Instruction Manual

Tektronix

TMSSP1
478-Pin Socket Hardware Support

071-1136-01

www.tektronix.com

HARDWARE WARRANTY

Tektronix warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If a product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the 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.

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating the system.

To Avoid Fire or Personal Injury

Use Proper Power Cord. Use only the power cord specified for this product and certified for the country of use.

Connect and Disconnect Properly. Do not connect or disconnect probes or test leads while they are connected to a voltage source.

Ground the Product. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Connect the ground lead of the probe to earth ground only.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Use Proper Fuse. Use only the fuse type and rating specified for this product.

Avoid Exposed Circuitry. Do not touch exposed connections and components when power is present.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Provide Proper Ventilation. Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

Symbols and Terms   **Terms in this Manual.** These terms may appear in this manual:

WARNING. Warning statements identify conditions or practices that could result in injury or loss of life.

CAUTION. Caution statements identify conditions or practices that could result in damage to this product or other property.

Terms on the Product. These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product. The following symbols may appear on the product:

CAUTION
Refer to Manual

WARNING
High Voltage

Protective Ground
(Earth) Terminal

Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

Do Not Service Alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect Power. To avoid electric shock, switch off the instrument power, then disconnect the power cord from the mains power.

Use Care When Servicing With Power On. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

Preface

This instruction manual contains specific information about the TMSSP1 478-Pin Socket microprocessor support package and is part of a set of information on how to operate this product on compatible Tektronix logic analyzers.

If you are familiar with operating microprocessor support packages on the logic analyzer for which the TMSSP1 478-Pin Socket support was purchased, all you need is this instruction manual to set up and run the support package.

If you are not familiar with operating microprocessor support packages, you need to supplement this instruction manual with information on basic operations from the Tektronix logic analyzer online help to set up and run the support package.

Manual Conventions

This manual uses the following conventions:

- A pound sign (#) following a signal name indicates an active low signal.

- The phrase "information on basic operations" refers to basic information in the logic analyzer online help.

- The terms "Master" and "Slave" refer to modules that are located in numbered slots (see Figure 1–1 on page 1–2).

Contacting Tektronix

Phone	1-800-833-9200*
Address	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com
Sales support	1-800-833-9200, select option 1*
Service support	1-800-833-9200, select option 2*
Technical support	Email: techsupport@tektronix.com 1-800-833-9200, select option 3* 6:00 a.m. – 5:00 p.m. Pacific time

* **This phone number is toll free in North America. After office hours, please leave a voice mail message.**
Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.

Getting Started

Getting Started

This section contains information about the TMSSP1 478-Pin Socket support product and connecting the logic analyzer to the target system.

Product Description

The probe adapter is an interposer design that allows the logic analyzer to acquire data from a microprocessor in the operating environment with little effect on the target system.

To accomplish this the probe adapter is connected to the target system, and then the microprocessor connects to the probe adapter. Signals from the microprocessor based system flow through the probe adapter and the probe cables and to the logic analyzer.

The TMSSP1 478-Pin Socket support product includes the following:

- PUB32G8 timing and limited state software

- TMSSP1 478-Pin Socket probe adapter

NOTE. This probe adapter is also compatible with the TMS117 IA32G8 software support product that provides timing and disassembly analysis capabilities, synchronous transactions, and instruction decoding. This software support product is available only to customers with a valid, restricted, secret nondisclosure agreement (RS-NDA) with Intel.

Contact your Tektronix representative if you would like to acquire this software.

Logic Analyzer Software Compatibility

The software label on the disc states that version 4.2 SP1 of the logic analyzer software is compatible with the TMSSP1 478-Pin Socket product.

Logic Analyzer Configuration

The TMSSP1 478-Pin Socket product requires a minimum of four, 136 channel, 235 MHz merged modules and a minimum of sixteen P6860 Probes.

The modules must be configured and merged as shown in Figure 1-1. The memory depth is chosen automatically based on the shallowest memory depth of the modules.
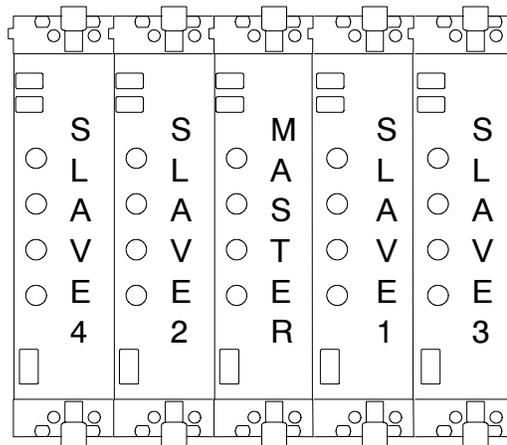
Figure 1-1: Configuration of the master and slave modules

The term master module refers to the middle module of a 5-wide module merge. The term slave module refers to the modules to the left or right of the master module of a 4 or 5-wide module merge.

Labeling Probes The probe adapter relies on the default channel mapping and labeling scheme for probes. Apply labels using the instructions described in the *P6860 High Density Logic Analyzer Probe Label Instructions,* Tektronix part number 071-1123-XX. You can access this manual at the Tektronix.com web site and locate probe information in the logic analyzer online help.

P6860 Probes You can use the TLA7AX, 235 MHz logic analyzer module and the P6860 probes to connect to the probe adapter.

Refer to the *P6810, P6860, and P6880 Logic Analyzer Probes Instruction manual*, Tektronix 071-1059-XX, for more information. You can access this manual from the Tektronix.com web site and find information about these probes in the logic analyzer online help.

Accessories

Optional and standard accessories are listed in the *Replaceable Parts List* on page 6–4.

Probe Adapter Review

⚠️ **CAUTION.** *To prevent the microprocessor from overheating, a forced-air cooling solution must be used (see page 1–11).*

Along with the TMSSP1 478-Pin Socket support product specific information, each logic analyzer includes additional information that describes how to perform tasks common to support packages on that platform.

This additional information is located in the logic analyzer online help, an installation manual, or a user manual. Review this information if you are unfamiliar with using support products on a logic analyzer product.

Also, review the *Specifications* section on page 3–1 as they pertain to the target system, as well as the following TMSSP1 478-Pin Socket product information.

System Clock Rate
The TMSSP1 478-Pin Socket support can acquire data from the 478-Pin Socket microprocessor operating at BCLK speeds of up to 200 MHz. The clock rate is not guaranteed for prototype shipment of the product.

Contact the Tektronix sales representative for current information on the fastest devices supported.

Acquisition before Reset
The data acquired by the logic analyzer will be inaccurate, if this data is acquired just before a power on Reset signal is observed by the target system.

BCLK
Refer to the BCLK specifications and restrictions listed in Table 3–3 on page 3–6, in the Specifications chapter.

Data Bus
The TMSSP1 478-Pin Socket probe adapter supports only a quad-pumped data bus.

Address Bus
The TMSSP1 478-Pin Socket probe adapter supports only a double-pumped address bus.

Disabling the Cache The cache bus is not monitored; therefore, the cache must be disabled. Disabling the cache makes all instruction prefetches visible on the bus and allows data to be correctly acquired, displayed, and disassembled.

