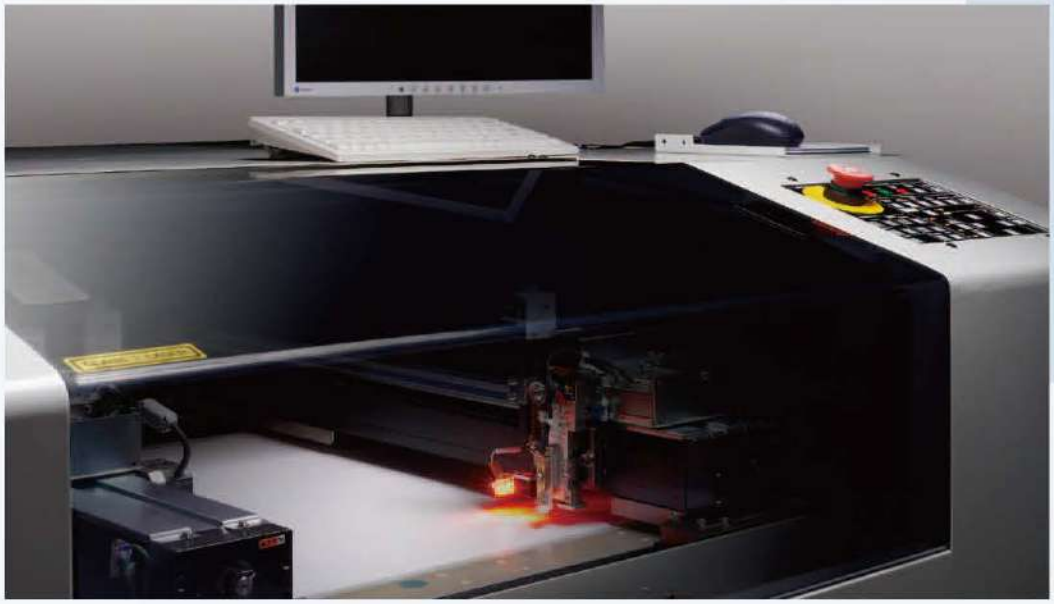
HIOKI

Test Systems ATE Series Catalog

Automatic Test Equipment



FLYING PROBE TESTER

IN-CIRCUIT TESTER

BARE BOARD TESTER

DATA CREATION SYSTEM

The Power to Connect

The power to connect that Hioki's printed circuit board testing systems deliver is the power to connect to the future. The ability to continue to support this rich and satisfying lifestyle together with customers is a small part of what testing systems can do. At Hioki, we strive on a daily basis to improve the contact performance--the power to connect with circuit boards--that is the lifeblood of electrical testing and to seek out the true potential of that capability. This is the path that we follow.

SOLUTION FACTORY

The HIOKI Solution Factory integrates all our tasks to provide high-quality products to our customers.

Measurement Technologies to


Design


Development


Call center

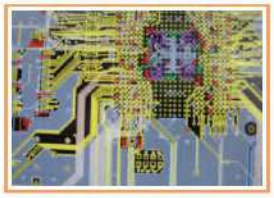
Sales Service

Solution sales helps customers realize their dreams


Repair and calibration

Development

Add ever-greater value by establishing unique development technologies


Board design

Production

The HIOKI production system ensures high product quality, low cost and short lead times


Shipment


Vacuum deposition


Board mounting


Printing instruction manuals


Assembly

Support New Testing Frontiers

INDEX

Just because you can't see it, doesn't mean we can't test it.

Flying Probe Type

Large

Testable board size

Bare board testing

Small

High-density, Multi-layer Board Solutions

- Assurance of minute via resistance values and detection of formation defects
- Probing of high-density boards
- High-speed measurement of interposer and package boards
- High-resistance insulation testing
- Standard 4-terminal measurement function

■ X-Y BOARD HiTESTER

1270/1271

Testable board size
1271 : 50×70 mm to 610×510 mm
(max. 24.02×20.08 in)
1270 : 50×50 mm to 400×330 mm
(max. 15.75×12.99 in)

See page 18.

FC-CSP/Ceramic Board FPC Solutions

- Capacitance C/S detection function
- Testing of panelized boards
- Flexible support for clamping thin boards

■ FLYING PROBE TESTER

FA1116

Testable board size
50×50 mm to 610×510 mm
(max. 24.02×20.08 in)

See page 12.

■ FLYING PROBE TESTER

FA1283

Testable board size
50×50 mm to 400×330 mm
(max. 15.75×12.99 in)

See page 14.

Large

Testable board size

Populated board testing

Small

High-density Populated Board Solutions

- Testing in multi-product small-lot production environments
- Pseudo-contact testing of IC leads (Standard 4-terminal measurement function)
- Active test (option)

Example of an inline configuration with model FA1240

■ FLYING PROBE TESTER

FA1240-61

Testable board size
50×50 mm to 510×460 mm
(max. 20.08×18.11 in)

See page 22.

■ FLYING PROBE TESTER

FA1240-63

Testable board size
50×50 mm to 400×330 mm
(max. 15.75×12.99 in)

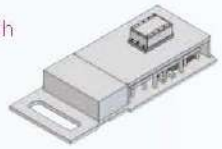
See page 22.

Moving fixture type

Measurement Units

Support for Device Embedded Substrates

- LSI reliability testing (I/O pin leakage current testing, LSI standby current consumption testing, Diode-based connection reliability testing)
- Complex component separation testing (when used with a scanner board equipped with guard feature)
- High-current continuity testing up to 150 mA
- Insulation testing with automatic protection for embedded devices
- Four-terminal continuity testing that assures pattern resistance
- Testing number of embedded devices



■ Test head (fixture)
1165-05/-06/-07

■ BARE BOARD HiTESTER
FA1811
Testable board size
test fixture
□10 mm to □80 mm
vacuum unit for Cap. test
50 × 90 mm to 105 × 250 mm

See page 10.

■ BARE BOARD TESTER
1232
(Double-sided alignment)
Testable board size
45 × 50 mm to 170 × 305 mm
(min. 1.77×1.97 in)
(max. 6.69×12.01 in)

See page 9.

System Expandability

- Ideal for embedding in automatic testing systems
- Multipurpose design enables measurement between user-specified points, data collection, and other functionalities.

■ BARE BOARD HiTESTER
1230
(Measurement/Control unit only)

See page 8.

High-speed Testing Solutions

- Support for testing in mass production environments
- Electrolytic capacitor reverse insertion detection function (option)
- Macro test
- Active test (option)

■ Test fixture
CP1167

See page 27.

■ IN-CIRCUIT HiTESTER

1220-51
(Offline type)
Testable board size
390×300 mm (15.35×11.81 in)

See page 20.

1220-52
(Space-saving model)
Testable board size
390×300 mm

See page 20.

1220-55
(Inline use only)
Testable board size
390×300 mm

See page 20.

■ IN-CIRCUIT HiTESTER
1220-50
(Desktop type)

See page 20.

Bare Board Electrical Testing System

Connected through HIOKI format Electrical testing equipment series

All pieces of HIOKI testing equipment, from bare board testers to populated board testers, are connected through the HIOKI format.

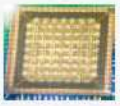
HIOKI excels in product development with a complementary relationship between populated board testing and bare board testing.

Our bare board testing equipment contains a range of component testing expertise Hioki has accumulated through years of experience in populated board testing.

Robust support for testing device embedded substrates

Bringing together populated electronic component measuring technologies

The bare board tester also utilizes the full range of HIOKI's in-circuit tester measurement technologies.

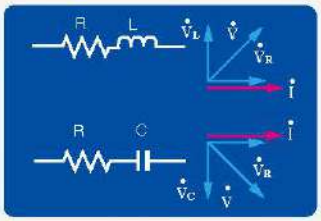


■ LSI reliability testing (EAD testing)

- I/O pin leakage current testing
- LSI standby current consumption testing
- Diode-based connection reliability testing
- Low-power mode (0.1V measurement)

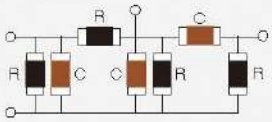
■ Complex component separation testing (when used with a scanner board equipped with guard feature)

- Guard settings eliminate the effects of surrounding circuit components
- Phase separation uses AC measurement



■ Testing of other components (DC/AC testing)

- Capacitors (10 pF to 4 mF)
- Inductance (1 µH to 100 mH)
- Diodes
- Zener diodes
- Voltage/current measurement
- MLCC (multi-layer ceramic capacitors)



Extensive continuity/insulation testing functionality

Technique that detects any latent defects

■ High-current continuity testing up to 200 mA Jig type achieves 150 mA

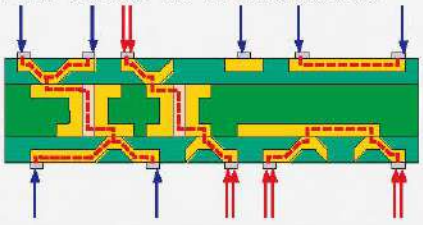
- High-reliability continuity testing with high-current application
- High-speed continuity testing for dramatically reduced measurement times
- Near-open test feature for detecting latent defects

■ Insulation testing with automatic protection for device embedded substrates

- Automatic protection of embedded devices during insulation testing
- Automatic, low-voltage short testing of nets connecting embedded devices
- Micro-short test feature
- Impulse testing feature for detecting latent defects
- ARC detection

■ Four-terminal continuity testing that assures trace resistance

- Trace resistance testing using low-resistance testing down to 400 µΩ
- Testing based on theoretical resistance values
- Detection of via defects on HDI substrates



Supported board type includes Feel free to contact HIOKI at any time

■ HDI substrates to assure trace resistance

- The use of theoretical resistance values generated by SIM-LINE and high-precision 4-terminal resistance measurement assures pattern reliability.

■ Device embedded substrates

- HIOKI utilizes measurement expertise developed for in-circuit testers to provide testing of embedded passive and active devices that's one step ahead of the competition.
  0.1 V low-voltage measurement not affected by semiconductors

■ Flexible boards

- Support for thin boards of 0.05 mm
- A tension clamp to securely hold flexible boards.

BARE BOARD HiTESTER 1230

Bare Board Testing Equipment

BARE BOARD HiTESTER 1230

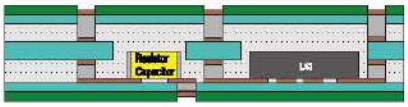
Measurement unit with support for testing device embedded substrates

■ BARE BOARD HiTESTER 1230

Features

Benefit from HIOKI's extensive populated board tester know-how

Testing of device embedded substrates



■ Icons facilitating intuitive operation

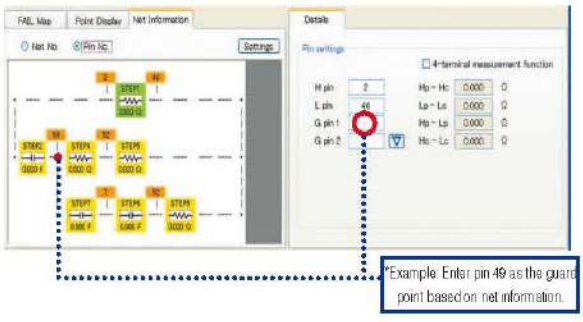
■ Embedded LSI testing (option)

The 1232 can perform the following tests on embedded LSIs:

- Connection reliability test
- Inter-pin open/short test
- Current consumption (standby power) test

■ Guarding measurement

The 1230 lets you set guard potentials for up to 5 points, helping you to exclude circuit wraparound as a cause of erroneous readings.



