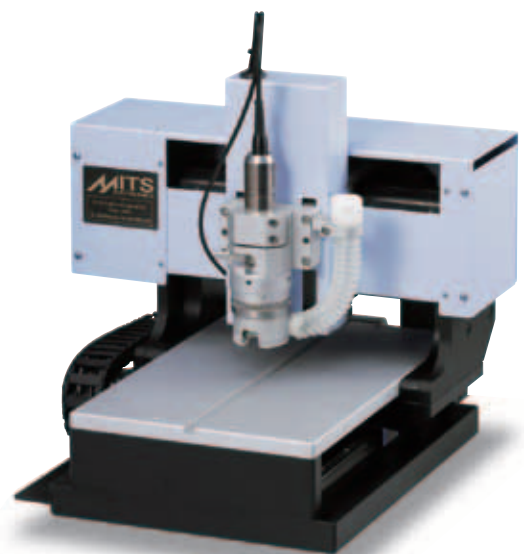
MIT S Electronics



Eleven Lab

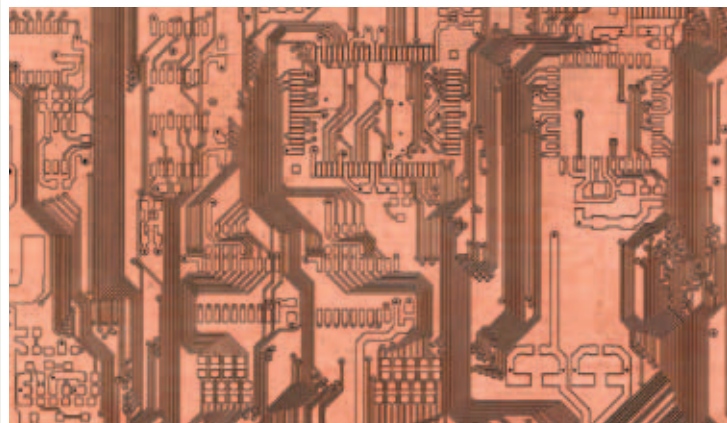


Auto Lab



FP-21T Precision

Providing very beautiful fine and accuracy cutting finish on the prototype PCB is most required point for the PCB Prototyping Machine.



For in-house printed circuit board prototyping

Wide range of product line-up

In order to meet the increasing demand for miniaturization and high-density of PCBs in many fields of electronics, MITS is offering wide range of PCB prototyping machines including FP-21T Precision, the world first 50 μm (2 mil) line/spacing milling machine, and many other machines for various purposes.

Made-in-Japan machines, renowned for quality and reliability

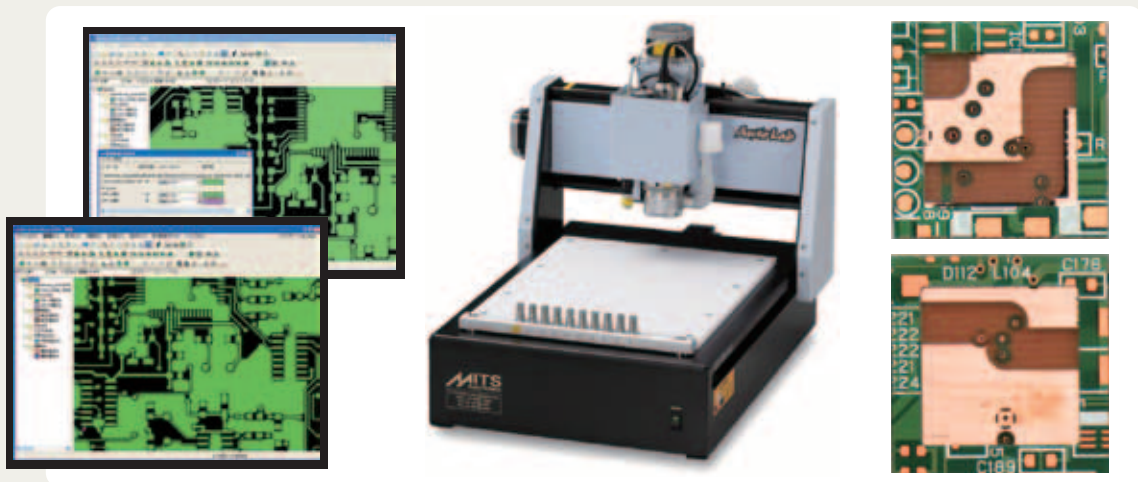
MITS has been enjoying high reputation as the leading Japanese manufacturer of PCB prototyping machines, offering the enduring, high-rigidity, and extraordinarily precise machines for many years.