Configuring the Probe Adapter

You can configure the probe adapter by using the jumper information in Table 1–1. Figure 1–2 shows the location of the jumpers.
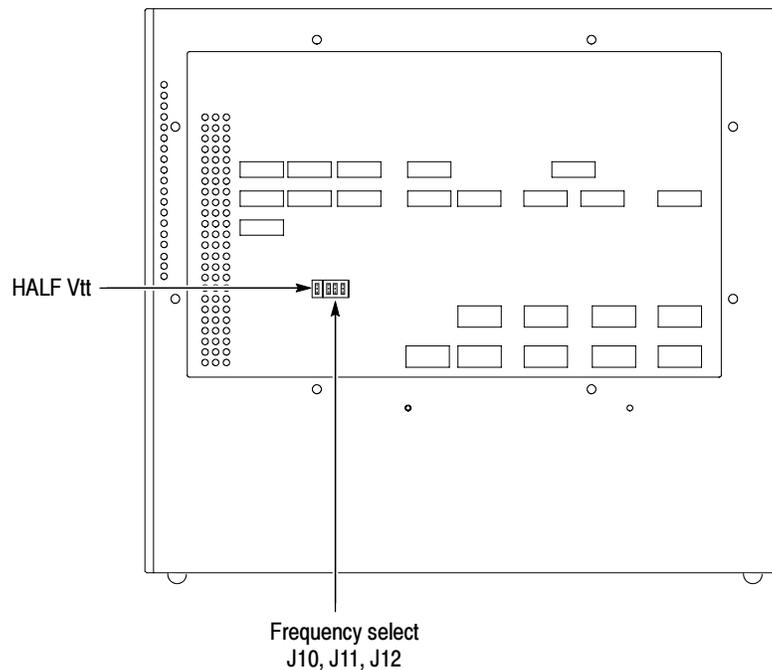
Figure 1–2: Jumper locations on the preprocessor unit

HALF Vtt Jumper Place the jumper in the pin 1–2 position to reference the following signals to 1/2 Vtt:

A20M#, INIT#, IGNNE#, LINT1, LINT0, SLP#, SMI#, STPCLK#

Place the jumper in the pin 2–3 position to reference the preceding signals to GTLREF. Refer to your microprocessor information for more details.

Frequency Select Jumpers   For the Frequency Select Jumper settings, see Table 1‑1 for the appropriate operating frequency.

Table 1‑1: Frequency select jumpers

Frequency	S1 (J10)	S2 (J11)	S3 (J12)
140 – 230 MHz	1-2	1-2	1-2
70 – 140 MHz	2-3	2-3	1-2
30 – 70 MHz	1-2	2-3	1-2
20 – 30 MHz	1-2	2-3	2-3

Connecting the Logic Analyzer to a Target System

⚠ **CAUTION.** *To prevent static damage to the microprocessor, probe adapter, probes, and module, you must handle components only in a static-free environment.*

Always wear a grounding wrist strap, heel strap, or similar device while handling the microprocessor and probe adapter.

Before you connect the probe adapter to the target system, connect the correct number of P6860 probes (for timing only or disassembly and timing) to the correct number of modules (Master, Slave1, Slave2, and Slave3). For reference, Figure 1‑3 shows the configuration for the Master and Slave modules.
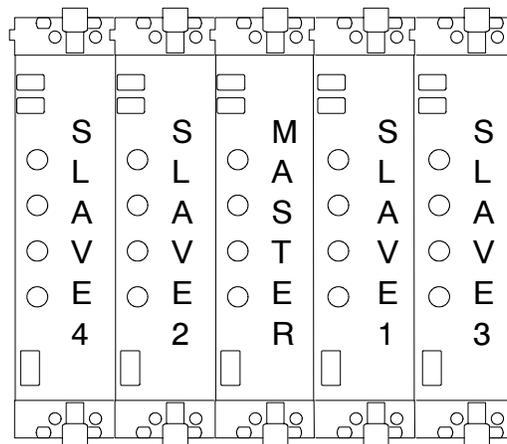
Figure 1‑3: Configuration for Master and Slave modules

The target system must allow clearance for the probe adapter. Refer to the dimensions on page 3‑9 for the required clearances.

⚠ **WARNING.** *To prevent harm to yourself or damage to the preprocessor unit, do not open the preprocessor unit, except to remove the probe adapter cables or exchange a fan. There are no operator serviceable parts inside the preprocessor unit. Refer servicing of internal parts in the preprocessor unit to Tektronix authorized personnel only. External parts may be replaced by qualified service personnel.*

Tools   The following is a list of the tools:

- Flatbladed screwdriver (0.1 inch tip width) to remove the heat sink retention module

- POZIDRIV (PZ1) screwdriver to install the brackets

- **Optional Tool.** A torque wrench helps to ensure reliable connections by meeting the nominal torque values listed in these instructions.

⚠ **CAUTION.** *To prevent static damage to the microprocessor, probe adapter, probes, and module, handle components only in a static-free environment.*

Always wear a grounding wrist strap, heel strap, or similar device while handling the microprocessor and probe adapter.

NOTE. *For storage and shipping, retain the cardboard cartons and packing material that is shipped with the probe adapter.*

Read the following general instructions before removing parts.

Use the following steps to connect the logic analyzer to the target system:

1. Power off the target system. It is not necessary to power off the logic analyzer.

2. Power off any probe adapters that may be attached to your target system.

3. To discharge any static electricity, touch the ground connector located on the logic analyzer.

4. On the target system, remove the heat sink from the microprocessor and set the heat sink aside.

5. Disengage the ZIF socket on the target system.

6. Remove the microprocessor from the target system by following the removal procedure from the microprocessor vendor.

7. Remove the heat sink retention mechanism from the target system by removing the center post from each rivet (see Figure 1‑4).
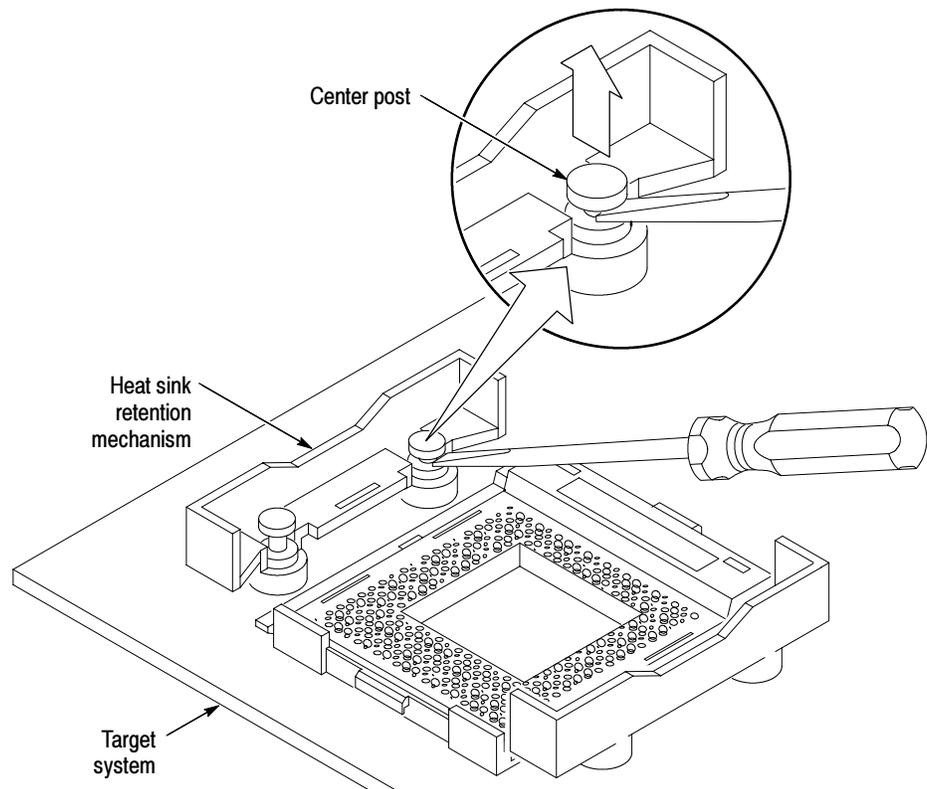
Figure 1‑4: Remove the heat sink retention mechanism from the target system

8. Install the front bracket tabs into the two holes on your type of target system (see Figure 1‑5 on page 1‑8). There are two styles of front and main bracket tabs for two different types of target systems:

   ■ System validation (SV)— the bracket tabs point outward. Slide this bracket away from the socket when inserting.

   ■ Desktop (DT) — the bracket tabs point inward. Slide this bracket toward the socket when inserting.