■ 1230-70 Specifications

Maximum number of test points	8,192 pins (4,096 top, 4,096 bottom) (*When using 4 scanner boxes)
Maximum number of test steps	10,000 steps
Measurement time	Continuity testing: 350 μs; insulation measurement: from 5 ms; capacitance and inductance measurement: from 4 ms; resistance measurement: from 1.8 ms
General specifications	Computer (Windows XP), 17" LCD display (standard accessory)
	Insulation/continuity testing with high-speed function
	4-terminal measurement support (with mixed 2-terminal/4-terminal steps)
Power supply	200 V AC ±10% (single-phase), 50/60 Hz, Power consumption: 500 VA (main unit), 600 VA (scanner box)
HiTESTER dimensions	Main unit: 328 (W) × 222 (H) × 255 (D) mm
	Scanner box: 353 (W) × 327 (H) × 265 (D) mm
Mass	Main unit: 8.62 kg (with all options) (* CPU board, AD board, IO board, HV board, DC board, AC board, single scanner IF board, 24-V IO power supply)
	Scanner box: 21.10 kg: 740 oz (with sixteen 1138-32 High-precision Scanner Boards)

BARE BOARD HiTESTER 1232

BARE BOARD TESTER 1232

Robust support for testing device embedded substrates

Bringing together populated electronic component measuring technologies. IC Package Board Tester.

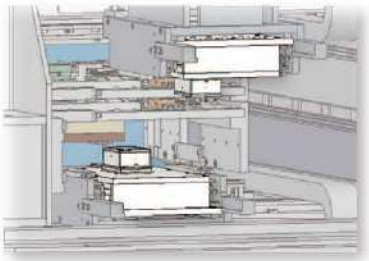
The 1232 utilizes the full range of HIOKI's in-circuit tester measurement technologies.

- Support for an extensive range of tests, from high-density FC-CSP boards to device embedded
- Multichannel test point configuration with 8,192 channels each for the upper and lower fixtures
- Test performance that is fast, highly precise, and highly reliable. High-speed measurement with parallel measurement. High-speed movement due to a combination of a lightweight unit and test head
- Jig replacement with the touch of a button (test head 1165-07)
- Additional convenience with genuine HIOKI fixtures thanks to the RFID function

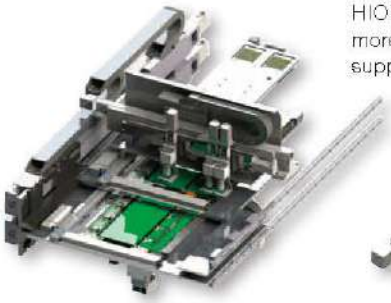
(Double-sided alignment)

■ BARE BOARD TESTER 1232

Features

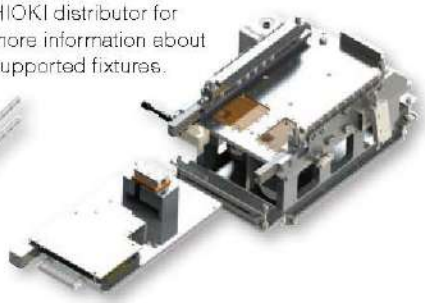


Test operation using test fixtures
(Step & repeat method)



Board transport operation
(Two-stage shuttle design)

*Please contact your HIOKI distributor for more information about supported fixtures.



One-touch fixture installation
with RFID function

■ FA1232-70 Specifications

Maximum number of test points	8,192 (4,096 top, 4,096 bottom)
Maximum number of test steps	10,000 steps
Min. pad diameter	φ20 μm
Supported range of board sizes for clamping and transport	Thickness: 0.05 to 2.5 mm (0.004 to 0.098 in.); Dimensions: 45 (W) × 50 (D) to 340 (W) × 330 (D) mm
Measurement Units	High-speed measurement unit
Power supply	200/220 V AC (3-phase, 3-wire), 50/60 Hz depending on location of use (please specify upon order) Power consumption: 3.5 kVA
HiTESTER dimensions	1437(W) × 1685(H) × 1905(D) mm
Mass	2,500 kg (88183 oz)

FLYING PROBE TESTER FA1811

FLYING PROBE TESTER FA1811

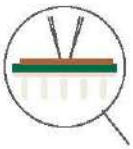
Package Board Testing. Revolutionized.

Meeting ever increasing demands for greater analytical power, faster testing speeds and reduced costs.

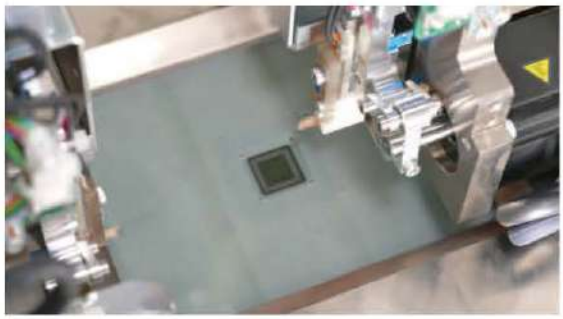
Achieve both high precision contact and high-speed probing in a space of □10 µm.

Double test method delivers an operation rate of 100%.

■ FLYING PROBE TESTER FA1811



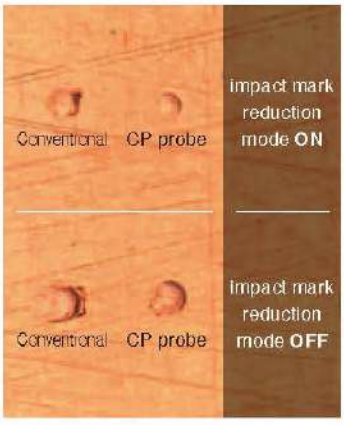
C4 side: □10 µm high-precision flying probe
Target: line and space 10 µm/10 µm



FLYING PROBE UNIT

- Total probing precision: □10 µm
- Minimum probe pitch: 40 µm - Work area: 75 mm (2.95 in) x 75 mm (2.95 in)

Combine with the latest probe to reduce impact marks



Improved impact mark depth

With an aim to decrease impact mark size and depth, HIOKI developed the FA1811-exclusive impact mark reduction probe. Even compared to the conventional machine FA1116, which reduced the impact mark depth by half, this probe improves impact mark performance.
The size and depth of the impact mark can be selected by combining three types of speed setting, "high-precision mode", "medium-speed mode", and "high-speed mode", and the impact mark reduction mode.

SEM material analysis

We used an SEM to analyze the materials and tip shape used in the probe, achieving contact performance that rivals a semiconductor prober.

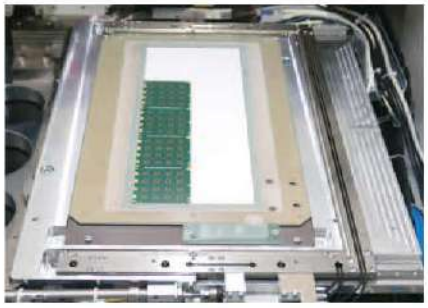
Switch the stage on the BGA side for an operation rate of 100%

Full-net insulation continuity test using resistance: x10 max. speed*
High-speed test using capacitance: x2 max. speed*

TEST FIXTURE
CP1165-11

Resistance testing
- Board size: Max of □ 80 mm (3.15 in)
- Maximum number of pins: 8192

〈Switchable〉

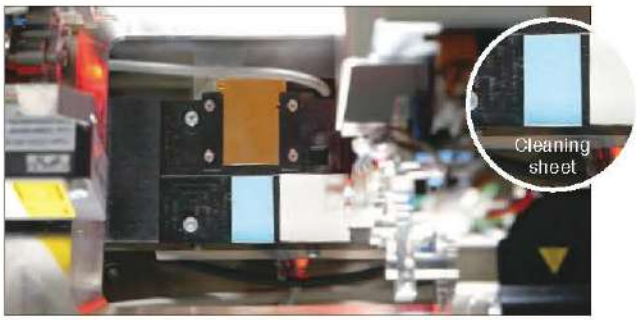


VACUUM UNIT FOR
CAPACITANCE TEST E4101

Capacitance testing
- Board size: 105 x 250mm (4.13 x 9.84 in)

Work flow menu

Just follow the work flow to easily perform basic work such as data creation.
Everything can be done using a mouse.



Offset station

The shuttle has an offset station and completes the offset in 1/10 of the conventional time.
Use probe tip automatic cleaning, a new function, to maintain stable measurements.

■ FA1811 Specifications

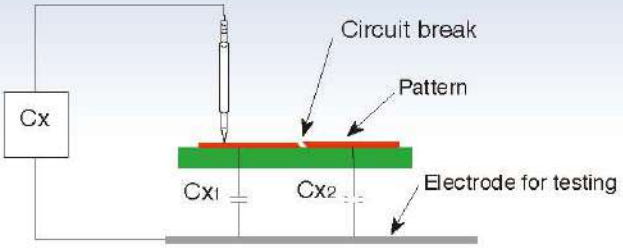
No. of arms	2
Maximum number of test steps	999,999 (max.)
Total probing precision	□10 μm
Supprted range of boad thickness for clamping	400 (W) × 324 (D) mm
Probing Area	75 mm (2.95 in) x 75 mm (2.95 in)
Power supply	AC 200 V±10% (single phase) 50/60 Hz Power consumption: 5 kVA
dimensions	1,300 (W) × 1,670 (H) × 1,700 (D) mm
Mass	2,200 kg

FLYING PROBE TESTER FA1116

FLYING PROBE TESTER FA1116

High-speed pattern testing with the capacitance measurement method

Half the impact mark depth **High-speed testing at up to 100 points/sec**

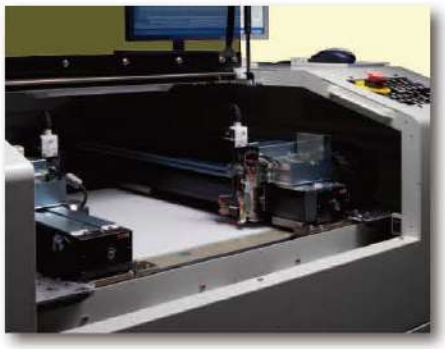


Measurement principle for capacitance method

When there is no circuit break, Cx = Cx1 + Cx2
When there is a circuit break, Cx = Cx1
In the case of a circuit break, the capacitance is detected as being lower than that of a reference board; if there is a short circuit, it will be detected as higher.