All the manufacturing process of MITS machines is taking place in Japan, from design to construction. Thorough performance testing (by our own technical staff) ensures MITS prototyping systems to achieve fine-pattern processing.

Seamless integration from CAD designing to board making

You can produce your boards by importing your CAD data (Gerber or DXF output format) to our software enabling smooth process from CAD designing to board making. Moreover, together with MITS original software suites and options, you will have even more useful and enhanced integrated MITS PCB prototyping systems.

You can produce single, double sided, multilayer, and high-density boards rapidly !

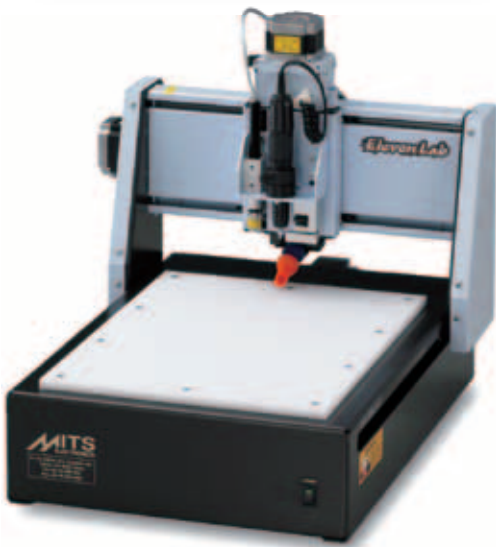


High Cost Performance Series

Standard Model

Low cost, popular and X,Y,Z triple-axes control

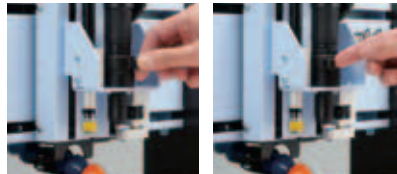
ElevenLab **Most popular**



- Spindle Speed : 41,000rpm
- Single Step Tool Change
- Standard Equipped Camera Monitoring System
- Cabinet (option)

Working area
229x320mm

Easy Operation!
Single Step Tool Change



Tool change can be done without any complicated action such as thread fastening.

Cabinet (option)



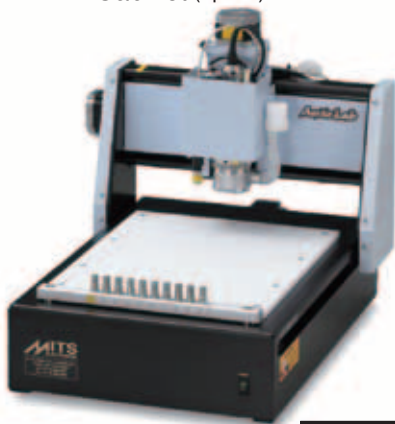
Applicable model:
Eleven Lab,
Auto Lab, Auto Lab100

Auto Tool Change Model

AutoLab **NEW** *AutoLab 100*

- Spindle speed 62,000rpm
- 10 Auto Tool Change
- Standard Equipped Camera Monitoring System
- Cabinet (option)

- Spindle speed 100,000rpm
- 10 Auto Tool Change
- Standard Equipped Camera Monitoring System
- Cabinet (option)



