New

HIOKI

2001

Two-arm model

1116 X-Y C HiTESTER

Automatic Testing Equipment

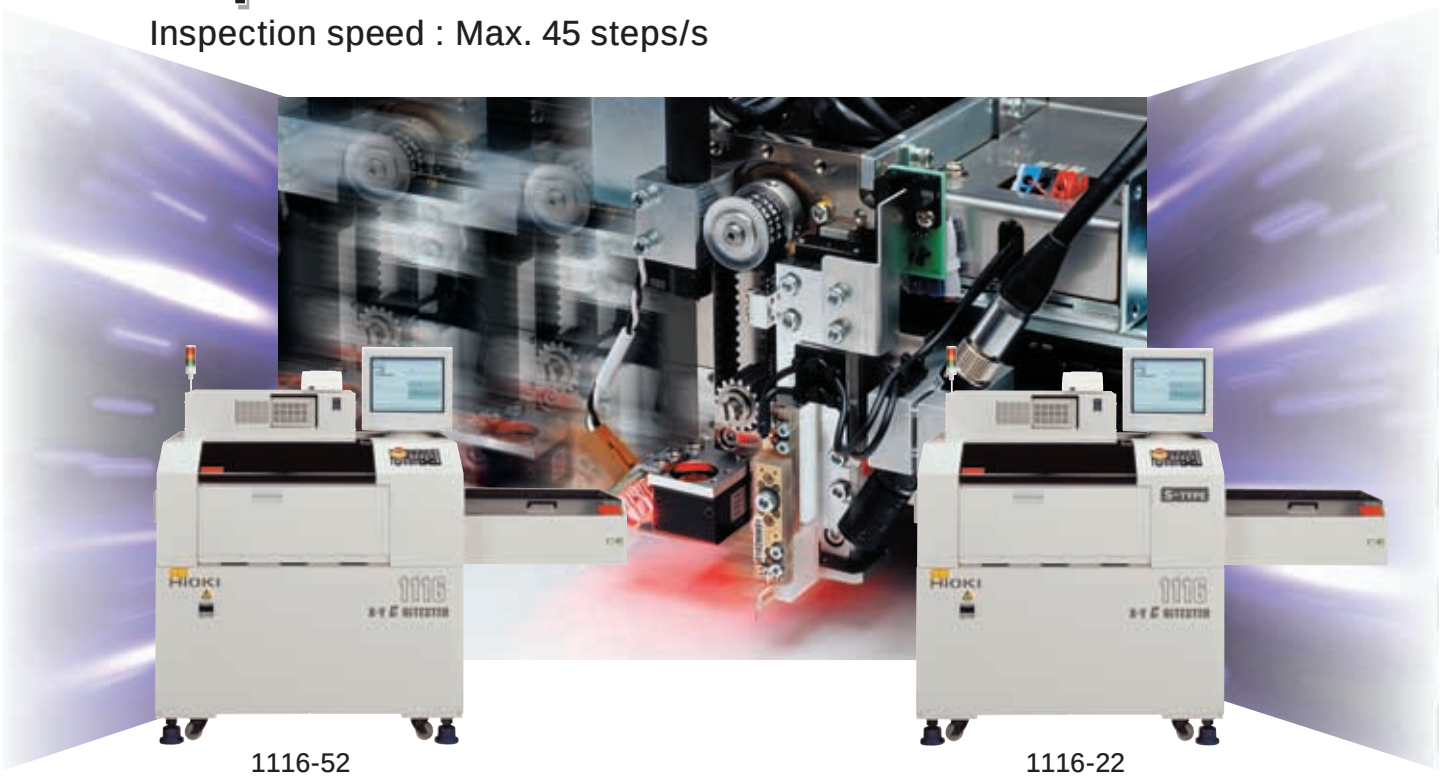
1116-51 to 1116-54

Max.70 steps/s ultra-high speed inspection

1116-21 to 1116-24

Superior cost effectiveness

Inspection speed : Max. 45 steps/s



1116-52

1116-22

The 1116 X-Y C HiTESTER is a high-speed substrate tester that uses capacitance measurement to greatly reduce the number of testing steps and time required for testing compared to testers that use continuity testing. The 1116 series is available in two versions: the ultra-high speed 1116-50, which operates at up to 70 steps/s; and the low-cost 1116-20. With a capacitance measurement resolution of 5aF , the 1116 X-Y C HiTESTER can detect extremely small variations with accuracy and certainty. In addition to its extremely low running cost, this fixtureless inspection unit has a high-speed soft landing function to minimize denting Further, it can be used for any board material regardless of composition, be it plastic, ceramic, or LCD glass.