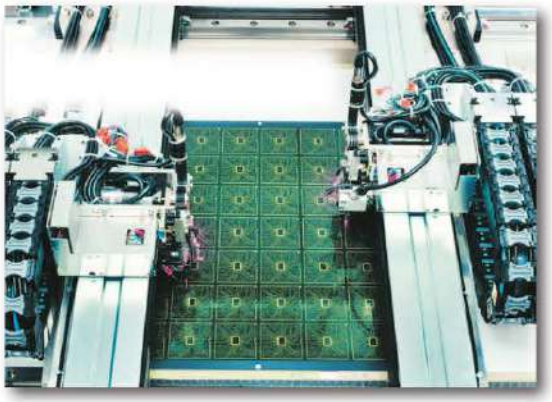
■ FLYING PROBE TESTER FA1116-03

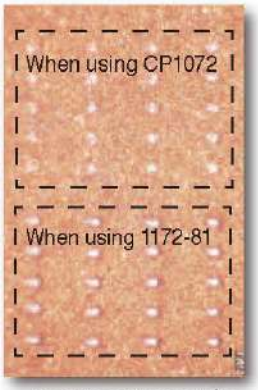
Features



Large aperture

With board loaded





Impact mark comparison
Z-axis speed 150
25 um pitch

■ FA1116-03 Specifications

No. of arms	2
Maximum number of test steps	40,000 steps (300,000 steps during continuous testing)
Measurement time	Max. 100 points/sec (0.1 mm probe movements, 2-arm simultaneous probing, capacitance measurement)
Min. pad diameter	□15 μm
Probe work area	610 (W) × 510 (D) mm
Supported range of board sizes for clamping and transport	Thickness: 0.1 to 3.2 mm (0.0039 to 0.126 in) External dimensions: 50 (W) × 50 (D) to 610 (W) × 510 (D) mm
Power supply	200 V AC ±10% (single-phase), 50/60 Hz, Power consumption: 3 kVA
HiTESTER dimensions	1,443 (W) × 1,656 (H)× 1,185 (D) mm
Mass	1,000 kg (35273 oz)

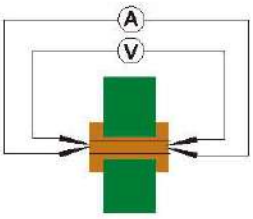
X-Y BOARD HiTESTER 1270/1271

X-Y BOARD HiTESTER 1270/1271

High Cost Performance

Four-terminal resistance measurement (Optional)

Open vias result in increased resistance and inductance, interfering in signal transmission. Four-terminal testing using an instrument with high resolution and precision is needed.



Open via

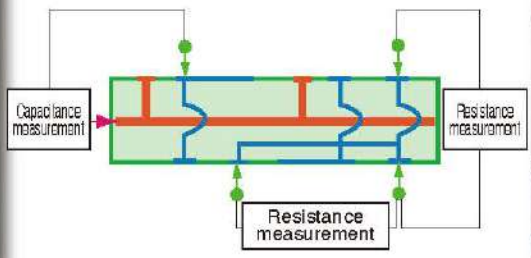
A via is a hole that electrically connects different wiring layers in a board. An open via exists when the connection in a hole does not make complete contact. An open via increases the resistance value and inductance, which interferes with signal propagation.

■ X-Y BOARD HiTESTER 1270/1271

High-speed testing at up to 0.015 sec/step

Features

Fixing flexible boards with tension frames



Testing principles

Testing status

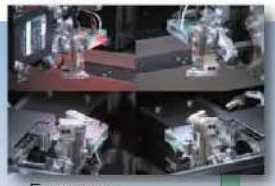
■ 1270/1271 Specifications

No. of arms	4 (2 each front and back)
Maximum number of test steps	40,000 (during continuous testing: 300,000)
Measurement time	Max. 67 steps/sec (0.15 mm probe movements, 4-arm simultaneous probing, capacitance measurement)
Min. pad diameter	ϕ20 μm
Probe work area	1270 : 394(W) × 324(D) mm / 1271 : 604(W) × 504(D) mm
Supported range of board sizes for clamping	Thickness: 0.6 to 3.2 mm (0.024 to 0.126 in) 1270: 50 (W) × 50 (H) to 400 (W) × 330 (H) mm 1271: 50 (W) × 70 (H) to 610 (W) × 510 (H) mm
Power supply	200 V AC ±10% (single-phase), 50/60 Hz, Power consumption: 3 kVA
HiTESTER dimensions	1270: 1,500 (W) × 1,867 (H) × 860 (D) mm 1271: 1,760 (W) × 2,000 (H) × 860 (D) mm
Mass	1270: 1,000 kg (35273 oz) / 1271: 1,200 kg (42328 oz)

FLYING PROBE TESTER FA1283

FLYING PROBE TESTER FA1283

Detecting even hidden defects to assure highest quality



Four arms
(upper, lower, left, right)

The FA1283 satisfies a wide range of measurement and testing requirements.

To detect via connection defects, a tester must offer high-precision (100 µΩ or lower) open via low-resistance measurement capability. Similarly, to verify latent defects such as impurities or voids in the board's insulation layers and narrowing of gaps due to abnormal pattern shape, a tester must provide resistance measurement capability of 10 GΩ or greater. The FA1282 ships standard with 4-terminal low-resistance measurement and super-insulation testing functionality to meet these requirements, enabling it to detect latent defects such as these.

■ FLYING PROBE TESTER FA1283

Features

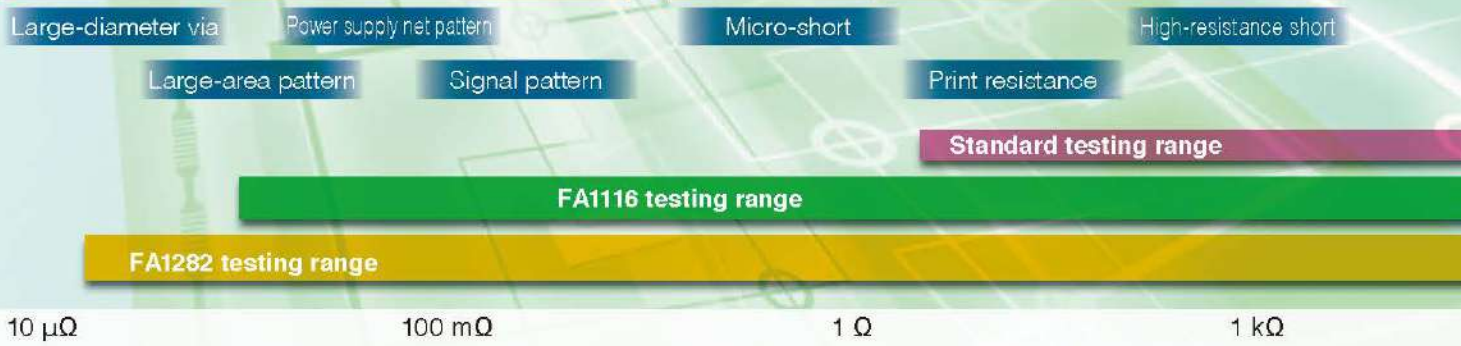
Dramatically expanding the detection range with low-

Four-terminal resistance measurement function

Uses 4-terminal probes to deliver outstanding accuracy and stability when measuring the minute resistance values of inner via holes (IVHs) and through-holes.

Comparative judgment using theoretical resistance values

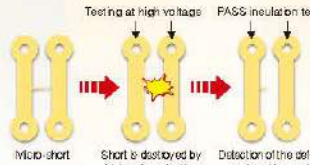
Theoretical resistance values for patterns can be calculated from the board's design data using HIOKI's optional SIM-LINE software. Four-terminal testing can then be performed using those values as reference values.



Ability to detect latent defects

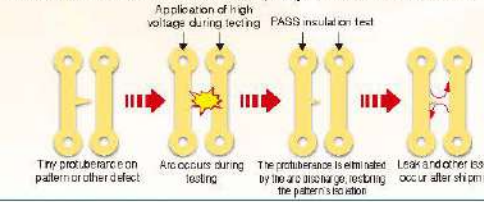
• Insulation micro-short testing

"Micro-shorts" consisting of a minute amount of contact between adjacent patterns can be destroyed by the application of high voltages, making detection of the defect impossible. HIOKI's micro-short testing function can discover defects such as these by measuring insulation at a low voltage before application of the high-voltage test signal.



• Arc detection (offered in a flying probe system for the first time in the industry)

Arcs are detected when a voltage drop in excess of a preset value is encountered during testing. As shown below, arc detection functionality prevents a false PASS judgment when testing patterns with a low withstand voltage caused by a tiny protuberance or other shape on one of the patterns, which is burned away when the arc occurs. When such a discharge is detected during testing, the location is judged to suffer from an arc defect, even if the insulation resistance value subsequently exceeds the reference value.



Importance of super-insulation testing (a type of insulation testing)

The FA1282 is capable of super-insulation testing at low voltages of 100 GΩ/250 V. This approach allows the reliable detection of latent defects without overstressing the target board.

High-accuracy probing □15μm and high-speed testing max. 100 p/s

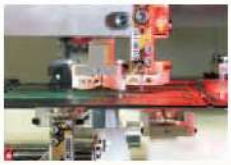
All-Round, High-Speed, Double-Sided Flying Probe Tester

A large number of options are available, including automatic transport and embedded device testing functions. Combine options as needed to minimize additional costs.

Reducing board testing manpower through automated operation

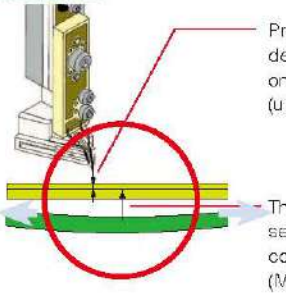
- **In-line functionality**
- Automatic transport functionality (standard)
- Laser-based board thickness correction (standard)
- General-purpose loader and unloader (optional)

- **Horizontal transport with tension mechanism**



- **Elimination of contact errors through automatic board thickness correction and tension features**

The minimum necessary probe stroke is used during testing to avoid causing damage to the target board. HIOKI's standard laser-based board thickness correction functionality reduces the likelihood of contact errors occurring by correcting for board thickness.



resistance and super-insulation testing

200 mA continuity testing

Pattern reliability is assured by applying a high current of up to 200 mA, close to the rated current for a typical fine pattern.

100 GΩ/250 V testing

High-speed insulation testing with coverage of up to 100 GΩ/250 V detects latent defects and allows insulation resistance between wiring patterns to be judged with unsurpassed reliability.

■ Specifications: FA1283-01 (without transport) / FA1283-11 (with automatic transport)

No. of arms	4 (2 each upper and lower)
Maximum number of test steps	999,999 (max.)
Measurement time	Max. 100 steps/sec (Capacitance measurement with 4-arm simultaneous probing and 0.15mm movements)
Total probing precision	□15 μm
Probe work area	400 (W) × 324 (D) mm
Supported range of board sizes for clamping and transport	Thickness:0.1 to 2.5 mm (0.004 to 0.098 in) Outer dimensions:50 (W) ×50 (H) to 400 (W) ×330 (H) mm
Power supply	AC 200 V±10%(single phase)50/60 Hz Power consumption: 5 kVA
HiTESTER dimensions	1,350 (W) × 1,626 (H) × 1,240 (D) mm
Mass	1,100 kg (38800 oz)

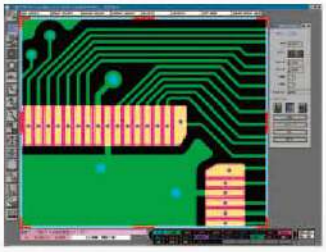
Covers a range of testing processes from testing data editing to repair support

HIOKI provides robust support for the data editing process through high-speed contour and reverse net extraction. The testing result viewer compatible with all HIOKI testing equipment reliably supports failure check and repair tasks.