NOTE. *The front and main brackets are marked with either SV or DT for you to gather the correct probe parts that fit your type of target system.*

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9. Install the main bracket into the target-system holes (see Figure 1–5). Refer to the bullets in step 8 for information about the two different kinds of target systems.

Step 1

Front bracket tab

Front bracket

Target system hole

Step 2

Main bracket tab

Attach one screw here

Main bracket
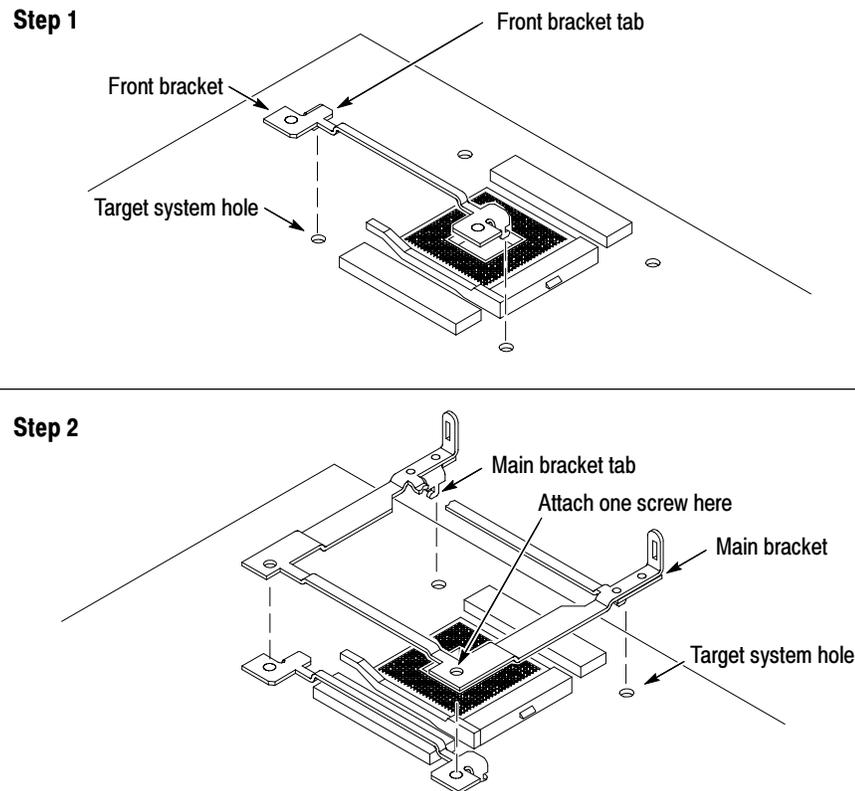
Target system hole

Figure 1–5: Install the front and main-brackets

10. Install one screw into the main bracket and target system, and torque the screw to 4 in-lbs. (see Figure 1–5). This secures the main bracket to the target system and allows easier attachment of the probe head.

⚠ *CAUTION. To prevent damage to the probe head and pins, you must always handle the probe head carefully and use care to properly align the probe head pins to the ZIF socket on the target system. Also, reinstall the pin protector to the bottom of the probe head when the probe head is not in use.*

11. Disengage the ZIF socket on the target system (see Figure 1–6).

12. Remove the tape and pin protector board from the bottom of the probe head.

13. Connect the probe pin head to the socket on the target system.

   a. You must visually verify proper pin alignment between the probe-head pins and the socket on the target system. Watch the pin alignment from the notched end of the probe pin head.

   b. Fold all ribbon cables up and away from the probe head.

Fold all cables when attaching

Probe head

Probe head notch

Target system

Lift the handle up to disengage the ZIF socket
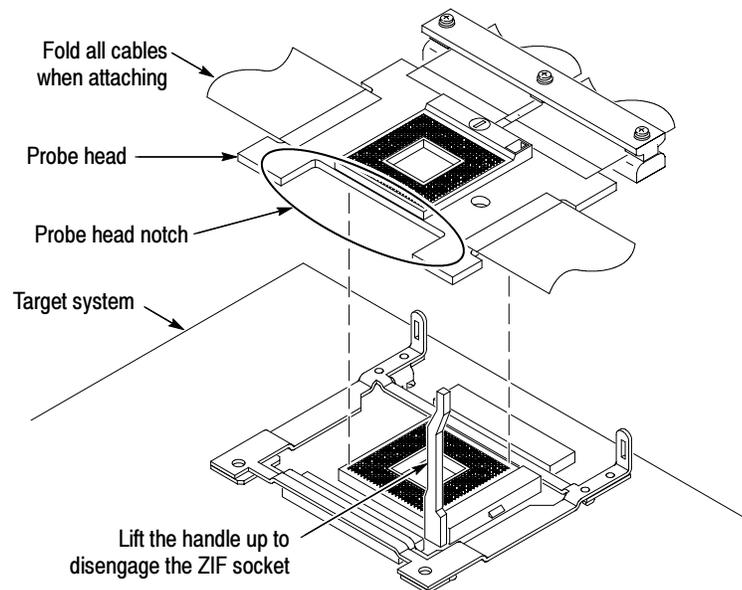
Figure 1-6: Connect the probe head to the target system

14. Engage the ZIF socket on the target system.

15. With a POZIDRIV (PZ1) screwdriver, remove the one screw from the main bracket (see Figure 1-5 on page 1-8) and set aside.

16. Connect the microprocessor to the ZIF socket in the probe head by aligning the microprocessor A1 pin indicator with the socket A1 pin indicator. Set the microprocessor in place. Lock the microprocessor to the probe head by turning the ZIF socket engagement screw on the probe head, as shown in Figure 1-7.

Microprocessor

Close lever to secure probe head to target system

Pin A1

Screws (2)

Heat sink tab

Turn ZIF socket engagement screw to lock in microprocessor

Main bracket slot
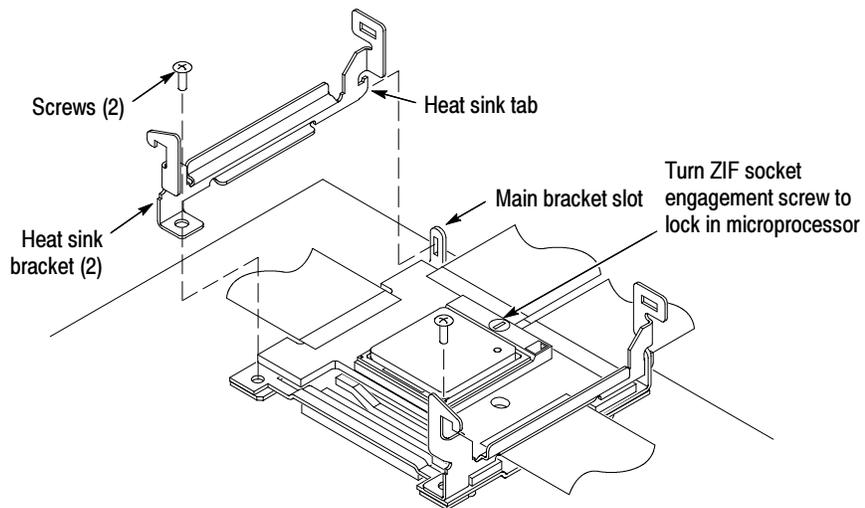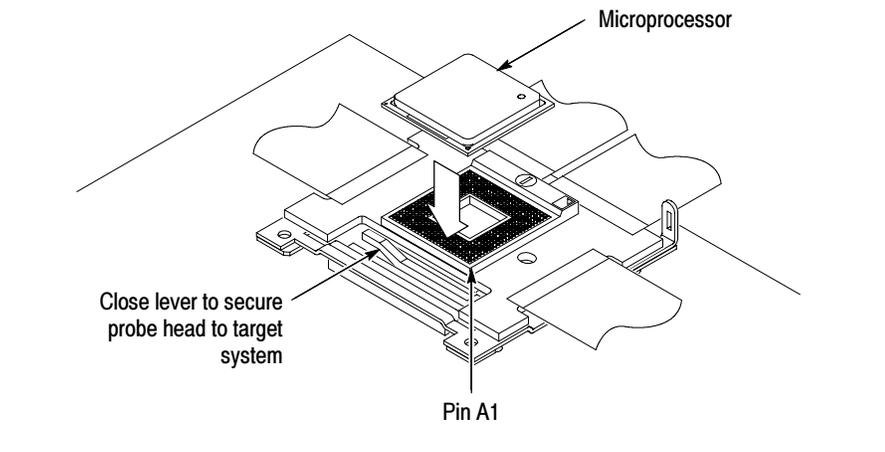
Heat sink bracket (2)

Figure 1-7: Connect the 478-Pin Socket microprocessor and the heat-sink brackets

17. Install the two heat-sink bracket tabs into the main bracket slots by sliding each tab into the slots on the main bracket (see Figure 1-7).