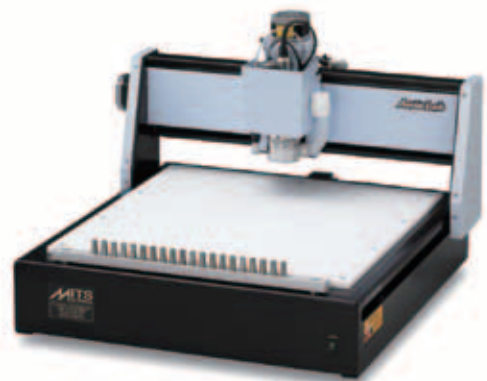
Working area
229x300mm



Wide Working Area Model

NEW *AutoLab W*

- Spindle speed 62,000rpm
- 10 Auto Tool Change (20 by option)
- Standard Equipped Camera Monitoring System



Working area
400x365mm

Comparison of models

	Eleven Lab	Auto Lab	Auto Lab 100	Auto Lab W	FP-21T	FP-21T Precision
Working area (mm)	229 x 320 (9" x 12.6")	229 x 300 (9" x 11.8")		400 x 365 (15.7" x 14.3")	350 x 250 (14" x 10")	150 x 150 (6" x 6")
Auto-tool-change	—	Standard			—	—
Fiducial camera	Standard equipment					
HP type	—	—	—	—	Option	Standard
Vacuum table	VT-ABS (Option)					VTP-CRM (Option)
Tool protrusion equipment	—	Option				
Price	low	—————→				high

High Precision Performance Series

FP-21T **Most recommended**

Desktop type with 3-axes control system

Equipped with high speed & high power spindle motor.

Air-floatation and non-contact pressure foot for 21THP.

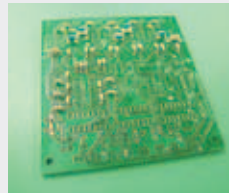
Ideal system for High-Frequency Circuit, Teflon Board, Flexible Films.



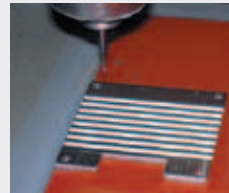
- Standard Equipped Camera Monitoring System
- Cabinet (option)

Working area
350x250 mm

Capable of processing various materials besides substrate boards. Hardware parts, panel engraving, supplementary work on finished board, and other works done with MITS prototyping machine are shown below. With your unique ideas, applications for FP-21T/21THP are limitless.



Double-sided board



Aluminum



Acrylic



Characters on a panel



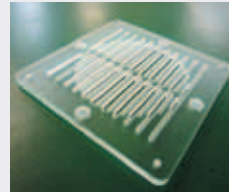
Supplementary processing



Parts made of duracon



LED light



Speaker cover

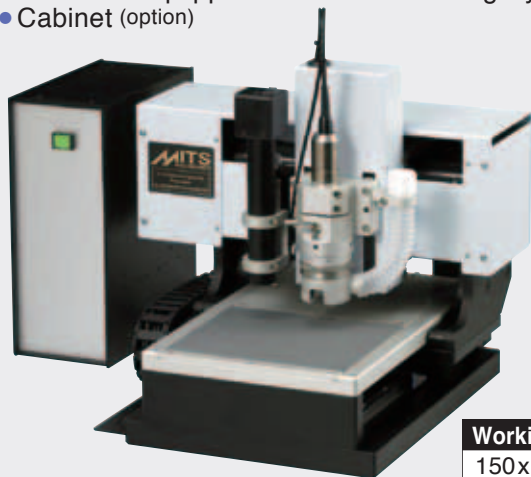


Puzzle pieces

50μm(2mil) line and space, the state of the art!

FP-21T **Precision**

- High performance spindle motor
- Standard Equipped Camera Monitoring System
- Cabinet (option)

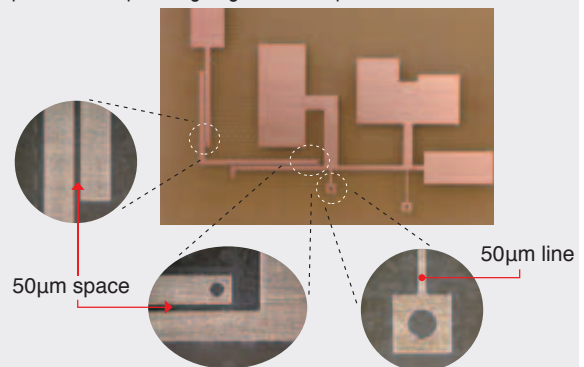


Working area
150x150 mm

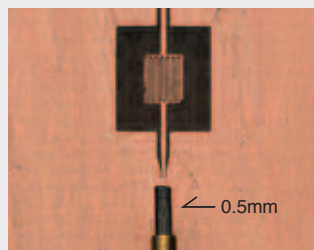
Stepping method (three dimensional regulation) and non-contacting pressure foot (HP type) lead to the fine processing technology