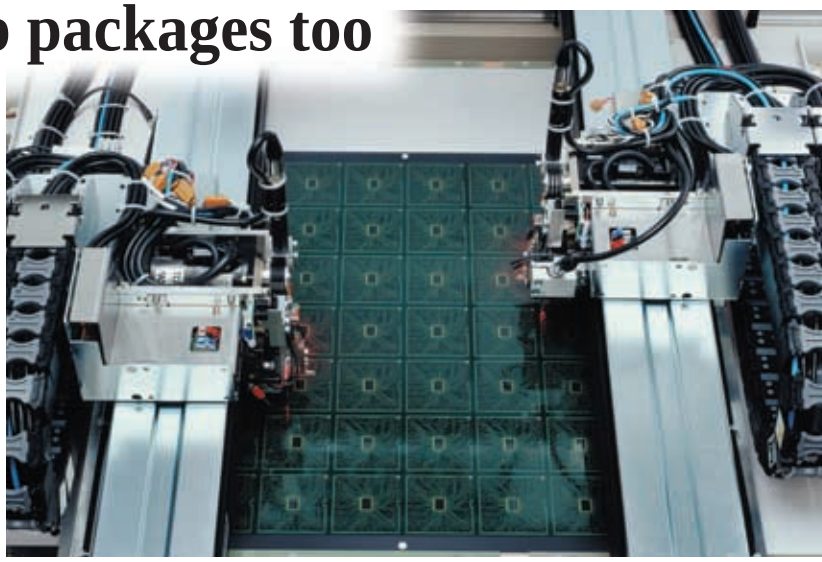
ISO14001
JQA-E-90091

INTERNET HIOKI Website

http://www.hioki.co.jp/

HIOKI company overview, new products, environmental considerations and other information are available on our website.

From ordinary bare boards to high-density BGA, CSP, or MCM packages Accommodates build-up packages too



■ High inspection speed

The 1116 achieves a maximum inspection speed of 70 steps per second (with the 1116-5x) or 45 steps per second (with the 1116-2x) .
(with 0.1 mm movement and all two arms used simultaneously during capacitance measurement)

■ Capacitance measurement resolution of 5aF(1aF=10^{-18}F)

Since the variation in capacitance accompanying a fault may be extremely small, high resolution is required for capacitance measurement. With a high resolution of 5aF, the 1116 X-Y C HiTESTER can detect extremely small variations.

■ High-precision probing

With a probing accuracy of ±50 µm and a positioning return accuracy of ± 20µm, the 1116 assures accurate probing of fine pitch pattern pads.

■ A standard automatic positioning correction function

Together with a high-precision mechanism, the automatic positioning correction function assures an additional degree of probing accuracy.

■ Vacuum clamping

The board being tested are fixed using the vacuum clamping method. Since chucks are not required to secure the board during carrying and testing, all areas on the board can be tested.

■ Large testing area

The 1116 X-Y C HiTESTER has a testing area of up to 610 (W) × 510 (D) mm, allowing the testing of large boards.

■ Fine pitch support

Using link-type probes, the minimum probe pitch between the left and right arms is 0.1 mm.

■ Two keyboard heights

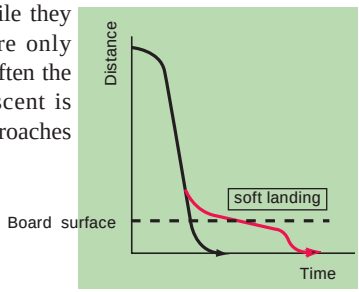
The keyboard can be placed at two heights to accommodate both standing and sitting working postures.