FLY-LINE is a comprehensive CAM system for automatically generating endpoint and net information from semiconductor package/printed circuit board manufacturing data and outputting electrical test data for use with HIOKI bare board electrical testing systems.
* CAM: Computer Aided Manufacturing

[Bare Board Testing Flow]

FEB-LINE UA1781



Manufacturing data (Gerber data)

CAM data input

RS274D | DXF
RS274X | IPC D356A

Net generation
Automatic test point generation

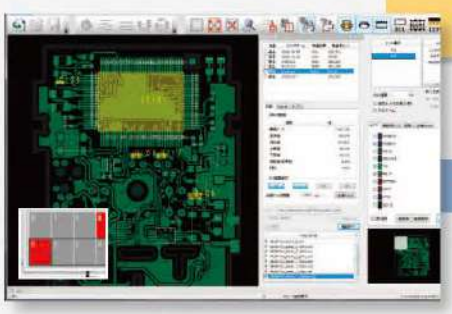
Theoretical Resistance Calculation System (1392)
(Optional)

Device embedded substrate test data creation system (1391)
(Optional)

Test data output
(Alignment mark instructions)

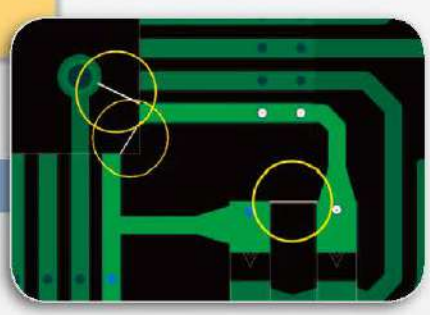
Testing

Defect analysis
FAIL VISUALIZER UA1782



View and Check

Check defective points to determine any dangerous locations



Inspection Data Creation System FEB-LINE UA1781

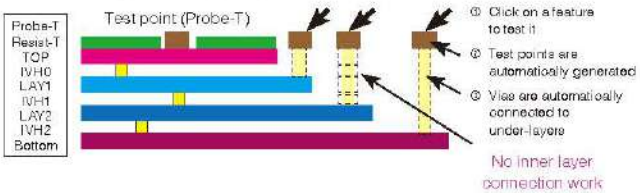
This CAM system automatically generates endpoint and net information and outputs electric test data for use with HIOKI flying probe testers.

- Delivers unlimited automation, from inputting manufacturing data to outputting flying probe data, in a simple package that can be operated by anyone.
- High-speed net/test point generation and near net extraction
- Creates embedded device layout information from simple graphical input

One-point test-point generation

Easily generate test points (probing points) anywhere you like, in addition to those created automatically.
Create test points on the top surface, bottom surface, and even on the inner layer for cavity structures with just a single click.

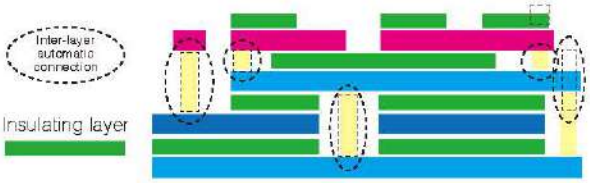
Image of test-point generation



Interlayer automatic connections

Even in touch panels, ceramic substrates, or other printed circuit board data in which non-conductive layers are combined, vias are automatically connected based on the overlapping of conduction layers to perform net generation. DXF entry support makes line connection and paint/blank processing easy too.

Image of generating via connections for printed board data



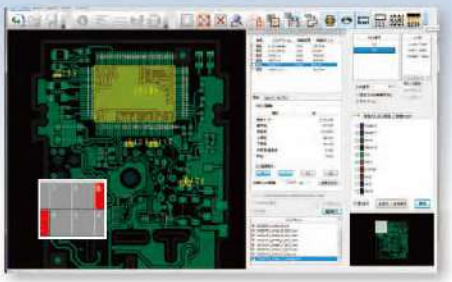
Theoretical Resistance Calculation (optional)

This system calculates theoretical resistance values between electrical test probes.

- Complete recognition of pattern/via branches and series/parallel configuration
- Supports parameter specification by layer
- Etching factor consideration
- Values can be used as reference values for 4-terminal testing

Defect analysis support FAIL VISUALIZER UA1782

This system supports the analysis of defects on printed circuit boards using error information from electrical testing systems



- Highlights any patterns and components determined to be defective in electrical testing
- Proximitye check view function that displays checkmarks at solder bridge risk points
- Searching for defective nets and points based on measured capacitance values
- Net search view function that highlights components connected to an identical net
- Supports a wide range of applications, from repairing for mass-production testing to checking device embedded substrates

■ Operating environment

	UA1781 / UA1782
Supported OS	Windows7/10 professional 64bit
CPU	Core i7 or equivalent
Memory	8 GB or more
Display resolution	1,920 × 1,080 or greater
Disk space	80 GB or more free space

Populated Board
Electrical Testing System

Program Test
Complete coverage,

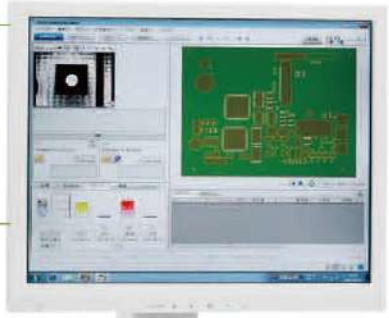
Experience the cumulative difference: UA1780 + FA1240 + UA1782

90% faster data creation

Reduce data creation time by a factor of 10.

93% less line downtime

Slash line stoppage time by a factor of 15.



Operation screen also available in Chinese

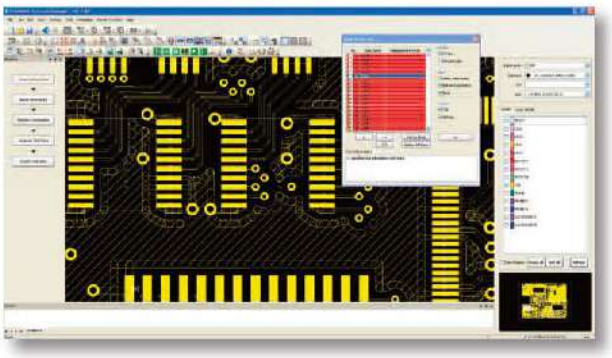
Visualize from data creation, populated board testing, right up to confirmation of defect locations

One of the issues with using flying probe testers is that all steps must be performed in-house, making the testing process a time-consuming undertaking.
By combining multiple components to form a board electrical testing system, Hioki has slashed data creation time by 90% and line downtime by more than 93% compared to previous models.
Hioki's approach promises to lower testing man-hours by offering full support for three processes that are essential when using flying probe testers in the field: data creation, electrical testing, and confirmation of defect locations.

Faster programming FIT-LINE UA1780

Creating test data quickly with nothing but electronic data (no need for actual boards)

Since test coordinates and net information can be created from Gerber data, mounting data, and other design information, it is possible to extract accurate testing information by means of a five-step process. If Gerber data is not available, it can be obtained easily from the board manufacturer. If accurate information is used, it is possible to create data that will not need to be corrected by hand.



Easier testing FLYING PROBE TESTER FA1240

Easy since you don't have to worry about component shapes

Since the size of components (their width and height) is acquired from the UA1780, the tester can automatically detect when probes will make contact. Workers need only load boards into the system to begin debugging.

Easy debugging: Just leave it to ATG (Automatic debugging)

The ATG function can automatically debug most components since the system acquires net information directly. Now technicians can complete debugging work in the smallest possible number of man-hours, making it easy to create high-quality data.

Faster visualization of defects FAIL VISUALIZER UA1782

Reliance on the UA1780 for high-speed performance

The Fail Visualizer allows you to check fail locations without stopping the tester.
To start confirmation work, you need only load the FA1240's test results into the Fail Visualizer.

Proactive application of FA1240 corrections for superior speed

Since the differences between the actual test data and the Gerber data, for example those due to corrections of test points made on the tester, have already been applied to the display of defect locations, you can easily obtain correct information.

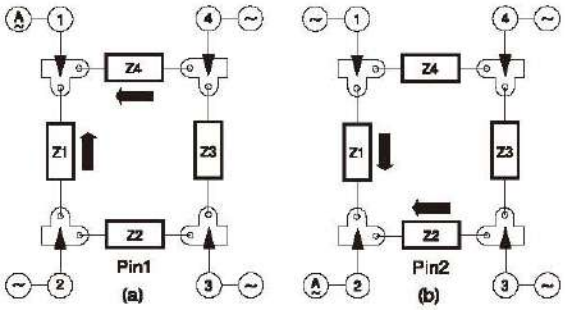
IN-CIRCUIT HiTESTER 1220

IN-CIRCUIT HiTESTER 1220

Helping improve the quality of populated circuit boards

Macro testing (high detection rate with a small number of points)

Macro testing, which measures the impedance of a single user-selected pattern compared to all other patterns, performs similar measurements for all patterns. The advantage of macro testing lies in the fact that the number of measurement steps equals the number of measurement points.
The number of measurement steps that would be required in order to test all possible combinations of 100 measurement points is given by:
$nCm=n!/((n-m)!\times m!)=n(n-1)/m=4950$ where n = 100 and m = 2
By contrast, macro testing uses a method such as that illustrated below to perform the test in approximately 1/50 the measurement time and data processing steps since the test consists of just 100 points.

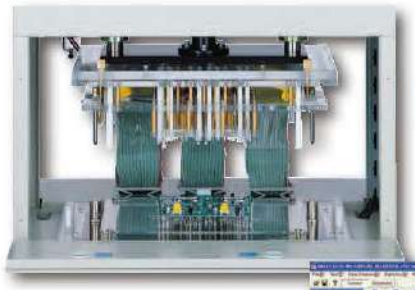


(Desktop model) 1220-50

(Offline model) 1220-51

(Inline model) 1220-55 (Space-saving model) 1220-52

Features

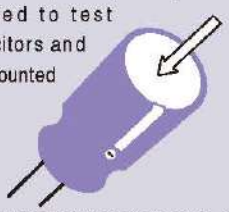


Testing table
(with fixture attached)

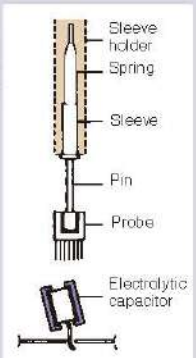
Display screen

Detection of electrolytic capacitor reverse insertion (Optional)

The aluminum cases of electrolytic capacitors can be probed to easily detect reverse insertion, and special probes can be used to test small capacitors and capacitors mounted at an angle.