This model features construction for high-rigidity and low center of gravity as well as a spindle motor with minimum level of runout, to ensure very low vibration making it ideal for the finest level of processing.

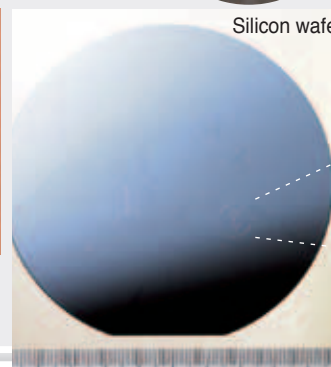
With our innovative Z-axis control (stepping method), the FP-21T Precision takes the advantages of the fine and fragile tools, and is capable of processing 50 μm (2 mil) lines and spacing for the first time in the world as a desktop PCB prototyping machine. In comparison to the laser machine, FP-21T Precision is far superior in sharp cutting edge and cost performance.



(magnified 1,050 times)



50μm Line & Space PCB Board
Comparing with
(mechanical pencil lead width.)



Silicon wafer



Magnified portion of the Silicon wafer

Specifications

Model	Eleven Lab	Auto Lab	Auto Lab 100
Working area (X/Y/Z) (mm)	229x320x10 *6 (30*5) (9.0"x12.6"x0.4")	229 x 300 x 45 *6 (9.0"x11.8"x1.8")	
Table size (mm)	296x396 (11.6"x15.6")		296x370 (11.6"x14.5")
Minimum width Line & Space (mm)	0.1 (4mil)		
Control axis	X , Y , Z		
Control motor	Stepper Motor		
Resolution (μm) *1	0.625 (0.0246 mil)	0.156 (0.00614 mil)	
Maximum Travel speed (mm/sec.) *2	55 (2.17")		
Spindle speed (min ⁻¹) // motor	5,000 - 41,000 DC Spindle	5,000 - 62,000 DC brushless Spindle	5,000 - 100,000 HF Spindle *4
Drilling (mm)	0.2 - 3.175 (8-125mil)		
Maximum drilling cycles (drill/min.) *3	55		
Tool Change	Manual Single Step Tool Change	Automatic / 10	
Pressure foot (Board Press Method)	One point of foot (3point:option)	3point of foot	
Camera System	Standard 30x		
Power consumption (VA)	150	200	
Machine dimensions WxDxH (mm)	435x575x430 (17.2"x23"x17")		
Machine weight (kg)	Approx.28 (62 lbs)	Approx.34 (76 lbs)	
Features		Auto-tool-change	High speed spindle motor Auto-tool-change

Auto-tool-change

NEW

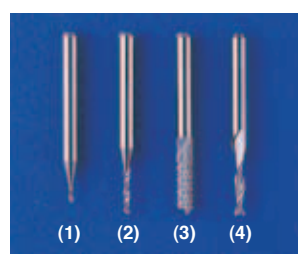
Auto-tool-change

*1 The minimum traveling figures for ordering each 3 axis movement. *2 Optimum speed for cutting depends on tool, material of board and so on. *3 This is a repeat count of drill's up and down on the maximum stroke. Optimum strokes depends on the diameter of tool.

