Instruction Manual

Tektronix

PQFP100 & PQFP132 Converter Clips

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In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the respective warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; or c) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

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Introduction

This instruction book gives you information about using the Tektronix PQFP100 and PQFP132 PQFP-to-PGA converters. Information in this manual is presented in the following order:

- **Product Description**: a description of the converter clips and their use
- **Specifications**: electrical, environmental, and physical characteristics and pinouts
- **Operation**: installation and operating considerations
- **Maintenance**: inspection, cleaning, and replaceable parts

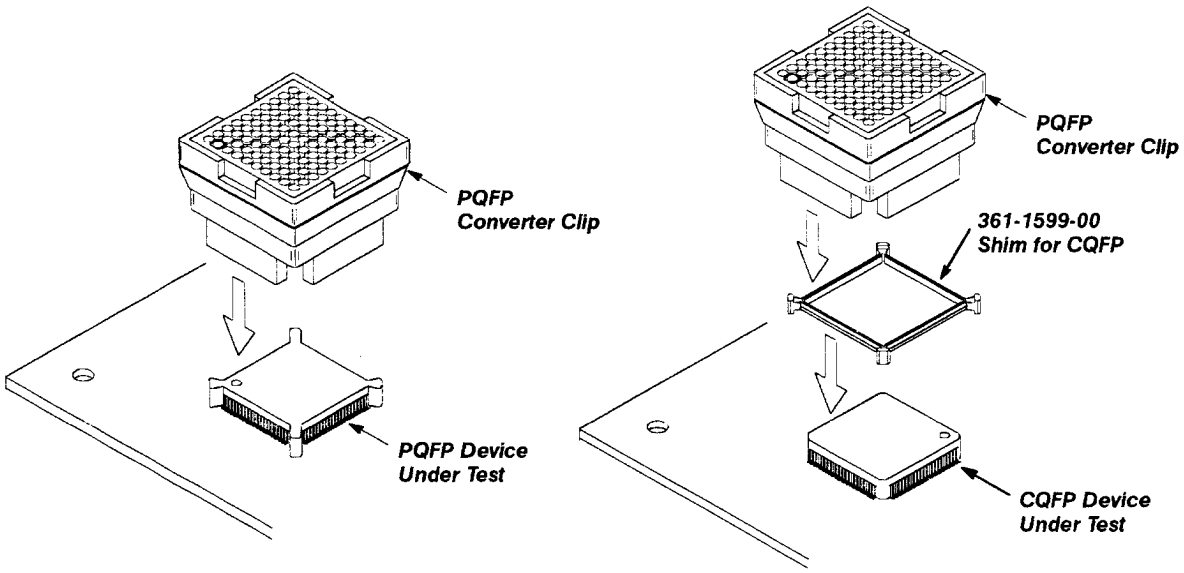

Figure 1: The PQFP100 and PQFP132 Converter Clips

Product Description

The PQFP Converter Clip allows you to probe integrated circuits having PQFP (plastic quad flat pack) surface mount chip carriers. (The PQFP132 includes a shim for targeting CQFP (ceramic quad flat pack) surface mount chip carriers.) The bottom of the converter clip fits on a PQFP surface mount chip carrier. The top of the converter clip is a PGA (pin grid array) socket. Its low-profile design provides high bandwidth and low reactance for unmatched precision in measuring high-speed logic signals. The PGA socket can be probed in several ways:

- using a matching PGA adapter
- using a P6562 SMT Probe
- using a conventional passive or active probe

Each converter clip includes a package of 25 test/ground pins that fit the PGA socket and assist in connecting individual probes.

Specifications

This section contains a set of electrical, environmental, and physical characteristics and pinout diagrams for each of the converter clips.

The pinouts in this section show the relationship between pin location on the PQFP device and the PGA socket of the converter clip. Because there are two standard pin numbering sequences, each clip has two diagrams and two indicators for Pin 1 on the PGA socket:

- A white square marks Pin 1 when that pin is in a corner.
- A white hexagon marks Pin 1 when that pin is in the center of a side.

PQFP100

The following specifications are for the PQFP100 100-pin Converter Clip. Figures 2 and 3 show the pin locations in the PGA.