18. Using a flat blade screwdriver and the two screws, attach the heat-sink and main brackets to the target system.

19. Place the air-cooled heat sink and fan on top of the microprocessor as shown in Figure 1–8. You need to use thermal grease for better contact between the heat sink and the microprocessor. For thermal requirements, refer to the microprocessor vendor information.

⚠️ **CAUTION.** *To prevent damage to the microprocessor, you must use the cooling fan that is provided with the heat sink whenever you operate the* TMSSP1 478-Pin Socket *probe adapter.*
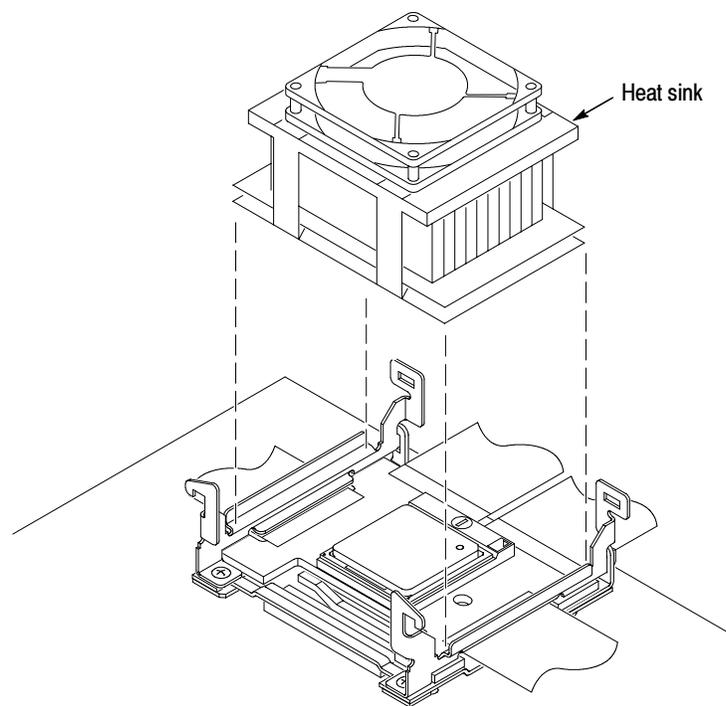
Heat sink

Figure 1–8: Place the heat sink on the probe head

20. Attach the spring clips to both sides of the heat sink brackets (see Figure 1–9).

⚠️ **CAUTION.** *To prevent damage to the microprocessor, you must not rock the probe head when attaching the spring clips. But you can press the top of the heat sink assembly to the microprocessor while installing the spring clips.*
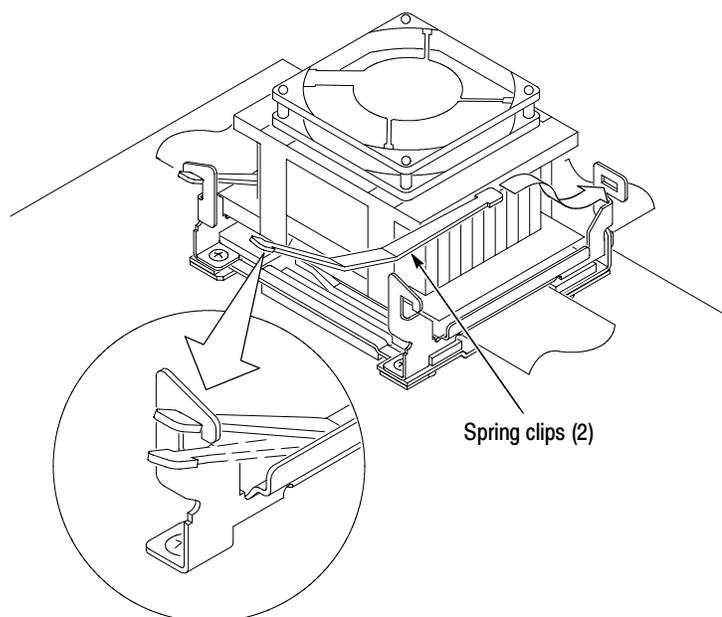
Spring clips (2)

Figure 1‑9: Attach the spring clips to the heat sink brackets

21. Connect the fan plug to the target system.

22. Apply forced air cooling across the microprocessor to keep the microprocessor from overheating unless you are using an air-cooled heat sink.

Remove the Probe Head from the Target System

To remove the probe head from the target system, follow these steps:

⚠ **CAUTION.** *To prevent static damage to the microprocessor, the probe adapter, the probes, and the module, handle components only in a static-free environment.*

Always wear a grounding wrist strap, heel strap, or similar device while handling the microprocessor and probe adapter.

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1. Power off the target system, and unplug the AC power cord on the preprocessor unit. The power switch for the probe adapter is located on the back of the preprocessor unit. It is not necessary to power off the logic analyzer.

2. Disconnect the fan plug from the target system.

3. Remove both spring clips from the heat sink (see Figure 1-9 on page 1-12).

4. Remove the heat sink and fan assembly from the microprocessor (see Figure 1-8 on page 1-11).

5. Unlock and remove the microprocessor from the probe head and place in protective packaging.

6. Remove the two screws from the heat-sink brackets (see Figure 1-7 on page 1-10).

7. Remove the heat-sink brackets.

8. Disengage the ZIF socket on the target system.

9. Disconnect the probe head from the 478-Pin Socket socket on the target system.

10. Install the pin-protector cover to the bottom of the probe head.

11. Remove the main bracket from the target system.

12. Remove the front bracket from the target system.

13. Disconnect the preprocessor unit from the Tektronix logic analyzer.

14. Store the probe adapter.

Connect the P6860 Probes to the Preprocessor Unit

You can configure the P6860 Probes for timing or disassembly software functions. Figure 1--10 shows the P6860 connectors and the preprocessor unit. For the number of P6860 probes and logic analyzer modules you will need, see page 1--2.