Tools and peripheral equipments

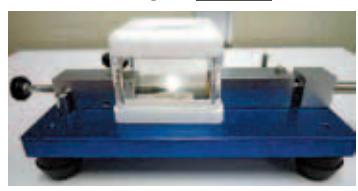
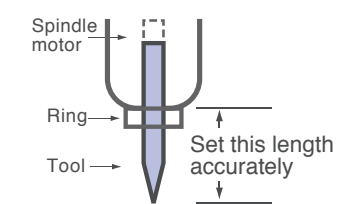
Types of Tools

- (1) Milling bit.
RF milling bit.
Diamond milling bit.
(30 times more durable)
- (2) Drilling bit
0.05 - 3.175 mm (2 - 125 mil)
- (3) Routing bit
1.0, 1.5 mm (39, 59 mil)
- (4) Aluminum engraving cutter
0.8, 1.0, 2.0 mm



Precision ring-setter (manual)

- Features
- You can attach or detach the ring to the tools.
 - Standardize the depth of the tools for the auto tool change machine.
 - Effective in adjusting to the material of varied thickness.
 - Applicable for tools less than 0.1 mm.



Jetstream

Super Cleaner "Jetstream" creates pollution-free quiet factory environment

- Collects 99.97% of milling particle debris as fine as 0.3microns, while 90% for average household vacuum cleaner. (MITS inhouse experiment data)
- Jetstream noise level is 57dB, while 70dB for average household vacuum cleaner.
- Linked with the milling machine and power supply is automatically turned on and off.
- Maximum suction pressure is 22,500pascals and the pressure level can be freely and automatically adjusted.
- Compact and lightweight.
255Wx360Dx310H mm, 12.5kg
- Power consumption 630VA.

- Available spare parts
- Filter Bag
(1 pack with 5 pieces)
 - HEPA Filter
(1 pack with 1 piece)
 - Exchangeable Motor Brush
(1pack with 2 pieces)



**Auto-tool-change**

Specifications

Auto Lab W	FP-21 T	FP-21T Precision	Model
400x365x45 *6 (15.7"x14.3"x1.8")	350x250x25 *7 (14"x10"x1")	150x150x25 *7 (6"x6"x1")	Working area (X/Y/Z)(mm)
490x490 (19.3"x19.3")	460x450 (18"x18")	240x380 (9"x15")	Table size (mm)
0.1 (4mil)		0.05 (50µm) (2mil)	Minimum width Line & Space (mm)
X, Y, Z			Control axis
Stepper Motor	5 phase Stepper Motor	5 phase Stepper Motor	Control motor
0.156 (0.00614 mil)	4 (0.16 mil)	1 (0.04 mil)	Resolution (µm) *1
80 (3.15")		60 (2.4")	Maximum Travel speed (mm/sec.) *2
5,000 - 62,000 (model 60) 5,000 - 100,000 (model 100) *4	5,000 - 40,000 (model 40) 5,000 - 60,000 (model 60) 5,000 - 100,000 (model 100) *4	5,000 - 40,000 Dynamic runout: less than 10µm DC Spindle	Spindle speed (min ⁻¹) // motor
0.2 - 3.175 (8-125mil)		0.05 - 3.175 (8-125mil)	Drilling (mm)
55	80		Maximum drilling cycles (drill/min.) *3
Automatic / 10 20 tools by option	Manual Single Step Tool Change		Tool Change
3point of foot	3point of foot (Non contact:option) *4	Air *4	Pressure foot (Board Press Method)
Standard 30x		Standard 60x	Camera System
200	250		Power consumption (VA)
635x643x430 (25"x25.3"x17")	620x505x420 (24"x20"x17")	415x500x375 (16"x20"x15") 125x235x305 (5"x9"x12")	Machine dimensions WxDxH (mm)
Approx.41 (90 lbs)	Approx.42 (93 lbs)	Machine : 36 (80 lbs) Controller : 4 (9 lbs)	Machine weight (kg)
Wide area type Auto-tool-change	High precision, High rigidity Various material milling	High precision 50µm milling, High rigidity	Features

*4 Air compressor required
*5 without aspiration nozzle

*6 z-axis stroke 50mm
*7 z-axis stroke 30mm

The above machines have acquired CE marking. **CE**

Cabinet (option)
Protect of dust and Less noise.