- Capacitor can be mounted at an angle of up to ±15° (varies with capacitor shape and mounting conditions)



1220-50/-51/-52/-55 Specifications

Test types and ranges	Round robin short/open, component test
	Macro test: 10 Ω to 10 MΩ (impedance)
	Resistor: 400 μΩ to 40 MΩ
	Capacitor: 10 pF to 400 mF
	Coil: 1 μH to 100 H
	Diode and transistor (VF): 0 V to 25 V
	Zener diode (VZ) measurement: 0 V to 25 V (option: 25 V to 100 V)
	Digital transistor (Q): 0 V to 25 V
	Photocoupler test function: 0 V to 25 V
	Capacitor reverse insertion detection (option)
	IC reverse insertion detection (option)

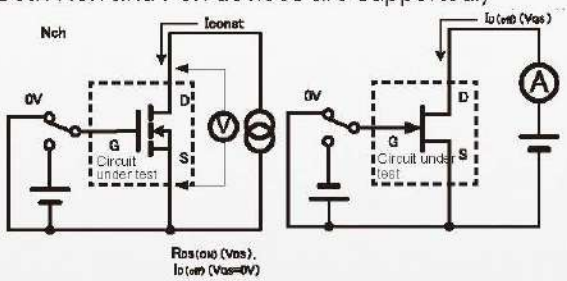
Max. number of test points	2,176 pins (with 3 expansion boxes): 1220-50/-51 1,536 pins (with 2 expansion boxes): 1220-52/-55 Standard: 128 pins: 1220-50 / Standard: 320 pins: 1220-51/ -52/ -55 Can be expanded in 64-pin blocks (for pins more than the maximum number, contact Hioki)
Max. number of test steps	10,000 steps
Measurement time	Round robin short/open: From approx. 0.8 msec/pin Component: From approx. 0.9 msec/step
Supported board size	390 (W) × 300 (D) mm (1220-51/-52)
Power supply	100 V AC ±10% (other specifications to be specified at time of order); 700 to 1,000 VA
HiTESTER dimensions and mass	1220-50: Approx. 200 (W) × 325 (H) × 298 (D) mm, 10 kg (352 oz)
	1220-51: Approx. 1,030 (W) × 1,470 (H) × 710 (D) mm, 240 kg (8465oz)
	1220-52: Approx. 655 (W) × 1,610 (H) × 705 (D) mm, 220 kg (7760 oz)

An extensive range of measurement modes

Using the 1220 as a controller, you can perform active testing on the same pin fixture after ICT testing without the need to reconfigure the system.

■ FET Active Testing

- A PASS/FAIL judgment of FET operation is made by measuring the voltage and current between the drain and source when on and off voltages are applied to the MOS-FET or J-FET gate. (Both Nch and Pch devices are supported.)

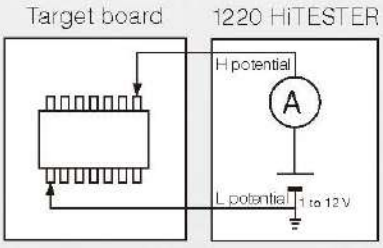


A PASS/FAIL judgment is made based on the OFF current and ON-resistance values.

A PASS/FAIL judgment is made based on the OFF current and measured current (IDSS).

■ IC Standby Current Measurement

- The standard CURR-CV mode can also support the measurement of minute currents, such as a standby current. You can complete applying constant voltage and measuring of minute currents in a single step.

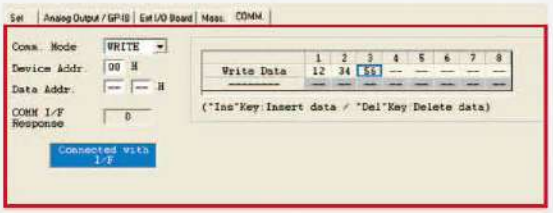


Current Test Block Diagram

■ I²C support

- The 1220 has incorporated I²C control functions, thus eliminating the need for dedicated control applications or linkage with external software.

ICs on the board under test are controlled using the I²C bus. Using its Ratoc Systems I²C controller, the 1220 can write data to target devices, verify write data, and generate controller DIO output.
This functionality allows the CURR-CV mode to be used to quickly measure the accurate leakage current after placing the target device in standby mode.



*I²C is a serial bus standard that is widely used for embedded systems in mobile terminals.

■ Multi-point Scanner Measurement

- The 1220-5x can conduct tests while switching among a large number of measurement points at high speed. Also supports a logging function, which starts testing at constant intervals.

Upgrading expands the possibility of ICT

POWER SOURCE UNIT 1937-04

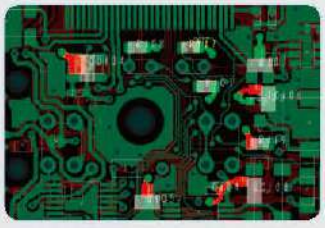
By integrating the power supply unit within the main unit, it can test circuits while supplying power to the user-specified measurement points.

- Five channels can be generated simultaneously at +12 V/120 mA (bipolar type).
- Integrated voltmeter allows verification of generated voltage and associated judgments.
- Integrated ammeter allows verification of current consumption and associated judgments.

FAIL VISUALIZER UA1782

You can easily find components, identify the probe location or check network information. This changes repair and pin board maintenance.

- Point information view screen



FLYING PROBE TESTER FA1240

FLYING PROBE TESTER FA1240-61/-63

new 1 Simply follow the workflow.

Quickly complete programs that take into account component height

◆Improved operability

The FA1240-50 features a redesigned user interface.
Control screens make extensive use of graphics to keep operation intuitive.
A high level of visibility on the production floor reflects the user-friendly focus of the system's design.

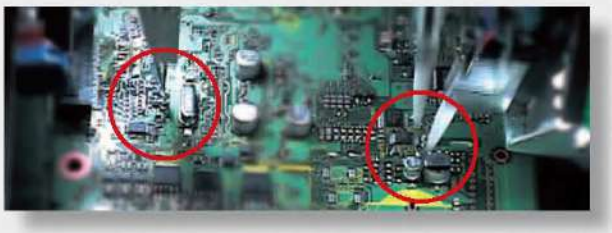
The control screens that make up this newly developed graphical application, which was designed for maximum ease of use, are easy on the operators who are tasked with creating test programs.
Thanks to program creation workflows and an operation assistance function, it's easy to create test programs without relying on system documentation.

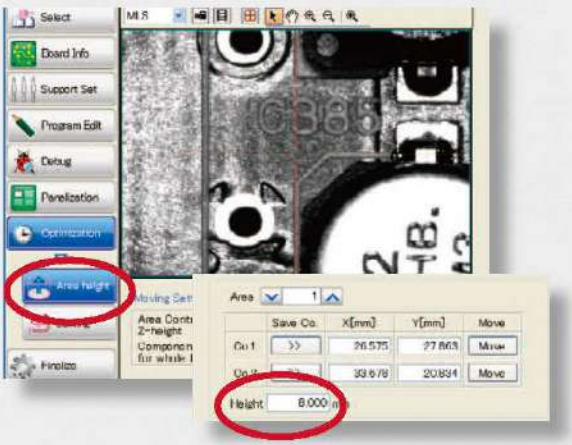
Used in conjunction with HIOKI's FIT-LINE Test Data Creation System UA1780 (optional software),
the FA1240-50 can automatically avoid arm interference based on component contour information.

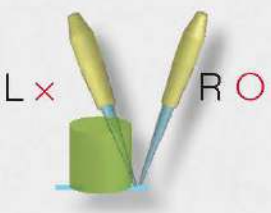
Slash line downtime by 93%.
Used in combination with the UA1780, the FA1240-50 can reduce test line downtime by 93% though effective data creation and debugging work.
HIOKI invites you to experience the new FA1240-50's man-machine interface for yourself.

new 2 No time required for checking the contact arm (ATG function & Automatic calculation of arm interference)

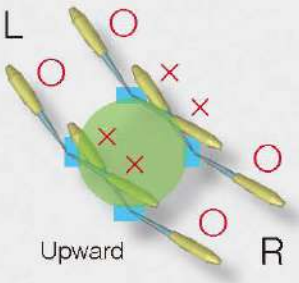
By combining the FA1240 and UA1780, you ensure that all necessary component information is taken into account. The system automatically calculates where interference between arms and components will occur and avoids it. Because it is possible to complete cumbersome and time-consuming verification work safely and rapidly, data creation time can be greatly shortened.







Crosswise



Upward

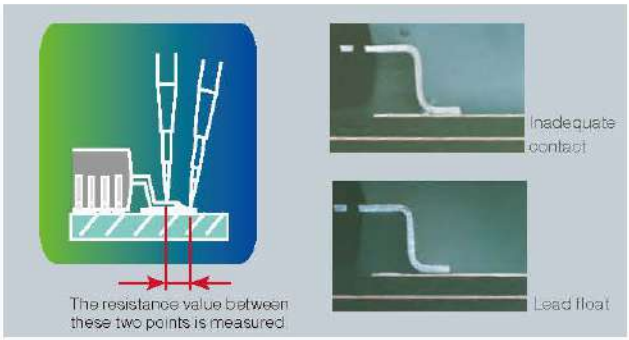
Probes are installed at an angle to allow probing of adjacent lands. At probing points near tall components, it is essential to check for interference between angled probes and components and to configure settings to avoid that eventuality.

Since UA1780 FIT-LINE data provides physical information about board features such as component shape, size, and height data, the FA1240 takes into account interference between probes and components based on that information and automatically selects arms from the dual standpoints of safety and optimal efficiency.
This allows safe, rapid probing without any special knowledge of the apparatus.

Uncompromising "Visualization" Technology

Assured detection of inadequate contact through resistance testing

Since HIOKI's proprietary lead float detection function makes judgments based on the resistance values between leads and pads, signal attributes are irrelevant.
And since the process is not affected by internal component circuitry, the method also provides an effective means of detecting lead float for ICs and SMT connectors.



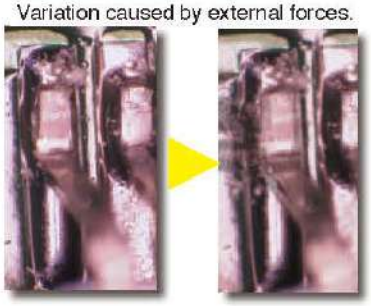
■ FLYING PROBE TESTER FA1240

Production tests can't find it! Visual tests lead to over-detection!

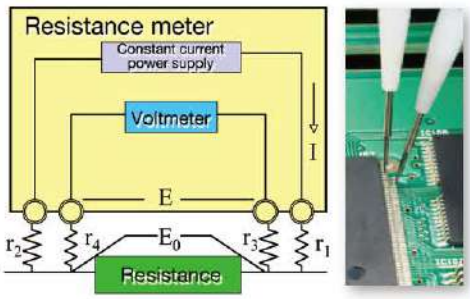
That's why you need 4-terminal resistance measurement for detecting inadequate contact of IC test leads.

• Poor soldering
Solder wicking is poor and the connection resistance has not decreased enough. This passes an operation (powered) test and therefore leads to unidentifiable malfunctions.

Variation caused by external forces.



• Poor contact
Oxide film on the test lead causes insufficient binding.
As there is no significant difference in appearance, this issue is easy to miss.



■ 4-terminal resistance measurement
The connection resistance of probes is cancelled for accurate measurement of resistance between terminals. This measurement method is built-in for upper DMM models.