■ Minimal probing impact

Probing impact is kept to a minimum with the high-speed soft landing function and shock-absorbing probes.

● High-speed soft landing function

The probes are raised while they are being moved, and are only lowered for testing. To soften the impact, the speed of descent is lessened as the probe approaches the target.



■ Accommodates boards as thin as 0.1 mm

Boards with thicknesses ranging from 0.1 mm to 3.2 mm can be tested, making it possible to test thin boards, such as flexible circuit boards.

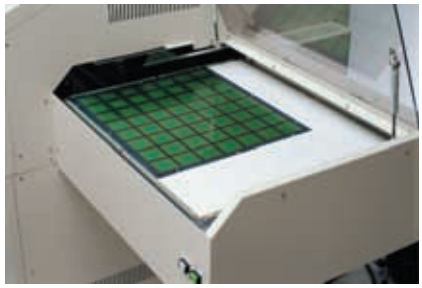
■ A variety of electrical measurements

In addition to capacitance measurement, the 1116 X-Y C HiTESTER can also measure resistance, inductance, diode VF, and voltage.

■ Loading system is standard outfit

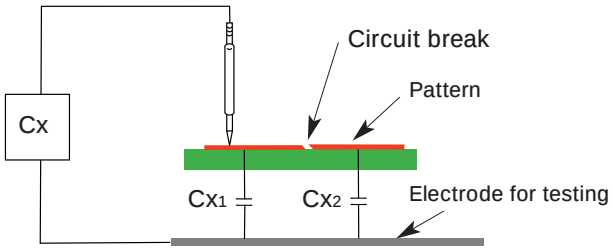
(1116-22,1116-24,1116-52,1116-54)

A single axis actuator is used to move the vacuum clamping jig. Boards to be tested can easily be set from outside the main unit.



High-speed pattern testing using capacitance measurement

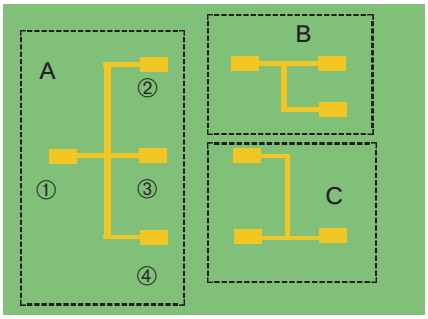
Each printed circuit pattern has a particular capacitance, proportional to its area, with respect to the electrically insulated electrode used for testing. If there are circuit breaks, or shorts, then the area of the pattern will differ, and the capacitance will change correspondingly. Therefore, by comparing the capacitance values with those of a reference board, the pattern can be checked for continuity. Since the floating capacitance of the pattern is extremely low, a special-purpose jig with vacuum clamping is used to obtain stable measurement values.



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.

Testing steps

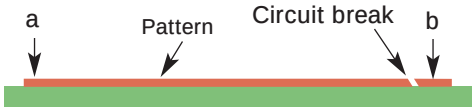
Using the conductivity measurement method to check pattern A in the figure for continuity requires three steps, measuring 1-2, 1-3, and 1-4, and the same is required for patterns B and C. Checking for short circuits in A, B, and C requires another three steps, testing A-B, A-C, and B-C. Thus, if the circuit is complex, the number of steps is very large. Using the capacitance measurement method, discontinuity and short circuit testing can be achieved by measuring at just the endpoints of each pattern.



■ Comparison of testing steps
For 100 networks with all 500 nodes

	Conductivity measurement method	Capacitance measurement method
Discontinuity testing	All nodes in the same network 500 - 100 = 400	Discontinuity and short circuit testing for capacitance measurements of all nodes. 500
Short circuit testing	nCr = $_{100}C_2$ 100 ×(100-1)/2 = 4950	
Testing steps	5350	500

As shown in the figure below, if there is a discontinuity near one end of the pattern, then there is very little change in the capacitance measured from a, but a large change measured from b.