- Dimensions WxDxH (mm)
500x580x450
- Weight
10kg

Applicable model :
Eleven Lab,
Auto Lab, Auto Lab100

Through Hole Plating Bath

These plating baths let you make trial boards with through holes when used in combination with PCB prototyping machine

MPT-DT+RW Environmentally Clean, Built-in Water Circulation System

Plating process needs flushing by water for cleansing board after treatment in the bath.

This plating bath has water circulation system enabling to reuse water for cleansing.

The system was designed to realize professional plating process compactly so that the system can ensure plating of 0.2mm diameter through hole.



[Rear View]
Filter pipes remove organic impurities and absorb ionized metals in the water circulated in the system.

- Specifications
- Number of layers 5
 - Circuit board size (mm)
220x230
 - Processing time (µm/H) 13
 - Board rocking system
OPTION
 - Temperature control Dimensions
OPTION
 - Dimensions WxDxH (mm)
920x650x960
 - Weight 40 kg
 - Power consumption
100 V 7A

For various types of the boards

MITS PCB prototyping machine can mill various types of the boards from normal circuit boards to extremely thin circuit boards. Besides PCBs, MITS PCB prototyping machine achieve the fine processing on the surface of other materials such as aluminum or acrylic.



Capable of milling a thin board like the above



An example of milling lines on a silicon wafer

Options enable you to process even more precisely

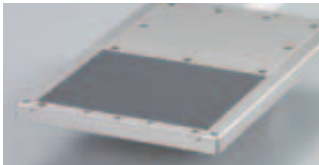
● Fiducial positioning camera (Standard equipment)

Board surface can be displayed 30,60 times magnified

Simply by equipping the color microscope with the machine and by connecting to the PC via USB, you can display the surface of the substrate board with 30,60 times magnification. Marking indicator and measurement function make it possible to align with high-precision and to measure the width of track/pattern.



● Vacuum table



● Precise model VTP-CRM

Precise vacuum table made of the ceramics. Suitable for the material whose thickness is as thin as 50 μ m (2 mil).

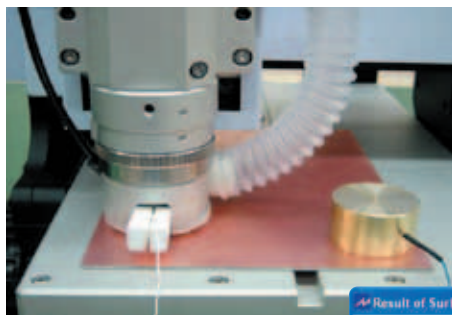


● Standard model VT-ABS

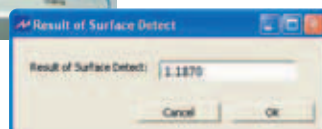
Vacuum table made of the plastic resin. Suitable for the material thicker than 200 μ m (8 mil).

Specification	VTP-CRM	VT-ABS
Working area WxD (mm)	150x120 (5.9"x 4.7")	300x 170 (11.8"x 6.7")
The minimum thickness	50 μ m (2mil)	200 μ m (8mil)
Porous surface material	Ceramics	Plastic resin
Applicable model	FP-21T Precision	FP-21T Lab Series

● Surface detecting Device



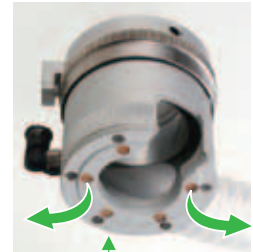
Surface detecting device measures the thickness of the PCB.



● Non-contact Milling Head

As the board is pressed by air pressure, it leaves no undesirable traces on the board surface.

Suitable for milling the soft substrate board such as teflon circuit board.



* Required for air compressor

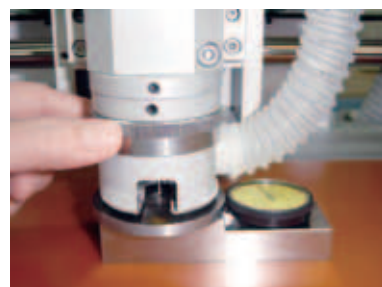
Air hole

● Tool protrusion equipment

You can measure the protrusion length of the tool from the pressure foot by the micro meter.