NOTE. For more detailed information about how to attach a P6860 probe to your connector, refer to the logic analyzer online help or the P6860 probe manual listed on page 1--2. Then connect the probes for the minimum configuration for disassembly or timing support, as described on page NO TAG.
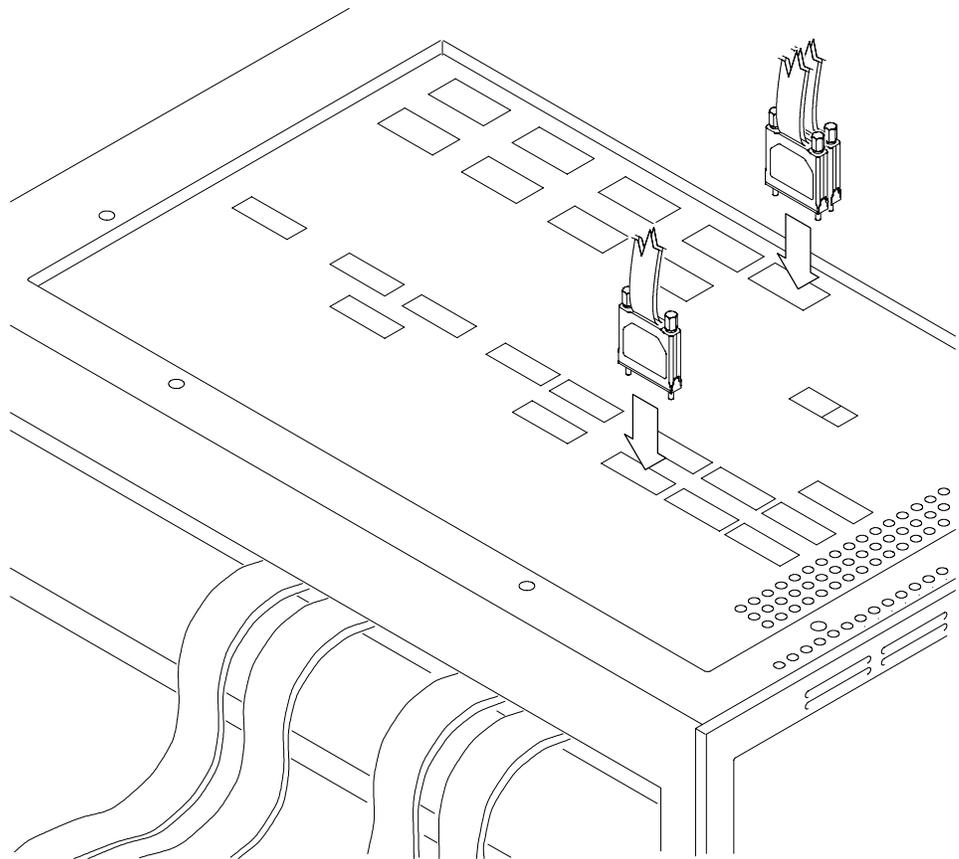
Figure 1--10: Connect the probes

Figure 1‑11 shows the configuration for the Master and Slave modules.
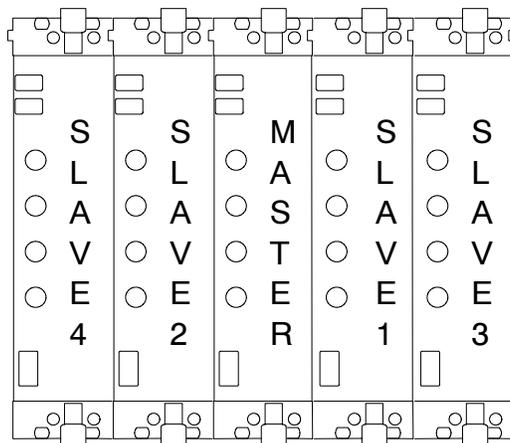
Figure 1‑11: Configuration of the Master and Slave modules

Following is the minimum configuration for timing support.

1. Match the A, D, C, and E probes from the Master module with the corresponding M_ D3/D2 and A3/A2, M_D1/D and A1/A0, M_C1/C0 and C3/C2, and M_E3/E2 and E1/E probe connector labels on the preprocessor unit. Align the Pin 1 indicator of each connector with the pin 1 indicator on the probe label connector on the preprocessor unit. Connect the probe.

2. Repeat step 1 to make probe connections between the Master, Slave1, and Slave3 module and the preprocessor unit.

⚠ **CAUTION.** *To prevent damage to the probe and preprocessor unit, you must always position the probes perpendicular to the foot print on the PCB. Incorrect handling of the P6860 probe while connecting to or disconnecting from the preprocessor unit can damage the probe.*

Applying Power

To apply power to the probe adapter and target system, follow these steps:

⚠ **WARNING.** *To prevent personal injury or damage to the preprocessor unit, there are no operator serviceable parts inside the cover of the preprocessor unit. Refer servicing of parts in the preprocessor unit to Tektronix authorized personnel only.*

1. Make sure the power switch on the preprocessor unit is in the off position. If powered off, the zero (0) is visible on the power switch.

2. Plug the AC power cord into the IEC connector on the back of the preprocessor unit.

3. Plug the AC power cord into an electrical outlet that you know is working properly.

4. Power on the preprocessor unit. A green, power-on LED lights on the front of the preprocessor unit, indicating that the probe adapter is active.

5. Power on the target system.

Removing Power

To remove power from the target system and the probe adapter, follow these steps:

1. Power off the target system.

2. Power off the probe adapter at the back of the preprocessor unit.

Verifying Probe Operation

If you have trouble using the probe adapter to acquire data from the target system, use the following check list to ensure that the probe adapter and probe-head cables are working correctly.

⚠️ *WARNING. To prevent harm to yourself or damage to the preprocessor unit, do not open the preprocessor unit, except to verify probe head cable connections. There are no operator serviceable parts inside the preprocessor unit. Refer servicing of internal parts in the preprocessor unit to Tektronix authorized personnel only. External parts may be replaced by qualified service personnel.*

1. Check that power is supplied to the preprocessor unit by observing the green LED on the front of the case. If the LED is not lighted:

   ■ Check that the power switch on the back of the preprocessor unit is powered on. If powered off, a zero (0) is visible on the switch.

   ■ Check that the AC power cord is plugged into an electrical outlet that you know is working properly.

   ■ Check if the fans in the preprocessor unit are rotating.

   ■ If the LED is still not lighted, call a Tektronix application engineer.

2. Check that signals are passing through the probe connectors by using the following procedure:

   a. Go to the setup menu and select "show activity".

b. Visually verify from the display that signals are transitioning on each probe connector and that the activity is on all used channels that are not demux destinations.

c. If the channels never transition: Check the probe connections on top of the preprocessor unit. Refer to the P6860 instruction manual (see page 1-2) for more information about connecting the P6860 probes.

If the preceding bulleted items did not correct the problem, replace the existing probe with a new probe.

d. If the signals are still not transitioning, disconnect the probe from the socket on the preprocessor unit. Then plug that probe into a socket that is transitioning signals.

Storage

The storage instructions describe short- and long-term storage of the probe head, cables, and preprocessor unit.

⚠ *CAUTION. To prevent damage to the sensitive probe-head cables, dress the cables to not pinch or contact any sharp objects. When you fold the cables use a minimum radius of 0.25 (0.64 cm) at the fold.*

Short-Term Storage   For short-term storage follow these steps:

1. Power off the probe adapter. You can leave the logic analyzer powdered on.

2. Disconnect the probe head from the target system (See page 1-13).

3. Wrap pink (nonstatic) bubble wrap around the probe head, and store the probe head with the preprocessor unit.

Long-Term Storage   For long-term storage use the existing cardboard carton and packaging, and follow these steps:

1. Power off the probe adapter. You can leave the logic analyzer powdered on.

2. Disconnect the preprocessor unit from the logic analyzer by removing the P6860 probes from the top of the preprocessor unit.

3. Unplug the AC power cord from the IEC connector on the back of the preprocessor unit.

4. Disconnect the probe head from the target system (see page 1-13).

5. Place the foam end caps on both sides of the preprocessor unit. The depression on the foam end caps are in the up position.

6. Place the preprocessor unit inside the cardboard carton.

7. Place the pink-foam panel on top of the end caps.

8. Place the probe head in the center cutout of the pink-foam panel.

CAUTION. To prevent damage to the sensitive probe head cables, dress the cables so they are not pinched or contacting any sharp objects. When you fold the cables use a minimum of 0.25 (0.64 cm) radius at the fold.

9. Place other accessories in the appropriate cutouts.

10. Place the cardboard accessory tray containing the P6860 probes on top of the pink-foam panel. Close the carton.

Care and Maintenance

Before cleaning this product, read the following information.

CAUTION. Static discharge can damage the microprocessor, the probe adapter, the probes, and the module. To prevent static damage, you must handle components only in a static-free environment.

The probe adapter, consisting of the probe head and preprocessor unit, does not require scheduled or periodic maintenance. However, to keep good electrical contact and efficient heat dissipation, keep the probe adapter free of dirt, dust, and contaminants. When not in use, store the probe adapter in the original shipping bags and cardboard carton (see *Storage* on page 1--17).