Table 1: Electrical Characteristics

Characteristic	Information
Operating Voltage	≤ 40 V (DC + peak AC)
Operating Current	0.5 A maximum
Insulation Resistance	5,000 MΩ minimum
Capacitance Between Contacts	2.0 pF maximum
Self-inductance	36 nH maximum
Contact Resistance	< 100 mΩ
Bandwidth (-3 dB)	350 MHz typical
Crosstalk	-17 dB @ 350 MHz typical

Table 2: Environmental Characteristics

Characteristic	Information
Operating Temperature	+10° C to +40° C (+50° F to +104° F)
Storage Temperature	-55° C to +75° C (-67° F to +167° F)
Relative Humidity	75% maximum

Table 3: Physical Characteristics

Characteristic	Information
Size (H× W× D)	1.84 × 2.79 × 2.79 cm (.725 × 1.1 × 1.1 in)
Weight	18 g

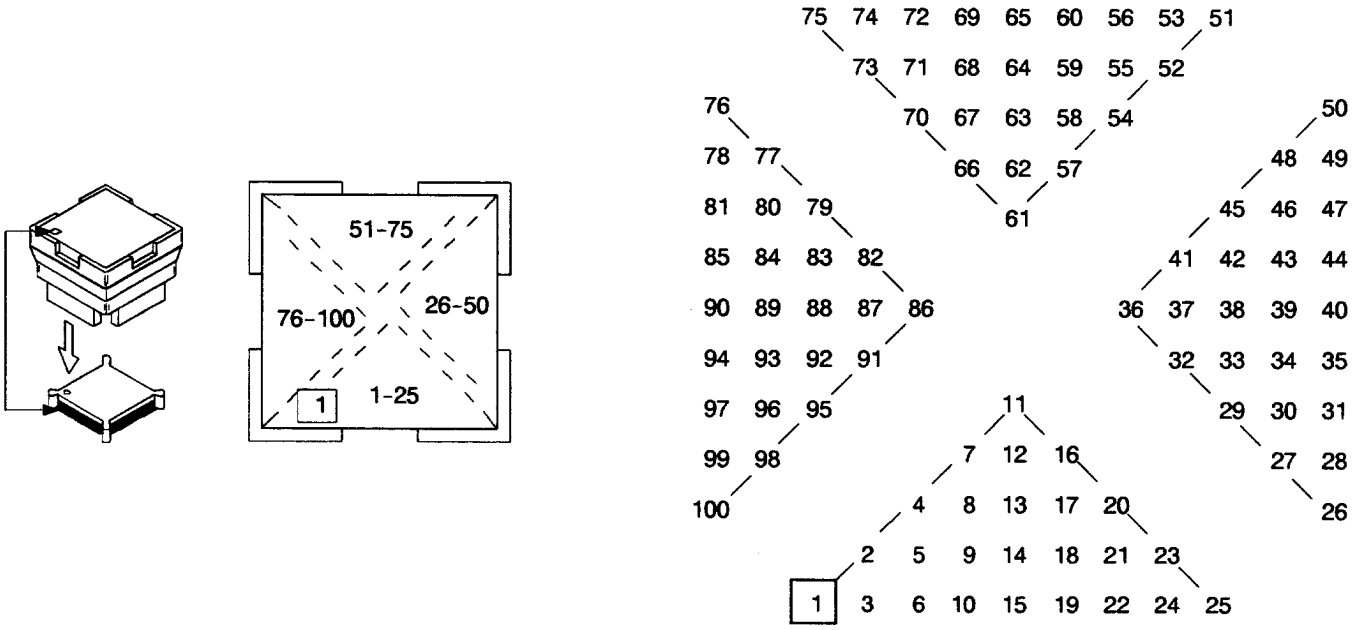

Figure 2: PQFP100 Pinout with Pin 1 in Corner

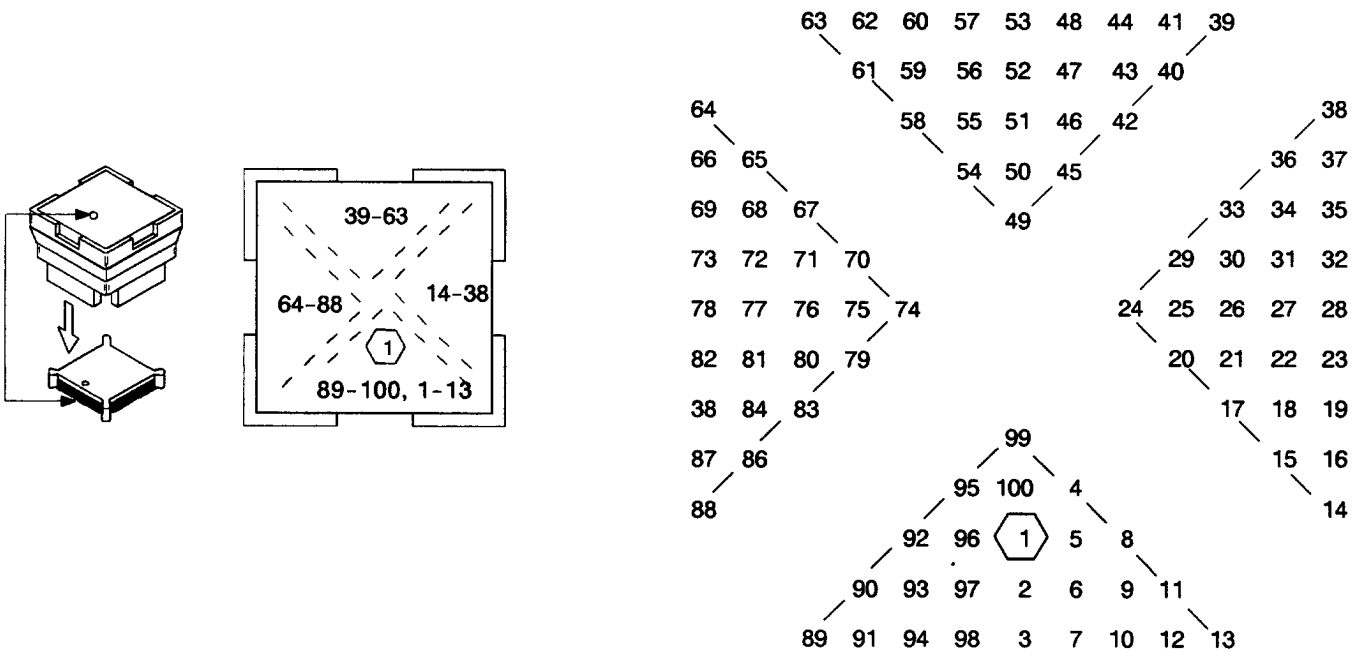

Figure 3: PQFP100 Pinout with Pin 1 in Center

PQFP132

The following specifications are for the PQFP132 132-pin Converter Clip. Figures 2 and 3 show the pin locations in the PGA.

Table 4: Electrical Characteristics

Characteristic	Information
Operating Voltage	≤ 40 V (DC + peak AC)
Operating Current	0.5 A maximum
Insulation Resistance	5,000 MΩ minimum
Capacitance Between Contacts	2.0 pF maximum
Self-inductance	36 nH maximum
Contact Resistance	< 100 mΩ
Bandwidth (-3 dB)	350 MHz typical
Crosstalk	-17 dB @ 350 MHz typical

Table 5: Environmental Characteristics

Characteristic	Information
Operating Temperature	+10° C to +40° C (+50° F to +104° F)
Storage Temperature	-55° C to +75° C (-67° F to +167° F)
Relative Humidity	75% maximum

Table 6: Physical Characteristics

Characteristic	Information
Size (H× W× D)	1.84 × 2.87 × 2.87 cm (.725 × 1.3 × 1.3 in)
Weight	25 g