■ FA1240-61/-63 Specifications

Test types and ranges	Resistor : 400 μΩ to 40 MΩ
	Capacitor : 1 pF to 400 mF
	Inductance : 1 μH to 100 H
	Diode : 0 V to 25 V
	Zener diode measurement: 0 V to 25 V (option: 25 V to 80 V)
	Digital transistor : 0 V to 25 V
	Photocoupler : 0 V to 25 V
	Short : 0.4 Ω to 40 kΩ Open : 4 Ω to 4 MΩ
	DC voltage measurement : 0 V to 25 V

No. of arms	Single, 4 (L, ML, MR, and R)
Maximum number of test steps	40,000 steps
Probing precision	Within ±100 μm (X and Y direction) (for all arms)
Positioning repeatability	Within ±50 μm (probing position)
Testable board size	Thickness: 0.6 to 3.2 mm (0.024 to 0.126 in.) External dimensions: Min. 50 (W) × 50 (D) mm to max. 460 (W) × 510 (D) mm (-61) External dimensions: Min. 50 (W) × 50 (D) to max. 400 (W) × 330 (D) mm (-63)
Power supply	200 V AC ±10% (single-phase), 50/60 Hz, 6 kVA (5 kVA for FA1240-63)
HiTESTER dimensions	1,410 (W) × 1,300 (H) × 1,380 (D) mm (FA1240-61) 1,320 (W) × 1,370 (H) × 1,430 (D) mm (FA1240-63)
Mass	1,250 kg:44091oz (FA1240-61), 1,050 kg:37037oz (FA1240-63)

FIT-LINE Test Data Creation System UA1780

FIT-LINE INSPECTION DATA CREATION SYSTEM UA1780, FAIL VISUALIZER UA1782

Five Steps for Creating High-Quality Data

(Simple data creation based on Gerber data and mount data*1)

High-quality data, regardless of who creates it

Utilization of net (circuit) information

Automatic generation of data for detecting solder bridges between adjacent components

UA1780 processing

Input Gerber data — Step 1

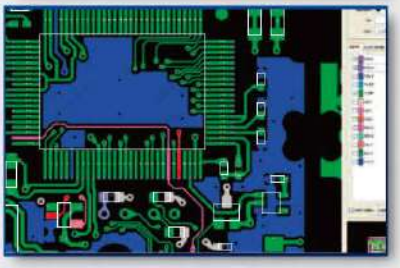
RS274D
RS274X

Input mount data*1
Circuit names, component names, layout coordinates, angles, shape names — Step 2

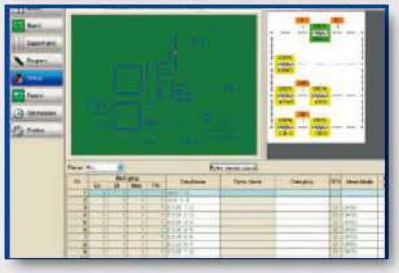
Register new components

Register electronic component libraries — Step 3

Identify test points
(generate data based on registered libraries) — Step 4



Output test data — Step 5



Perform test

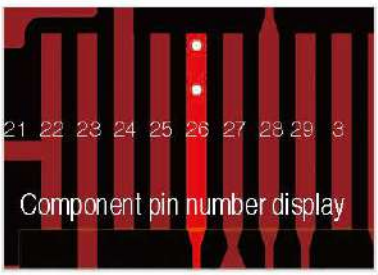
FAIL VISUALIZER UA1782

Data is created based on Gerber data and mount data*1 while referencing component library information.

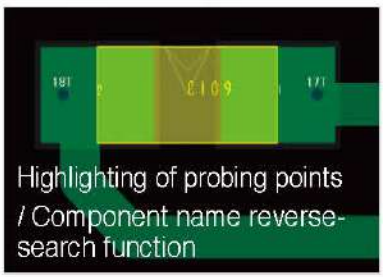
Quickly find the locations of failed components FAIL VISUALIZER UA1782

Since you can select the information you wish to view with a single check, you can accelerate your analysis work

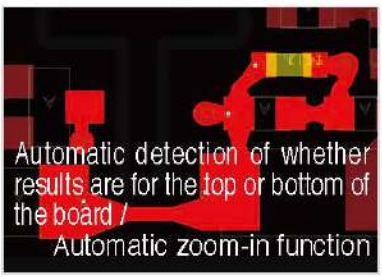
View pin numbers



View probing positions



View the opposite side



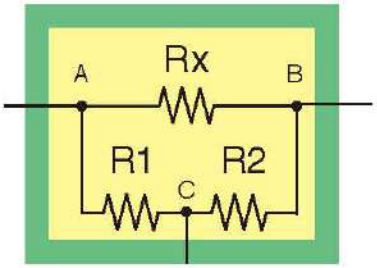
FIT-LINE Test Data Creation System UA1780 (Specifications)

Application CD, license key (USB), user manual *Note: User is responsible for providing a computer, monitor, and other hardware.	
Recommended operating environment (for both UA1780 and UA1782)	
Supported OS	Windows7/10 Professional 64bit
CPU	Core i7 or equivalent
Memory	8 GB or more
Display resolution	1,920 × 1,080 or greater
Disk space	80 GB
Function details (UA1780)	
Gerber data input function	Loading of Gerber files (RS-274X, RS-274D), aperture files, and drill files
Mount data*1 input function	Loading of CSV files containing circuit names, layout coordinates, angles of rotation, shape names, and component names Support for operations such as rotation and mirroring; Display of mounting positions and other data Support for operations such as rotation and mirroring; Display of mounting positions and other data
Graphical editing function	Figure copying, movement, deletion, etc.
Component library registration function	Display of component lists; registration of component size, height, and pin numbers; registration of test pin intervals, test modes, ratings (threshold values), and upper and lower limit values; duplication of libraries
Test data generation function	Reverse net generation, identification of test points based on components and patterns, automatic movement of test points lying underneath components, generation of open tests between closely spaced pads, etc.
Test point review function	Graphical display of test points
Test data output function	FA1240 files, 1240/1114 files
Data management function	Saving of databases and management of component libraries

Testing Technology

Guarding

Guarding functionality is included on all HIOKI populated component testing equipment and testing equipment for device embedded substrates.



Guarding allows parallel elements to be isolated and measured individually.

Suppose combined resistance values R1 and R2 for elements near the terminals of the element under measure Rx on a populated board. If a measurement is taken across the terminals of Rx, the resistance value would be as follows: 1 / [1/Rx+1/(R1+R2)] = Rx × (R1+R2) / (Rx+R1+R2). Guarding enables these elements to be isolated from one another and measured individually.

Bare board tester latent defect detection function

Open via

When an oxidized film spreads, an insulated state can suddenly develop, causing the circuit to malfunction. Even slight vibration can cause the via to separate.

【Detection of open via defects】

Wiring resistance and contact resistance can be canceled in four-terminal low-resistance measurement, allowing the detection of minute changes in resistance.

Importance of insulation testing

Insulation testing can be performed up to 100 GΩ with 250 V.

【Detection of defective insulation FA1283】

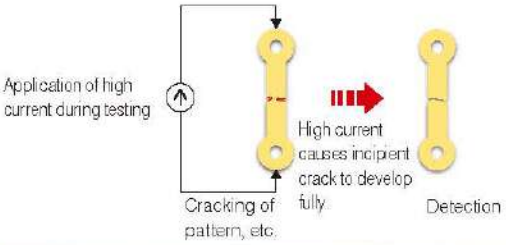
Available models can perform super-insulation testing up to 100 GΩ with a comparatively low voltage of 250 V. This approach allows the reliable detection of latent defects without overstressing the target board.

Near-open

Near-open defects are caused by a pseudo-break such as cracks in patterns and open or separated vias. The latent nature of this defect means that its effects will not be evident until a considerable period of time passes following the board's manufacture.

【Detection of near-open defects】

Continuity testing can be performed with current settings of up to 150 mA. The momentary application of a high current causes the pattern to begin to separate, enabling the detection of the defect.

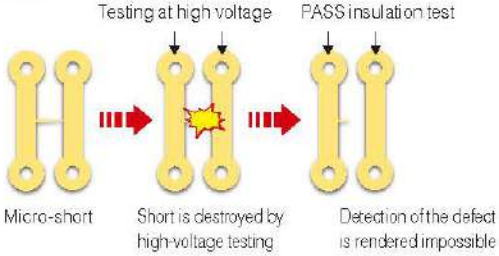


Micro-short

Micro-short defects are extremely fine shorts between patterns. Even fused micro-shorts can interfere with high-frequency signal transmission.

【Insulation micro-short testing】

"Micro-shorts" consisting of a minute amount of contact between adjacent patterns can be destroyed by the application of high voltages, making detection of the defect impossible. HIOKI's micro-short testing function can discover defects such as these by measuring insulation at a low voltage before application of the high-voltage test signal.

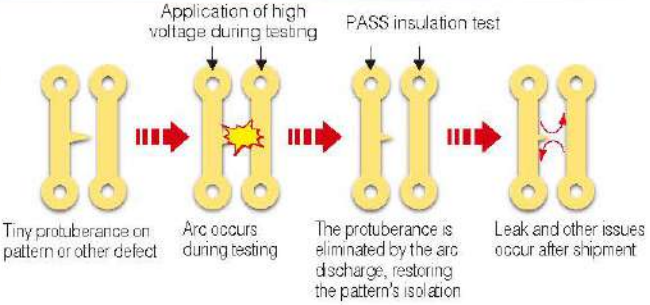


Arc detection (offered in a flying probe system for the first time in the industry)

Detection of arc discharge during insulation testing

【Arc detection】

Arcs are detected when a voltage drop in excess of a preset value is encountered during testing. As shown in the diagram on the right, arc detection functionality prevents a false PASS judgment when testing patterns with a low withstand voltage caused by a tiny protuberance or other shape on one of the patterns, which is burned away when the arc occurs. When such a discharge is detected during testing, the location is judged to suffer from an arc defect, even if the insulation resistance value subsequently exceeds the reference value.

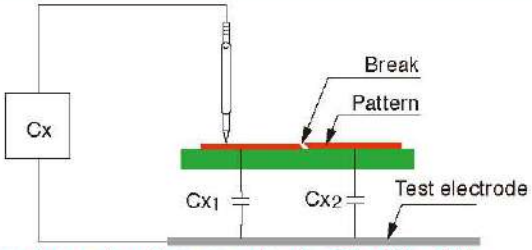


High-speed pattern testing using the capacitance measurement method

Patterns on boards exhibit a certain capacitance relative to the electrically isolated test electrode, and this capacitance varies with their area. Any shorts or breaks in the pattern cause its area, and therefore its capacitance, to change.
By comparing the measured capacitance value to data for a reference board, it is possible to detect shorts and breaks in the pattern.