External Cleaning Only   Clean dirt and dust with a soft bristle brush. For more extensive cleaning, use only a damp cloth moistened with deionized water; do not use any other chemical cleaning agents.

WARNING. To prevent harm to yourself or damage to the preprocessor unit, do not open the preprocessor unit for cleaning and do not allow any moisture inside the preprocessor unit. There are no operator serviceable parts inside the preprocessor unit. Refer servicing of internal parts in the preprocessor unit to Tektronix authorized personnel only. External parts may be replaced by qualified service personnel.

Shipping the Probe Adapter

To commercially transport the TMSSP1 478-Pin Socket probe adapter, package as follows:

1. Use the existing cardboard shipping carton and cushioning material.

   If the existing shipping carton is not available, use a double-walled, corrugated cardboard shipping carton that allows a 3 inch (7.62 cm) minimum on all sides of the product.

2. If you are shipping the probe adapter to a Tektronix service center for Warranty service, attach a tag to the probe adapter showing the following:

   ■ Owner's name and address

   ■ Name of a person who can be contacted

   ■ Probe adapter type and serial number

   ■ Description of the problem

3. Using nonstatic generating tape, tape the pin-protector board to the bottom of the pin header.

4. Place the probe head in a static shielding bag, close with nonstatic generating tape, and then lay the probe head on top of the preprocessor unit (see Figure 1–12 on page 1–20).

CAUTION. To prevent damage to the probe head and preprocessor unit, DO NOT place the probe head in the large static shielding bag with the processor unit.

Figure 1-12: Place the probe head in a static shielding bag

5. Place the preprocessor unit inside a static shielding bag.

6. Place the foam end caps on both sides of the preprocessor unit and the preprocessor unit inside the cardboard carton (see Figure 1-13).

Figure 1-13: Place the end caps on the preprocessor

7. Place the pink-foam panel on top of the end caps (see Figure 1‑14).

8. Place the probe head in the center cutout of the pink-foam panel.

⚠ *CAUTION. To prevent damage to the sensitive probe head cables, you must dress the cables so they are not pinched or contacting any sharp objects. When you fold the cables use a minimum of 0.25 inch (0.64 cm) radius at the fold.*

Figure 1‑14: Place the probe head into the square cutout

9. Place other accessories in the appropriate cutouts.

10. Lay the pink foam spacer panel on top of the probe head.

11. Optional: If you are also returning the probe cables, place the cardboard accessory tray containing the P6860 probes on top of the pink foam panel.

12. Close and tape the cardboard carton.

Operating Basics

Setting Up the Software

This section covers the following information:

- Acquiring data

- Changing how data is displayed

Before you acquire and display data, you need to load the software and specify the setup as described in this section. The TMSSP1 478-Pin Socket microprocessor software provides default values for the setup, but you can change them as needed.

Information on general tasks and functions for the logic analyzer is described in the logic analyzer online help or the user manual.

You need to purchase the TMS117 IA32G8 software support product from your Tektronix sales representative if you are interested in disassembling data.

Installing the Software

NOTE. Before you install any software, it is recommended you verify that the microprocessor support software is compatible with the logic analyzer software.

To install the TMSSP1 478-Pin Socket software on your Tektronix logic analyzer, follow these steps:

1. Insert the floppy disk in the disk drive.

2. Click the Windows Start button, point to Settings, and click Control Panel.

3. In the Control Panel window, double-click Add/Remove Programs.

4. Follow the instructions on the screen for installing the software from the floppy disk.

To remove or uninstall software, follow the above instructions except select Uninstall. You must close all windows before you uninstall any software.

The TMSSP1 478-Pin Socket software installs the PUB32G8 setup file. This setup file has custom clocking options.

Custom Clocking

The TMSSP1 478-Pin Socket software installs the PUB32G8 setup file. This setup provides timing and state support only for the 478-Pin Socket microprocessor. This setup file offers different state speeds and custom clocking options. All channels are displayed as active high.

Options   A special custom clocking program is loaded into the module every time you load the setup file from the TMSSP1 478-Pin Socket support software.

You can change the custom clocking or state speed options by clicking the "More..." button in the PUB32G8 setup window.

State Speed. Select the nearest state speed to your BCLK frequency in the Custom Options window (see Figure 2-1).
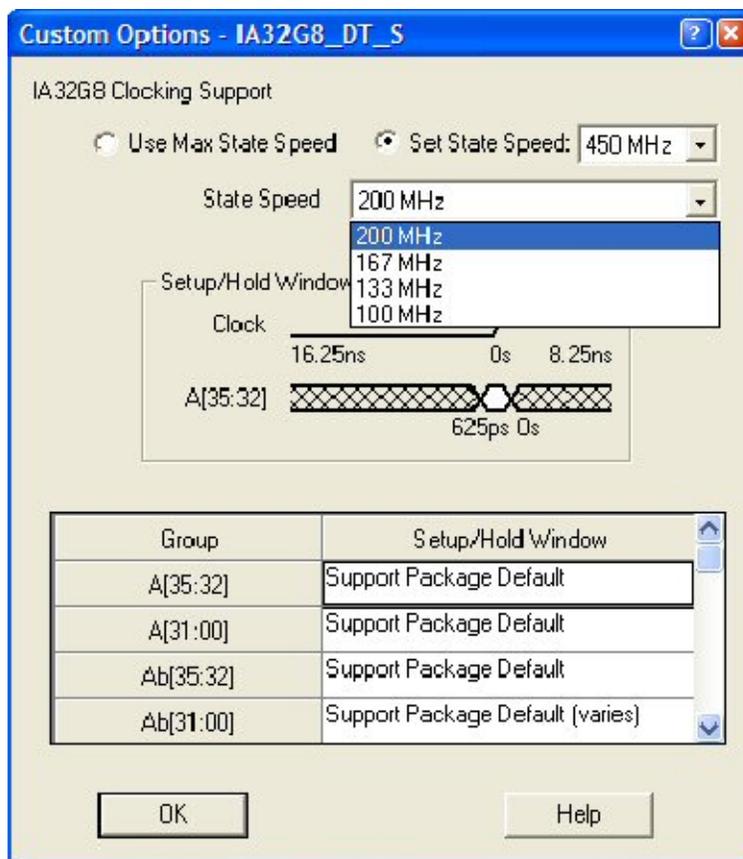
Figure 2-1: State Speed menu

Channel Group Definitions

The TMSSP1 478-Pin Socket software automatically defines channel groups for the following installed PUB32G8 software setup. Following is a list all the channel group definition tables. The channel group definition tables are located in th*e Reference* section beginning on page 4–25.

The channel groups are listed below:

Address1	ASTB1
Address0	ASTB
Data3	DSTB3
Data2	DSTB2
Data1	DSTB1
Data	DSTB0
DataInvert	DataStrobe
DataParity	DataCtrl
Arbitrate	Request
Execution	Error
Address	AddrStrobe
AddrParity	Snoop
Response	Compatible
Diagnostic	Misc
VID	

Channel Assignments

Channel assignments tables and the corresponding support signals are located in th*e Reference* section of this manual beginning on page 4–1.

Specifications

Specifications

This section contains specifications for the TMSSP1 478-Pin Socket hardware support.

Circuit Description

The TMSSP1 478-Pin Socket probe adapter hardware uses a custom ASIC to preprocess all signals on the IA32G8 microprocessor before the signals are captured by the logic analyzer. The custom ASIC performs the following functions:

■ Latches signals within a narrow valid window

■ Demultiplexes double-pumped, source-synchronous signals

■ Deterministically synchronizes source-synchronous signals to BCLK

Latched Operation   The ASIC latches all signals on the IA32G8 microprocessor. The latched signals are processed in the ASIC according to their type. Following is a description of each type:

4x Quad-Pumped Signals. These signals include D[63:00]# and DP[3:0]#. The ASIC latches these signals using their dedicated strobes, STBP[3:0] and STBN[3:0], and then performs four-way demultiplexing on these signals. The ASIC also inverts the appropriate signals when the DBI[3:0] signals are active.