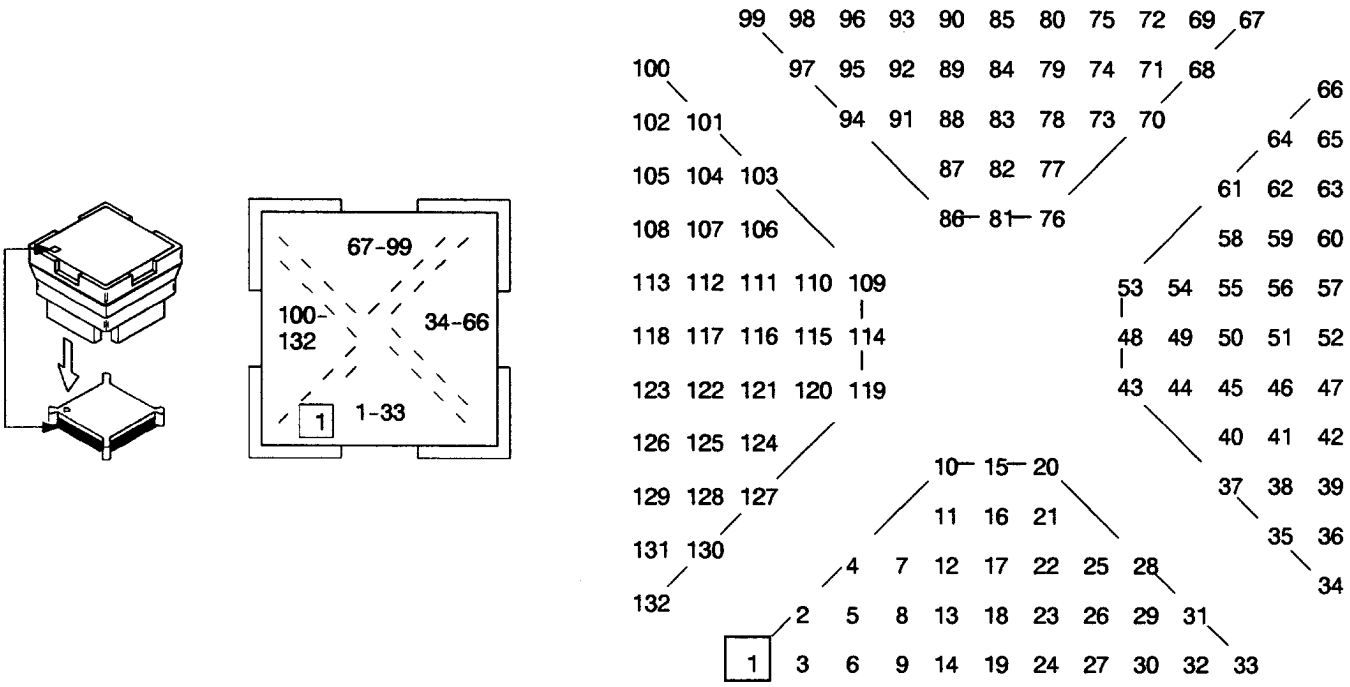

Figure 4: PQFP132 Pinout with Pin 1 in Corner

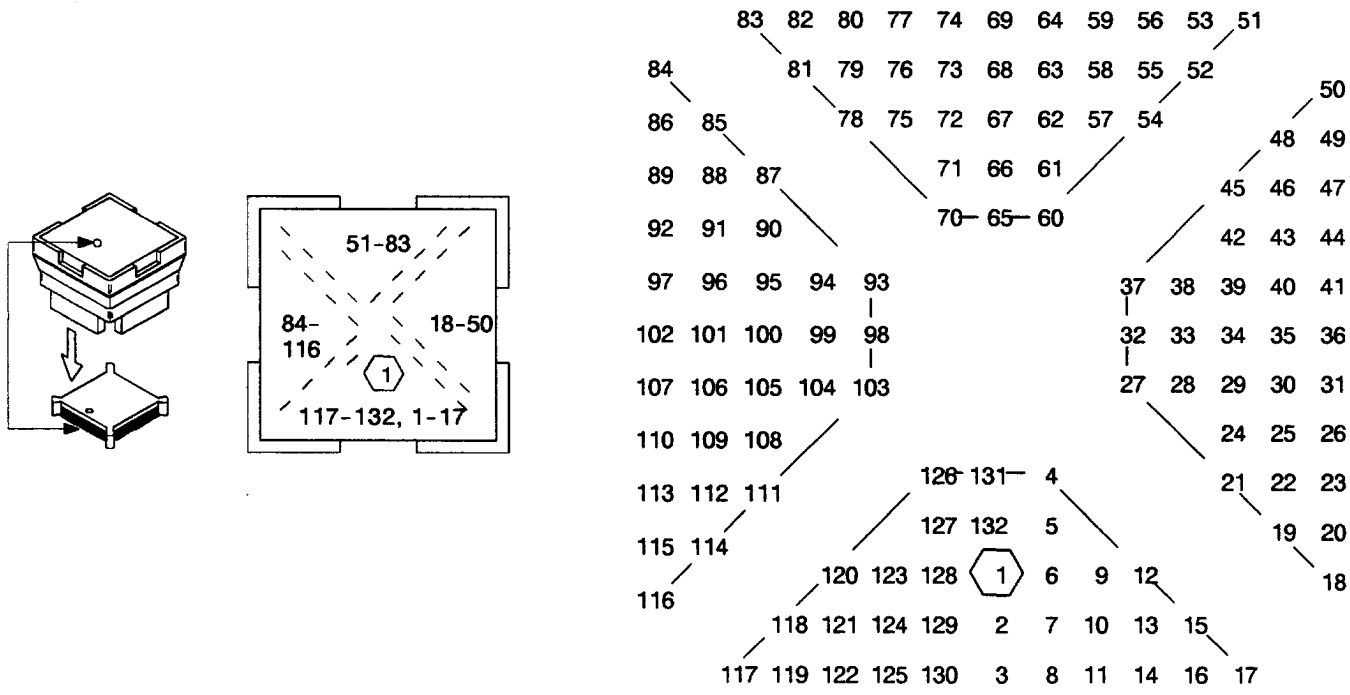

Figure 5: PQFP132 Pinout with Pin 1 in Center

Operation

This section tells you how to install the converter clip and gives some considerations regarding its use.

Installation

Refer to the pinout diagrams while you perform the following steps:

☐ **Step 1:** Shut off power to the system under test.

☐ **Step 2:** Make sure the leads of the device under test (DUT) are straight and free of residue that would increase the contact resistance or cause damage to the clip contacts.

CAUTION

To avoid damage to the converter clip, do not install the clip on a device that has bent, misaligned, or distorted leads.

☐ **Step 3:** Align the appropriate Pin 1 indicator of the converter clip (square or hexagon) with the Pin 1 index of the DUT.

☐ **Step 4:** Push the converter clip onto the DUT.

CAUTION

Take care not to use excessive force when inserting the converter clip on the DUT. For the PQFP100, nominal insertion force is 6 lbs. For the PQFP132, nominal insertion force is 8 lbs.

To ensure penetration of the oxide layer on the DUT, we recommend that you remove and reseat the clip at least once.

☐ **Step 5:** Power up the system under test.

At this point you can either attach a PGA adapter and connect it to your test instrument, or probe the PGA socket on top of the converter clip.

Operating Considerations

CAUTION

Take standard anti-static precautions, such as use of a ground strap, when using this product around static-sensitive components.

You may need to allow for the reactance between contacts of the converter clip. To determine the maximum reactance, refer to the *Specifications* section in this manual.

For additional oscilloscope probing capabilities, we recommend the Tektronix P6562 SMT probe. The probe tip of the P6562 fits into the PGA socket (Figure 6A) and allows you to perform hands-off probing of your system. Additional P6562 probes can fit in adjacent holes. For more information on the P6562 probe, contact your Tektronix field representative.

For maximum performance we recommend use of active probes, such as the Tektronix P6204 or P6202A. Figure 6B shows how to connect these types of probes. The probe is grounded through a ground pin on the device under test.