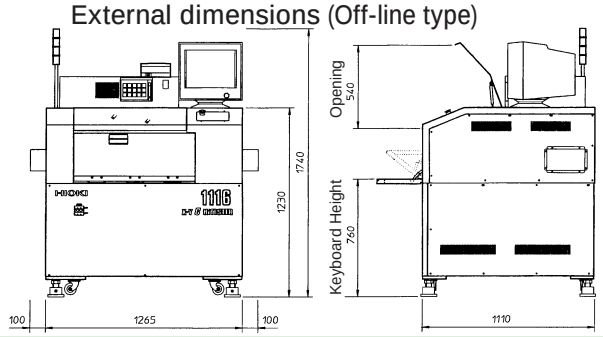


Testing data with FLY LINE

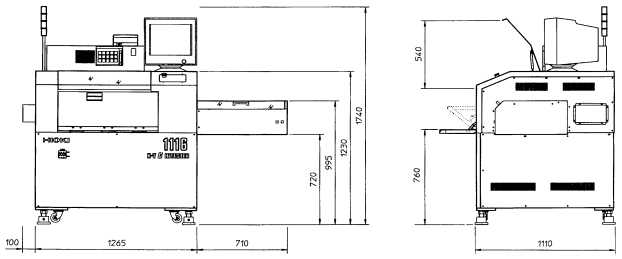
FLY LINE searches for network information and end point coordinates from various types of garber and NC data, and automatically extracts the testing points required to conduct pattern tests for printed substrates. FLY LINE produces test data with great efficiency.

Supports unattended operation when used with a handler

External dimensions (Off-line type)



External dimensions (Single-robot type)



1116 Specifications

No. of arms	2
No. of probes	2
No. of test steps	Max. 40,000 (300,000 for continuous testing)
Test ranges	DC measurement function Resistance :400μΩ to 40MΩ Capacitance :4μF to 400mF Diodes, transistors (VF) : 0 to 25V Zener diodes (VZ) : 0 to 25V Short circuit :400mΩ to 40kΩ Open circuit :4Ω to 4MΩ Voltage : 0 to 25V AC measurement function Resistance :100Ω to 100MΩ Capacitance :10 fF to 10μF Coils :10μH to 100H
Measurement signal	DC constant voltage : 100mV/400mV(2 ranges) DC constant current :200nA to 200mA(13 ranges) AC constant voltage : 1V rms /10 V peak (2 ranges) AC frequency :160Hz/1.6kHz/16kHz/160kHz
Measurement ranges	DC voltage measurement : 800 μV to 25V f.s.(8 ranges) DC current measurement : 100nA to 25mA f.s.(7 ranges) AC current measurement : 10μA to 1mArms.(3 ranges) for 1 Vrms : 1μA to 100μApeak (3 ranges) for 10 Vpeak
Decision range setting	-99.9% to +999.9% or absolute value
Measurement time	Min. 0.014 s/step(1116-5x), Min. 0.022 s/step(1116-2x), (0.1 mm movement with 2-arm simultaneous probing during capacitance measurement)
Probing position accuracy	Within±50μm(x- and y-axes)
Positioning return accuracy	Within±20μm (probing position, 20±3˚C)
Minimum movement step	XY : 1.25μm/pulse Z : 6.00μm/pulse
Minimum Probing pitch	0.1 mm Between the left and the right arm while using a link-type probe

Probe work area	610(W)×510(D)mm
Fixed and movable boards	Thickness : 0.1 to 3.2 mm External dimensions : 50×50mm to 610×510mm Component mounting limits : Upper surface ; 12 mm(including board thickness) Lower surface ; not possible Board weight : 2.0 kg max.
Board-carrier	Vacuum jig horizontal carrier with a single axis actuator
Positioning correction	Automatic positioning correction function
Safety devices	Emergency stop switch, safety cover (of anti-static resin), interference prevention (stops arms from colliding)
External memory	FDD, HDD, CD-ROM
Display	17-inch color display
Power supply	200 V AC±10%(single phase) 50/60Hz Power consumption :3kVA
Pneumatic system	Primary pressure: 0.5 to 0.99 MPa (dry air)
Air consumption	Max.0.3Nl/min.
Operating environment	Temperature : 23±10 ˚C Humidity : 75%rh or less(no condensation) Atmosphere : Avoid use subject to dust, vibration, or corrosive gases Floor strength: at least 500 kg/m²
Accessories	Thermal mini printer, printer cable, grease, grease can, arm offset board, keyboard, PS/2 mouse, mouse pad, mouse pocket, PC accessories, Setup disk, leveling jacks (4), color display (17 inch), power cord (loose ends, 3 m), spare fuse, impression sheets
Unit dimensions	1465 (W) ×1230 (H)× 1110 (D) mm approx.
Mass	1000 kg approx.