2x Double-Pumped Signals. These signals include A[53:03]# and AP[1:0]#. The module latches these signals using their dedicated strobes, ASTB[1:0], and then performs two-way demultiplexing on these signals.

1x Common-Clock Signals. These signals include all of the remaining front-side bus signals. The module latches these signals using the rising edge of BCLK.

Derived Signals
The TMSSP1 478-Pin Socket probe adapter hardware derives several custom signals from the front-side bus signals captured by the ASIC. These signals are used by the logic analyzer support software to provide clocking, transaction phase linking, and disassembly. Following is a description of these custom signals:

PHASE_D. This signal can be used by the logic analyzer to store only bus cycles that contain active information. The PHASE_D signal is asserted when any of the following signals are asserted: ADS#, DRDY#, INIT#, RESET#, RS[2:0]#, and SNOOP_D.

TRACK_ERR_D. This signal is asserted whenever the request or snoop counters exceed their maximum or a minimum value. This signal is also asserted when ADS# has been observed active for two clock cycles in a row.

Signal Probing
The 478-Pin Socket probe adapter uses passive series isolation to acquire data.

Bus Tracking Logic
The 478-Pin Socket probe adapter uses a bus tracking PAL to aid the disassembly software in linking various bus phases.

Common Clock
The IA32G8 software allows disassembly from a data bus operating at the common clock rate specified in Table 3-1. The setup and hold sample points are set to default timing numbers based on FSB specifications.

Loading Diagrams
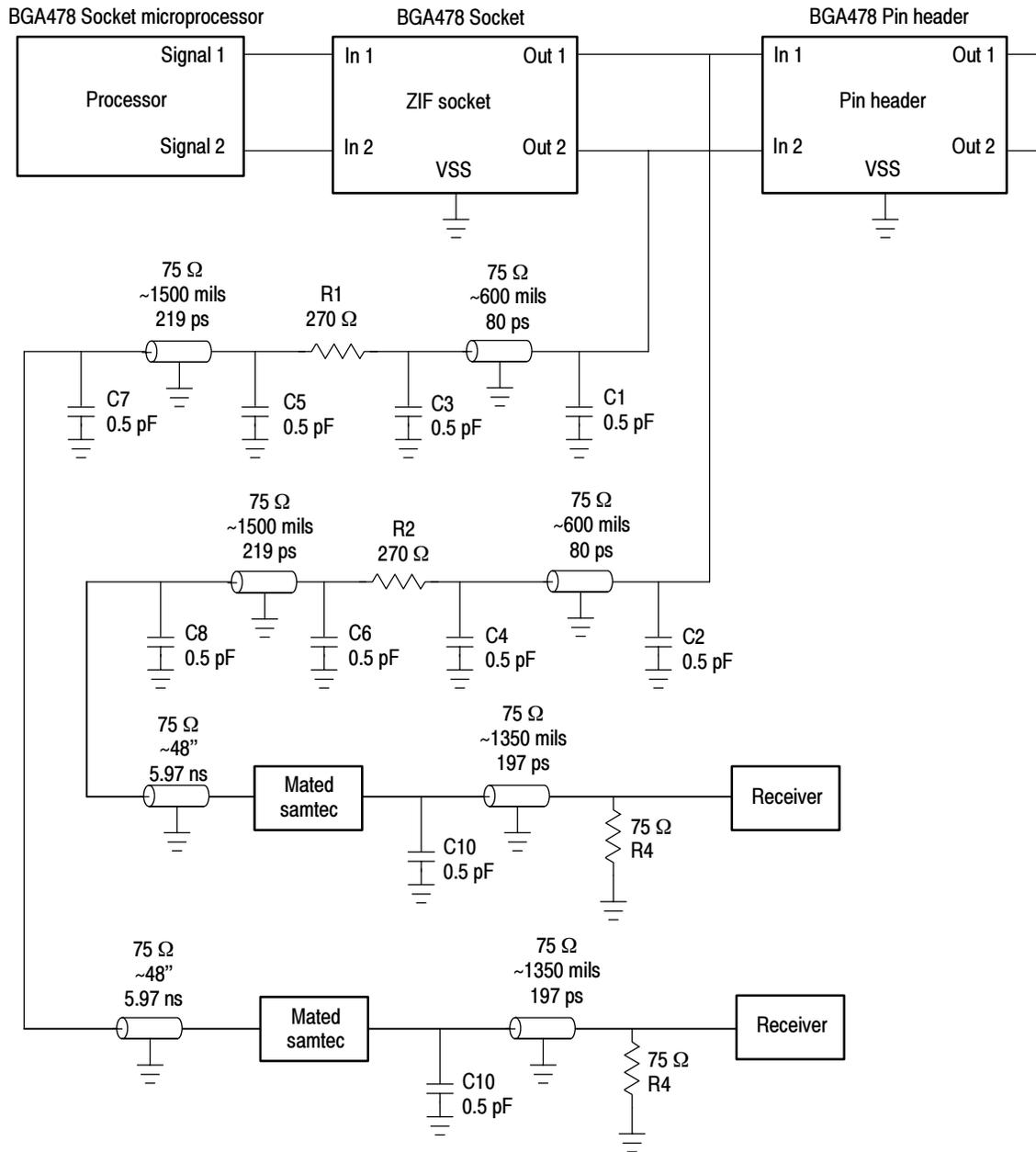
Figure 3-1: Electrical load model for typical signals

TF2_1
K12= 0.082
L1=1.685 n
L2=1.685 n

Signal in 1

Signal in 2

C1
0.44 p

Signal out 1

Signal out 2

C2
0.44 p

C3
0.44 p

Vss

Vss
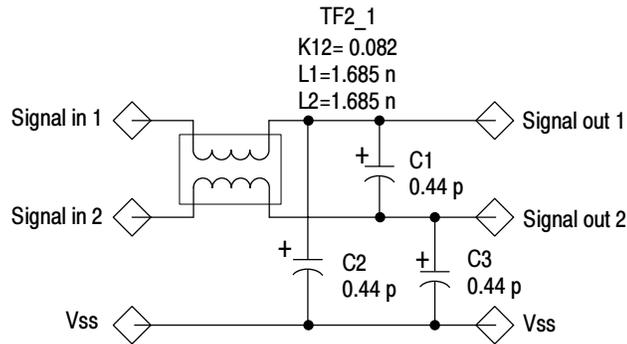
Figure 3-2: Pin header electrical load model for typical signals

TF2_1
K12= 0.318
L1=5.20 n
L2=5.20 n

Signal in 1

Signal in 2

C1
0.66 p

Signal out 1

Signal out 2

C2
1.3 p

C3
1.3 p

Vss

Vss
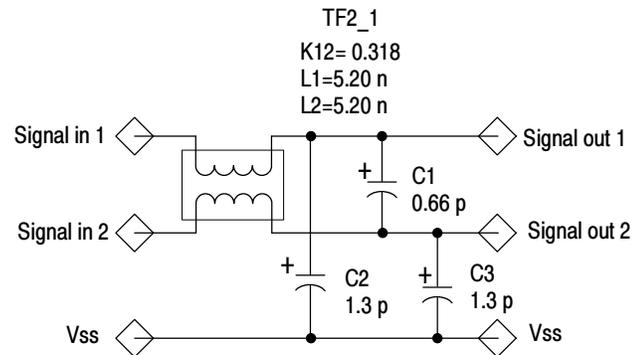
Figure 3-3: ZIF electrical load model for typical signals

Signal In 1

R1
10 m

L1
3.2 n

Signal Out 2

C4
0.5 p

C3
0.7 p

C2
0.5 p
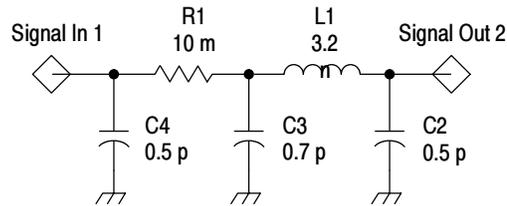
Figure 3-4: Mated Samtec model

Signal in 1

750 Ω

750 Ω

0.1 Ω

1.5 nH

1.5 nH

750 Ω

1.5 pF
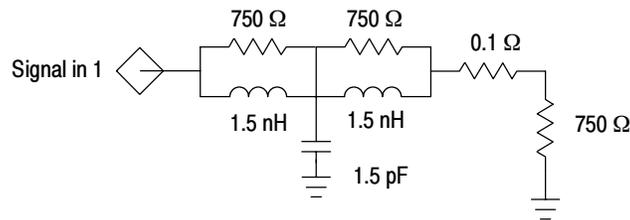
Figure 3-5: BCLK Receiver

Specification Tables

These specifications are for a probe adapter connected between a compatible Tektronix logic analyzer and a target system. Signal voltage swing in your target system must be at least 300 mV$_{p-p}$ around the GTL+ reference voltage.