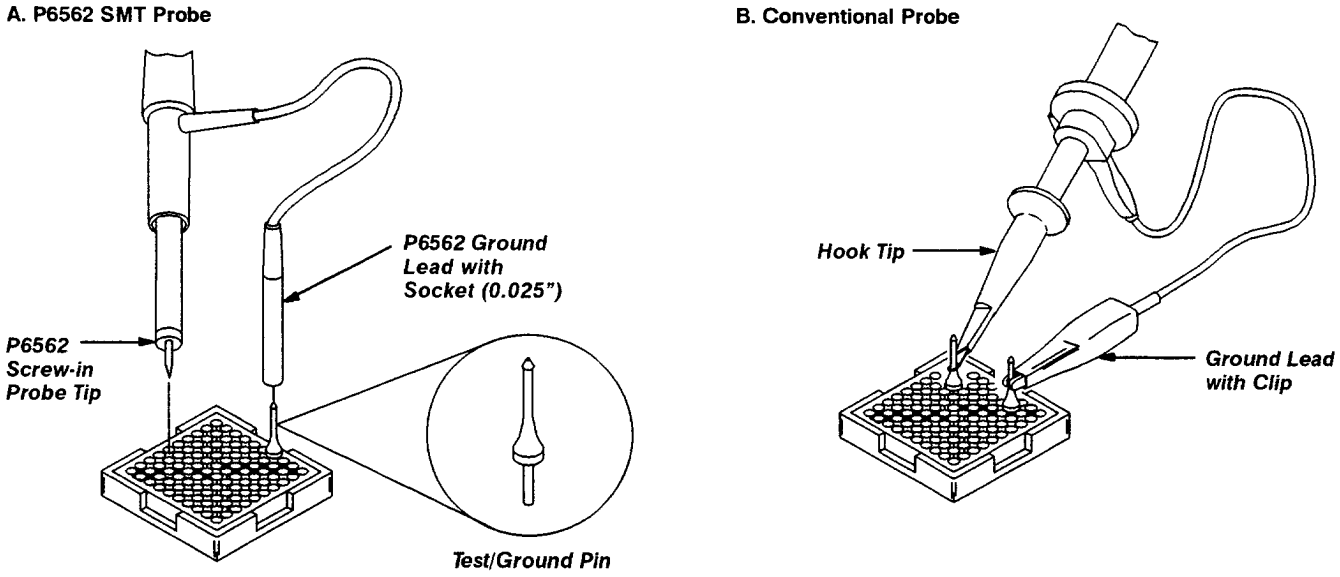

Figure 6: Connecting Probes

Tektronix offers, as optional accessories, a 100-pin male PGA adapter (Tektronix part number 103-0287-00) and a 132-pin male PGA adapter (Tektronix part number 103-0324-00), for use:

- Where probe access may be required at any random pin
- Where mass termination is required, for example in ATE or in life-cycle testing, when quick connection to or from wire cable or flexible circuit interconnects is to be made

These accessories are described in more detail on page 10.

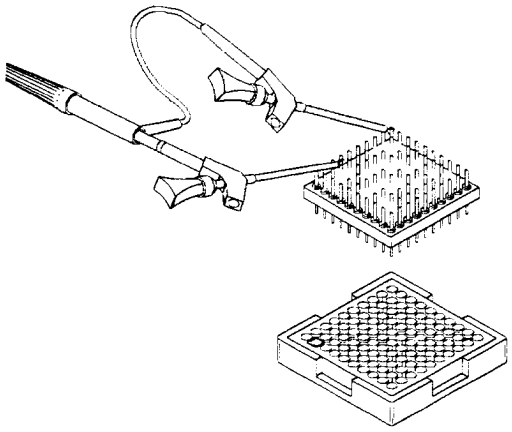

Figure 7: Using the Optional 100-Pin or 132-Pin PGA Adapter

Maintenance

Preventive maintenance consists primarily of cleaning and visual inspection.

Inspection

Periodically inspect the converter clip for defects such as broken connections, damaged parts, bent leads, and damage from overheating. The frequency of inspection depends on the severity of the environment to which the clip is subjected.

Cleaning

Loose dust accumulated on the inside of the converter clip can be removed with low-pressure air. Dirt that remains on the plastic can be removed with a soft cloth dampened with a mild detergent and water solution. Do not use abrasive cleaners.

CAUTION

Do not use strong chemical cleaning agents which may damage the plastic of the converter clip. Avoid chemicals that contain benzene, toluene, xylene, acetone, MEK, or similar solvents. For additional information on recommended cleaning agents, consult your Tektronix Service Center or representative.

PQFP100 Accessories

Standard Accessories

- Package of 25 test/ground pins, Tektronix part number 131-5336-01.

Contact your Tektronix sales representative if you need to order additional test/ground pins.

Optional Accessories

- 100-pin male PGA adapter, Tektronix part number 103-0287-00, for use where probe access may be required at any random pin, or where mass termination is required, for example in ATE or in life-cycle testing, when quick connection to or from wire cable or flexible circuit interconnects is to be made.

  The adapter has .030 inch square, .217 inch long pins for probe access or cable-harness wiring, and small-diameter VLIF pins for easy mass-entry of the PQFP100 PGA sockets.

PQFP132 Accessories

Standard Accessories

- Package of 25 test/ground pins, Tektronix part number 131-5336-01.
- Square Shim, Tektronix part number 361-1599-00, for targeting CQFP devices.

Contact your Tektronix sales representative if you need to order additional test/ground pins or shims.

Optional Accessories

- 132-pin male PGA adapter, Tektronix part number 103-0324-00, for use where probe access may be required at any random pin, or where mass termination is required, for example in ATE or in life-cycle testing, when quick connection to or from wire cable or flexible circuit interconnects is to be made.

  The adapter has .030 inch round, .217 long pins for probe access or cable-harness wiring, and small-diameter VLIF pins for easy mass-entry of the PQFP132 PGA sockets.