■ Comparison of test steps
with 100 nets and 500 total nodes

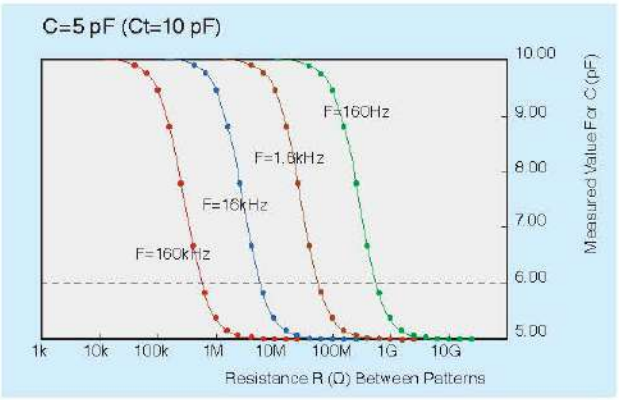
	Continuity test method	Capacitance measurement method
Testing for breaks	All nodes on same net 500 − 100 = 400	Breaks and shorts are detected by measuring the capacitance of all nodes. 500
Testing for shorts	nCr = 100C2 100×(100 − 1)/2 = 4950	
Test steps	5350	500

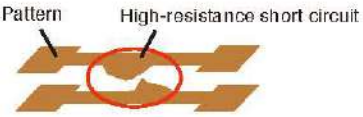


Capacitance when there are no breaks: CX = CX1 + CX2
Capacitance when there is a break: CX = CX1
When there is a break, the detected capacitance is lower than the capacitance of the reference board; when there is a short, the detected capacitance is higher than the reference board due to the additional capacitance of the other pattern.

To test for both breaks and shorts, the capacitance measurement method need test only the endpoints of each pattern.

Detection of high resistance short circuits with capacitance measurement





Capacitance variations can be accurately measured based on the resistance between neighboring patterns, to detect short circuits that have high resistance.
The detection range depends on the frequency.
A single measurement detects short circuits between one net and all the other nets.

Genuine HIOKI test fixtures

Support for increasingly dense boards and faster transitions from prototyping to mass production... the requirements for test fixture manufacturing grow more rigorous with each passing year. HIOKI leverages its experience as a manufacturer of in-circuit testing equipment to meet the full range of customer requirements.

Test fixture 1160 and CP1167 manufacturing

Improved contact reliability means a higher first-run rate!

Manufacturing Requirements

Customers are asked to prepare the following documentation when ordering a test fixture.

1. Populated board
2. Bare board
3. Circuit diagram
4. BOM (bill of material)
5. Component layout (Can be determined using bare board if no layout is available.)
6. Net list (Orders can be processed without a net list.)

* Fixtures can also be manufactured based on Gerber data.

For more information, contact your HIOKI distributor.

HIOKI can deliver a stable supply of high-quality test fixtures.

Test Fixture CP1167

Fixture Manufacturing Process

Probe tip shapes available for press-type test fixture 1160 (list)

☒ 1171 Series tip shape (table)

1171-41□
Needle

1171-42□
Headless crown

1171-43□
3-Point needle

1171-44□
Crown

1171-45□
Serrated, small

1171-46□
Serrated, large

1171-47□
Chisel

1171-48□
Reduced crown, small

1171-49□
Reduced crown, large

1171-4A□
Blade

1171-4B□
Chisel, small

1171-4C□
Chisel, large

1171-4D□
Cup

1171-61□
Needle

1171-62□
Headless crown

1171-67□
Chisel

1171-68□
Reduced crown, small

1171-69□
Reduced crown, large

1171-6A□
Blade

1171-6B□
Chisel, small

1171-6C□
Chisel, large

1171-6E□
Reduced headless crown

• CP Series tip shape (table)

1.27 mm pitch probes

CP1411
Blade

CP1421
Single-blade (small)

CP1422
Single-blade (large)

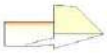
CP1450
Reduced headless crown

2.54 mm pitch probes

CP1511
Blade

CP1521
Single-blade (small)

CP1523
Single-blade (medium)



CP1524
Single-blade (large)

CP1534
Four-pronged (large)

CP1535
Four-pronged (medium)

CP1536
Four-pronged (large)

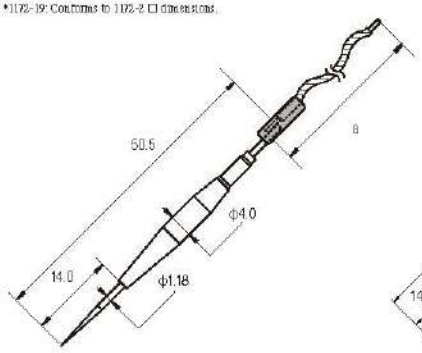
CP1550
Reduced headless crown

CP1553
Crown

Dimensional drawings of probes available for populated board testers (flying probe testers)

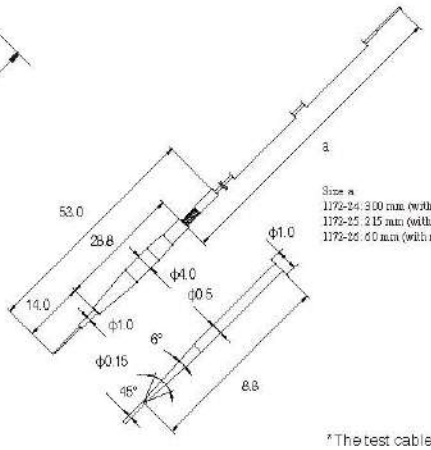
1172-1□

*1172-19: Conforms to 1172-2 □ dimensions.



*The test cable is soldered in place.

1172-2□

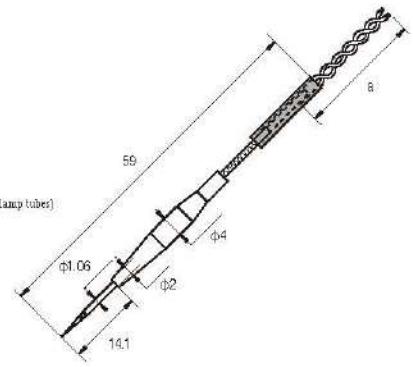


Size a
1172-24: 300 mm (with 2 clamp tubes)
1172-25: 215 mm (with 3 clamp tubes)
1172-26: 60 mm (with notch in holder; no clamp tubes)

*The test cable is soldered in place.

1172-4□

*1172-46: Conforms to 1172-2 □ dimensions.

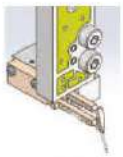


Stock No.	Model	Tip Shape	Cord lengths (size a)	1114	1240-01,02		1240-03	FA1240
				All arms	L and M arms	R arm	All arms	All arms
1172-12	Contact probe	Needle	280 mm (11.02 in.)		○			
1172-14	Contact probe	Reduced crown, small	280 mm (11.02 in.)	○*1	○	○*1		
1172-16	Contact probe	Chisel	280 mm (11.02 in.)	○*1	○	○*1		
1172-17	Contact probe	Needle	195 mm (7.68 in.)	○		○		
1172-18	Contact probe	Needle	56 mm (2.20 in.)				○	
1172-19	Contact probe	Needle	50 mm (1.97 in.)					○
1172-24	Hardened probe	Needle	300 mm (11.81 in.)		○			
1172-25	Hardened probe	Needle	215 mm (8.46 in.)			○		
1172-26	Hardened probe	Needle	60 mm (2.36 in.)				○	
1172-27	Hardened probe	Needle	50 mm (1.97 in.)					○
1172-41	4-terminal probe	1 needle (4-terminal)	202 mm (7.95 in.)	○				
1172-43	4-terminal probe	1 needle (4-terminal)	310 mm (12.21 in.)		○			
1172-44	4-terminal probe	1 needle (4-terminal)	190 mm (7.48 in.)			○		
1172-45	4-terminal probe	1 needle (4-terminal)	62 mm (2.44 in.)				○	
1172-46	4-terminal probe	1 needle (4-terminal)	50 mm (1.97 in.)					○

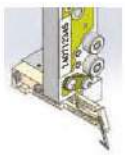
For all of the above products, the probe pressure is 1.35N (when using a 2mm stroke)

*1 Can be used with a cable length of 195 mm.

List of probes available for bare board testers



Link Probe
(Single Probe)



Link Probe with Blade

4-terminal probe
(Kelvin Probe)

1172-66
Link Probe

1172-67
4-terminal probe

1172-68
Link Probe with Blade

1172-69
Double Link Probe with Blade

1172-81
Link Probe

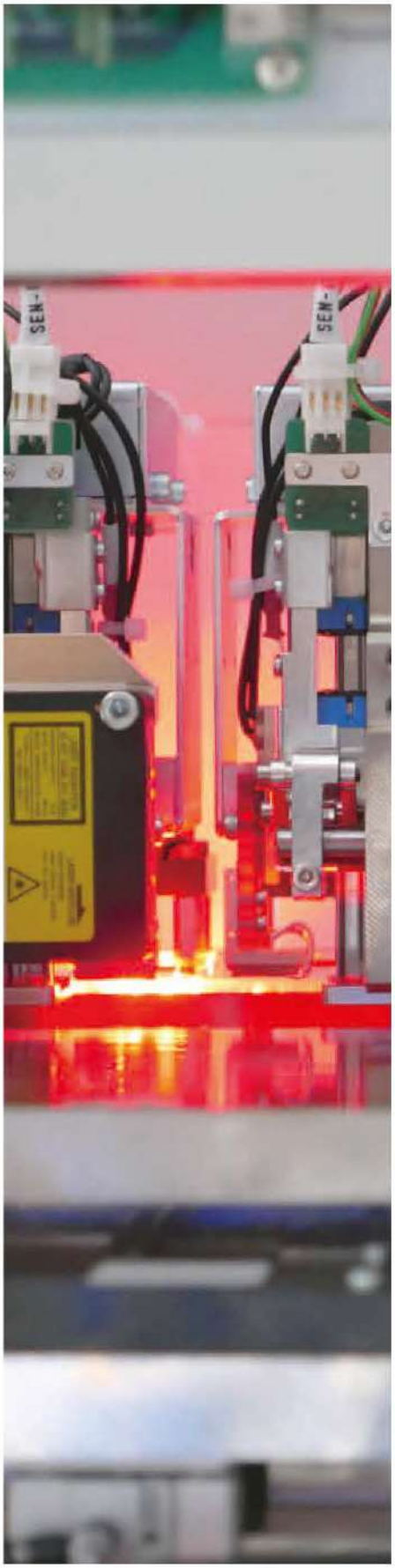
1172-82
Link Probe

1172-83
Double Link Probe (HP)

CP1072-01
Probe (reduced-impact type)

Stock No.	Repair	Model	FA1116	1270/1271	FA1283	FA1811
1172-66	○	Link Probe	○	○	○	
1172-67	○	4-terminal probe	○	○	○	
1172-68	○	Link Probe with Blade	○	○	○	
1172-69	○	Double Link Probe With Blade (forLandR.A.R.M.)	○	○	○	
1172-81	○	Link Probe	○	○	○	
1172-82	○	Link Probe	○	○	○	
1172-83	○	Double Link Probe (HP)	○	○	○	
CP1072-01	○	Probe (reduced-impact type)	○		○ Dedicated to FA1116	
CP1073-01	○	Single Probe (reduced-impact type)				○
CP1073-11	○	Kelvin Probe				○

For repairs, you can either repair the tip or replace the unit board. (Contact your nearest HIOKI distributor for more information.)