*Air is required when using the stamp unit.

1116-21 (Off-line)
1116-22 (Transport System : Single-robot)
1116-23 (Off-line, with 1945-21 and 1945-22)
1116-24 (Transport System : Single-robot, with 1945-21 and 1945-22)
1116-51 (Off-line)
1116-52 (Transport System : Single-robot)
1116-53 (Off-line, with 1945-21 and 1945-22)
1116-54 (Transport System : Single-robot, with 1945-21 and 1945-22)

The 1116 does not include a printer. please consult with Hioki regarding availability of English printers.

● Factory options

1355-01 VACUUM PUMP (AC200 V, three phase)
1933-20 INSULATION MEASUREMENT UNIT
1941-31 STAMP UNIT for R ARM
1941-32 STAMP UNIT for L ARM
1941-35 STAMP UNIT WITH THE CAP for L ARM
1944-01 EXTENSION I/O BOARD
1945-21 COAXIAL DOWNWARD ILLUMINATION UNIT for R ARM
1945-22 COAXIAL DOWNWARD ILLUMINATION UNIT for L ARM
1946-04 MONITOR CAMERA
1947-21 1.2 POWER LENS UNIT for R ARM
1947-22 1.2 POWER LENS UNIT for L ARM

● Options

1139-03 1116-5x DATA COMPOSITION SOFTWARE
1139-53 FL-Link4 FLY-LINE LINK SOFTWARE
1330-03 MEASUREMENT SECTION CALIBRATION UNIT
1356 MAINTENANCE TOOL SET
1172-66 LINK PROBE (for L and R ARM)
1172-67 DOUBLE LINK PROBE (for L and R ARM)
1172-68 LINK PROBE WITH BLADE (for L and R ARM)
1172-69 DOUBLE LINK PROBE WITH BLADE (for L and R ARM)
1172-70 SHOCK-ABSORBING SINGLE NEEDLE PROBE (SK)
1172-71 SHOCK-ABSORBING SINGLE NEEDLE PROBE (WC)
1172-72 SHOCK-ABSORBING TRIANGULAR PYRAMID PROBE (SK)
1172-74 PROBE FOR CALIBRATION (for L and R ARM)
1172-77 SHOCK-ABSORBING SINGLE NEEDLE PROBE (WC SR10)
1172-81 LINK PROBE
1172-83 DOUBLELINK PROBE
1134-02 IMPRESSION SHEETS
1164-02 ONE-WAY CLUTCH
1164-03 PROBE ATTACHMENT
1196 RECORDING PAPER (25m,10rolls)
1350 OFFSET BOARD (t=2mm)
1350-01 OFFSET BOARD (t=1mm)

HIOKI
HIOKI E. E. CORPORATION

HEAD OFFICE :
81 Koizumi, Ueda, Nagano, 386-1192, Japan
TEL +81-268-28-0562 / FAX +81-268-28-0568
E-mail: os-com@hioki.co.jp

HIOKI USA CORPORATION :
6 Corporate Drive, Cranbury, NJ 08512 USA
TEL +1-609-409-9109 / FAX +1-609-409-9108
E-mail: hioki@hiokiusa.com

DISTRIBUTED BY

TKK HIOKI CO.,LTD :
NO.66-8,Sec.2,Nan Kan Road,Lu-chu,
Taoyuan,Taiwan,R.O.C.
TEL +886-3-311-7260 / FAX +886-3-311-8236

HIOKI E.E.CORPORATION Singapore Representative Office :
12 New Industrial Road,#02-04 Thoren Technocentre,Singapore 536202
TEL +65-288-0050 / FAX +65-282-2283
E-mail: kensoh@hioki.per.sg

1116-20E1-19B-03P Printed in Japan