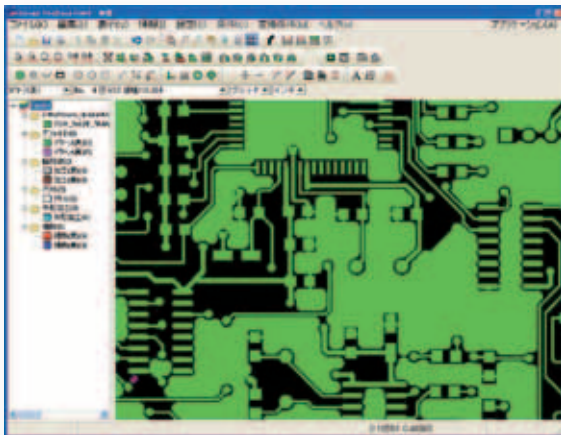
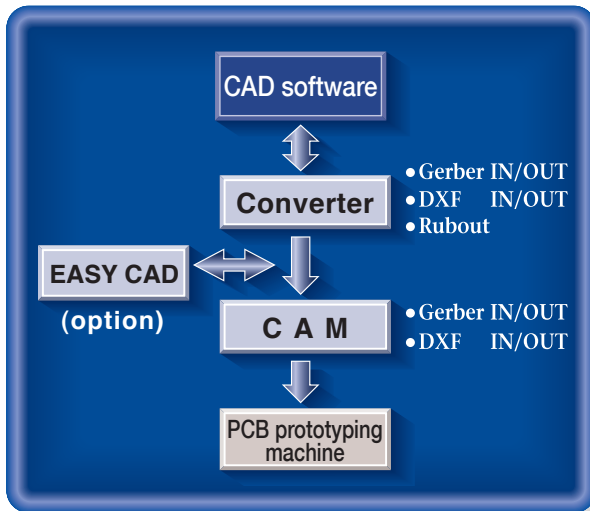
Easily viewable gauge



Fine tuning

Minimum measuring quantity : 0.001mm (0.04 mil)
 Maximum measuring quantity : 0.140mm (5.5 mil)
 Dimension W x D x H (mm) : 115 x 58 x 25 (4.1" x 2.3" x 1.0")

Design Pro Chart



● Design Pro (Standard Accessory)

Design Pro contains Converter and CAD application. The function of Converter is editing PCB pattern data, and data import/export.

And, CAM application is designed to control our PCB prototyping machines.

(For drawing and editing PCB patterns, our software EASY CAD is available as an optional extra.)

● Converter

This application has functions to import Gerber Data (RS274D, RS274X), or DXF data, and automatically generate PCB milling data based on imported PCB pattern data.

● CAM

This application is designed to control and set up MITS PCB prototyping machines.

The machine runs along the generated PCB milling data on Converter or Easy CAD, also manual operation command.

Any required setup to run machine is set in this application.

● System Requirements

OS: Windows 7 / Vista / XP (SP2, 32 bit)

● EASY CAD option

- By using this easy-to-operate software, you can easily draw the patterns exactly as you want.

- Straight forward and Easy to use.

- Popular for high-frequency patterns.

Functions & Features

● Pattern Creation

After setting the line width, land/pad width and hole diameter, create a pattern on screen.

● Pattern Drawing

Diagrams of points, straight lines, arcs and characters can be produced.

You can draw patterns by inputting numerical values.

● Editing Function

Editing functions such as line extension, line cutting, beveling (rounded corner or 45° bevel), object repositioning, copying, deleting, offsetting and hatching are possible.

● CAD Softwares of Other Companies

Convertible file format

- Gerber
- GerberX (274X)
- Excellon Drill output data
- DXF

Compliant Softwares

- CR-5000 (ZUKEN)
- Protel (Altium Designer)
- PADS
- OrCAD
- Win PCB
- Eagle
- Microwave Office
- Auto CAD (Auto Desk)
- CADLUS
- Ansoft Designer
- HFSS
- PCBE Altium
- Other

Specifications and product details are subject to change without notice.



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