Bare Board Testing Equipment

	FA1116	1270	1271	FA1283-01/-11	FA1811	
See page	P12	P13		P14	P10	
Test method	Flying Probe Type					
Surface(s) tested	Single	Vertical, double		Horizontal, double	Horizontal, double	
No. of arms	2	4 (Upper: 2, lower: 2)		4 (Top: 2, bottom: 2)	2	
Maximum number of test steps	40,000 steps During continuous testing, 800,000 steps			999,999 (max.)	999,999 (max.)	
Total probing precision	☐20 µm			☐15 µm	☐10µm	
Probe Work area	610x510 mm (24.02x20.08 in.)	330x400 mm (12.99x15.75 in.)	610x510 mm (24.02x20.08 in)	400x324 mm (15.75x12.76 in.)	75x75 mm	
Board clamping	Absorption	Clamp	Clamp	Tension clamp FA1282-11 Automatic transport support	Absorption (optional)	Test Fixture (optional)
Boards suitable for clamping/transport	50x50 mm to 610x510 mm (24.02x20.08 in)	50x50 mm to 400x330 mm (15.75x12.99 in)	50x70 mm to 610x510 mm (24.02x20.08 in)	50x50 mm (1.97x1.97 in) to 400x330 mm (15.75x12.99 in)	50x50 mm (1.97x3.54 in) to 165x250 mm (4.13x9.84 in)	☐10mm (0.004 in) to ☐80 mm (3.15 in)
Power supply	AC 200 V Single-phase, 50/60 Hz				AC 200 V three-phase, 50/60 Hz	
Power consumption	3 kVA			5 kVA	5 kVA	
TESTER dimensions mm(in.)	1443(56.81)W 1656(65.20)H 1185(46.65)D	1500(59.06)W 1867(73.50)H 860(33.86)D	1760(69.28)W 2000(78.74)H 860(33.86)D	1350(53.15 in)W 1206(47.48 in)H 1240(48.82 in)D	1300(51.18 in)W 1670(65.75 in)H 1700(66.93 in)D	
Mass	1,000 kg (35275 oz.)		1,200 kg (42326oz)	1,100 kg (38800 oz.)	2,200 kg (70546 oz.)	
Continuity test	400 mΩ to 1 kΩ					
Short test	400 mΩ to 40 kΩ					
Insulation test	Option 200Ω to 500 MΩ (1 to 250 V)			200Ω to 100 GΩ (1 to 250 V)	1000Ω to 100 GΩ	1000Ω to 1250 MΩ
Open test	4Ω to 4 MΩ					
DC measurement voltage	100 mV/400 mV			100 mV/400 mV/12 V	100 mV/400 mV	
AC measurement voltage	1 V(rms) 10 V(peak)			1 V(rms) 10 V(peak) / Option 0.1 V	1 V(rms) 10 V(peak)	
Resistance measurement	400 µΩ to 100 MΩ	4 Ω to 100 MΩ		40 µΩ to 40 MΩ	400 µΩ to 40 MΩ	4 Ω to 4 MΩ
Continuity test	10 fF to 400 mF			10 fF to 40 mF	10 fF to 40 µF	
Inductance test	10 µH to 100 H			10 µH or larger 100 mH / Option 1 µH or larger	—	
Diode test	0 V to 25 V				—	
Zener diode test	0 V to 25 V				—	
Voltage (DC) test	0 V to 25 V				—	
Digital transistor test	—	0 V to 25 V			—	
Photocouplers	—	0 V to 25 V			—	
Special measurement						
4-terminal measurement function	Standard	Standard	Standard	Standard	Standard	
DC measurement function	Standard	Standard	Standard	Standard	—	
EAD test	—	—	—	Option 100 nA to 100 mA	—	
MLCC measurement	Optional 120 Hz, 1 kHz	—	—	Option 120 Hz, 1 kHz	120 Hz, 1 kHz 100 nF to 100µF	
Open via detection	Standard	Standard	Standard	Standard	Standard	
Near-open detection	—	Option	Option	Option	Standard	
Micro-short detection	Option	Option	Option	Standard	Standard	
Arc test	—	—	—	Option	Standard	
Support software (optional)						
FLY-LINE	•	•	•	• / •	•	
FAIL VISUALIZER	•	•	•	• / •	•	

Notes:

- • : Supported , — : N/A

*1: Operating conditions apply when using special, flat-tipped probes.

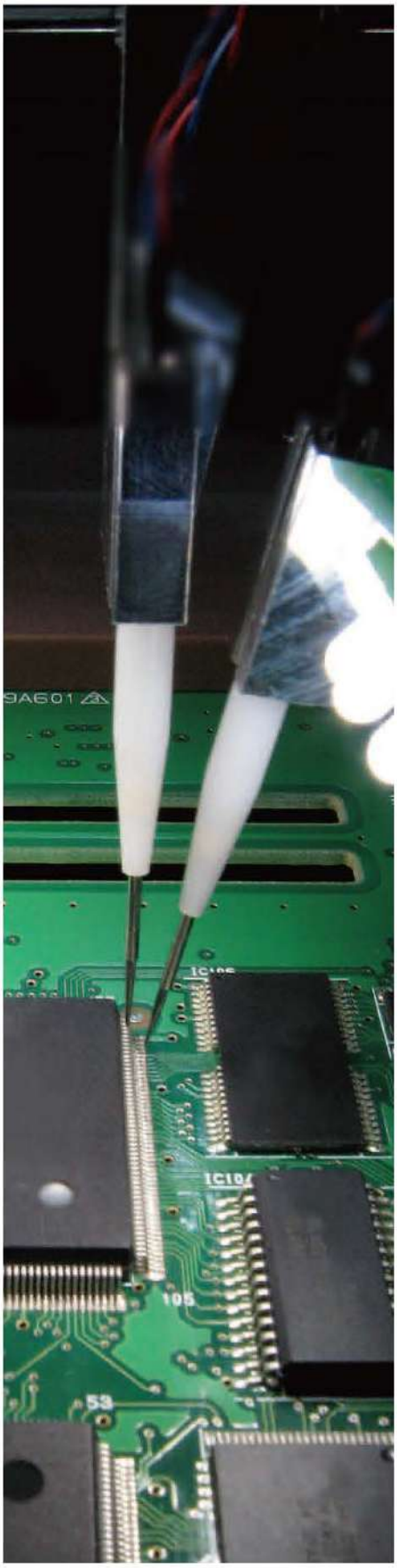
*2: Requires Power Source Unit 1937-04 or other power supply unit as well as external IO.

*Contact HIOKI for more information about compatible board sizes when combining testing equipment with other systems.

*Note on testable board dimensions: Width (W) × depth (D) (minimum) to width (W) × depth (D) (maximum) mm

Support software (optional): Page 17		Model	Description
FLY-LINE	1741	X-Y test data creation system	Automates the data creation process, from manufacturing data input to flying data output.
SIM-LINE	1392	Theoretical resistance value calculation program	Calculates theoretical resistance values generated between electrical test probes from printed circuit board manufacturing data.
EPA-LINE	1391	Test data creation system for device embedded substrates	Extracts nets related to embedded devices from device embedded substrate manufacturing data and outputs test data.
FAIL VISUALIZER	UA1792	FAIL VISUALIZER	Displays data highlighting net information for points that generated errors.
FIT-LINE	UA1780	Testing Data Creation System	Creates test data by automatically extracting test points and net information from manufacturing data (CAD data).

	Populated Board Testing Equipment						
	1220-50	1220-51	1220-52	1220-55	FA1240-51	FA1240-52	FA1240-53
See page	P18				P22		
Test method	Moving fixture type				Flying Probe Type		
Surface(s) tested	Double				Single		
No. of arms	—				4		
Maximum number of test steps	Max. 10,000step				Max. 40,000step		
No. of test points	Max. 2,176		Max. 1,536	Max. 1,536	Upper: 4 arms Lower: 8 pins (Clamping pins can be added)		
Min. pad diameter	—	φ800 μm			φ100 μm		
Probe Work area (transport margin: 3 mm)	—	Standard Single-sided: 990 x 300 mm (38.95 x 11.81 in.) Double-sided: 340 x 240 mm (13.39 x 9.45 in.)		Standard 270 x 330mm (10.63 x 12.99 in.) 210 x 330mm (8.27 x 12.99 in.)	60x60 mm (1.97 x 1.97 in.) to 460 x 510 mm (18.11x20.08 in.)		50x50mm to 400x330mm (15.75 x 12.99 in.)
Boards suitable for clamping/transport	—	Standard Single-sided: 990 x 300 mm Double-sided: 340 x 240 mm		Standard 270 x 330mm 210 x 330 mm	50x50 mm to 460 x 510 mm		50 x 50 mm to 400x330 mm
Power supply	100 to 240 V AC Single-phase, 50/60 Hz	100/120/200/230/240 V AC (specify at time of order) Single-phase, 50/60 Hz			AC 200 V Single-phase, 50/60 Hz		
Power consumption	0.7 kVA	1 kVA			6 kVA		5 kVA
HiTESTER dimensions mm (in.)	200(7.87)W 325(12.80)H 298(11.73)D	1030(40.55)W 1470(57.87)H 710(27.95)D	655(25.79)W 1610(63.39)H 705(27.76)D	780(30.71)W 1685(62.40)H 980(38.58)D	1410(55.51)W 1300(51.18)H 1380(54.33)D		1320(51.97)W 1970(59.94)H 1430(56.30)D
Mass	10 kg(352 oz.)	240 kg(8465 oz.)	240 kg(8465 oz.)	300 kg(10582 oz.)	1,250 kg(44091 oz.)		1050kg(37037oz.)
Scanner boards	1131-01/-03 (64 channels/board)				4 channels/board (for use with lower fixed pins); 1 board can be added		
Scanner cables	1156-01 (64 channels/ cable)	1152-04 (64 channels/cable)		1152-05 (64 channels/ cable)	—		
Continuity test	4 Ω to 400 Ω				—		
Short test	400 mΩ to 400 kΩ				400 mΩ to 40 kΩ		
Open test	4Ω to 4 MΩ						
High-voltage resistance and insulation resistance measurement	Option 400 mΩ to 1 GΩ (between 2 pins) (6 mV to 100 V)				—		
Resistance measurement	400 μΩ to 40 MΩ						
Continuity test	10 pF to 400 mF				1 pF to 400 mF		
Inductance test	1μH to 100 H						
Diode test	0 V to 25 V						
Zener diode test	0 V to 25 V (Optional: 25 V to 100 V)				0 V to 25 V (optional 25 V to 120 V)		
Voltage (DC)test	0 V to 25 V (Optional: 1 mV to 250 V)				0 V to 25 V		
Digital transistor test	0 V to 25 V						
Photocouplers	0 V to 25 V						
Macro test	1Ω to 10 MΩ				—		
Impedance	1Ω to 10 MΩ				—		
Capacitor reverse insertion test	Option						
IC reverse insertion test	Option				—		
Active testing							
FET test	Standard	Standard	Standard	Standard	Option	Option	Option
Relay test	Standard *2	Standard *2	Standard *2	Standard *2	Option	Option	Option
3-terminal regulator test	Standard *2	Standard *2	Standard *2	Standard *2	Option	Option	Option
FIT-LINE	—	—	—	—	•	•	•
FAIL VISUALIZER	•	•	•	•	•	•	•



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