NOTE. *The functionality and specifications are not guaranteed for the prototype product.*

Table 3-1 lists the electrical requirements of the target system. Table 3-2 on page 3-6 lists the electrical requirements for the power supply that provides power to the 478-Pin Socket probe adapter. Table 3-3 on page 3-6 lists the BCLK timing and electrical specifications. Table 3-4 on page 3-6 lists the environmental specifications.

Table 3-1: Electrical specifications for the target system

Characteristics	Requirements
DC power requirements	
Voltage, V$_{cc}$	1.05 V $\pm$ 5%
Current, V$_{REF}$	I maximum <2 mA, I typical <1 mA
Common clock rate	Maximum 200 MHz
Common clock capture	
Window	725 ps
T$_{su}$	975 ps
T$_{hd}$	-250 ps
2x Source Synchronous capture	
Window	725 ps
T$_{su}$	375 ps
T$_{hd}$	350 ps
4x Source Synchronous capture	
Window	500 ps
T$_{su}$	200 ps
T$_{hd}$	300 ps

Table 3–2: Electrical specifications for the AC input to the preprocessor unit

Characteristic	Description
Input Voltage rating	100 – 240 VAC CAT II
Input Frequency rating	50 – 60 Hz
Input Current rating	6 A maximum

Table 3–3: BCLK timing and electrical specifications

Characteristics	Minimum	Maximum	Units	Notes
V_{in} (lo) min	–	V_{REF} –125 mV	V	
V_{in} (hi) max	V_{REF} +125 mV	–	V	
Duty Cycle	45	55	%	
t_{lh}	–	1.25	ns	Monotonically increasing
t_{hl}	–	1.25	ns	Monotonically decreasing

Table 3–4: Environmental specifications

Characteristic[1]	Description
Temperature	
Maximum operating	+50 °C (+122 °F)[2]
Minimum operating	0 °C (+32 °F)
Nonoperating	–55 °C to +75 °C (–67 °F to +167 °F)
Humidity	10 to 95% relative humidity, noncondensing
Altitude	
Operating	3 km (10,000 ft) maximum
Nonoperating	15 km (50,000 ft) maximum
Electrostatic immunity	The probe adapter is static sensitive
Required airflow clearances for the preprocessor unit	
Sides	5.08 cm (2 in)
Back	7.62 cm (3 in)

[1] **Designed to meet Tektronix standard 062-2847-00 class 5.**

[2] **Not to exceed microprocessor thermal considerations. Customer supplied cooling might be required across the CPU.**

Table 3-5: Certifications and compliances

Category	Standards or description
EC Declaration of Conformity – EMC	Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities: EN 61000-3-2 AC power line harmonic emissions
EC Declaration of Conformity – Low Voltage	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Communities: Low Voltage Directive 73/23/EEC, amended by 93/68/EEC EN 61010-1/A2:1995 Safety requirements for electrical equipment for measurement control and laboratory use.
U.S. Nationally Recognized Testing Laboratory Listing	UL3111-1 Standard for electrical measuring and test equipment.
Canadian Certification	CAN/CSA C22.2 No. 1010.1 Safety requirements for electrical equipment for measurement, control, and laboratory use.
Additional Compliance	ANSI/ISA S82.01:1994 Safety standard for electrical and electronic test, measuring, controlling, and related equipment. IEC61010-1/A2:1995 Safety requirements for electrical equipment for measurement, control, and laboratory use.
Installation (Overvoltage) Category Descriptions	Terminals on this product may have different installation (overvoltage) category designations. The installation categories are: CAT III Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location. CAT II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected. CAT I Secondary (signal level) or battery operated circuits of electronic equipment.
Pollution Degree Descriptions	A measure of the contaminates that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated. Pollution Degree 2 Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.
Equipment Type	Test and measuring
Safety Class	Class 1 (as defined in IEC 61010-1, Annex H) – grounded product
Pollution Degree Descriptions	Pollution Degree 2 (as defined in IEC 61010-1). Note: Rated for indoor use only.

Dimensions Figure 3-6 shows the dimensions of the TMSSP1 478-Pin Socket probe head.
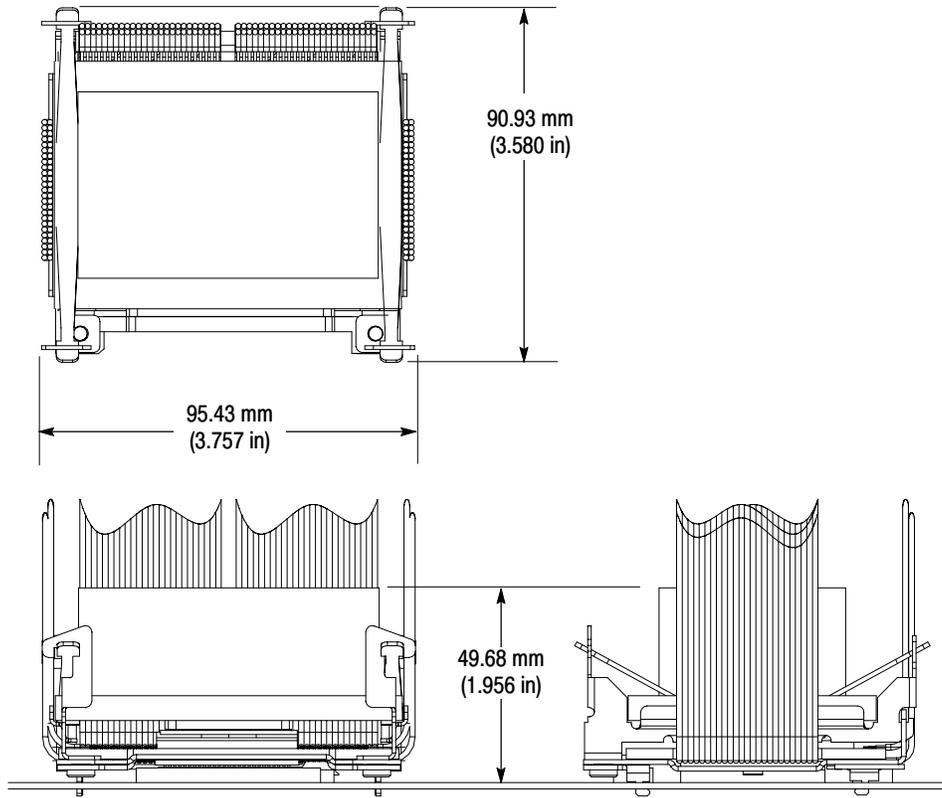
Figure 3-6: Dimensions of the probe head

Figure 3‑7 shows the dimensions of the preprocessor unit.

⚠ **CAUTION.** *To prevent damage to the circuitry in the preprocessor unit, you must observe the required clearances in Table 3‑4 on page 3‑6 (clearances are not shown in Figure 3‑7).*

474.32 mm
(18.674 in)

425.45 mm
(16.750 in)

420.37 mm
(16.550 in)

139.70 mm
(5.500 in)

160.27 mm
(6.310 in)
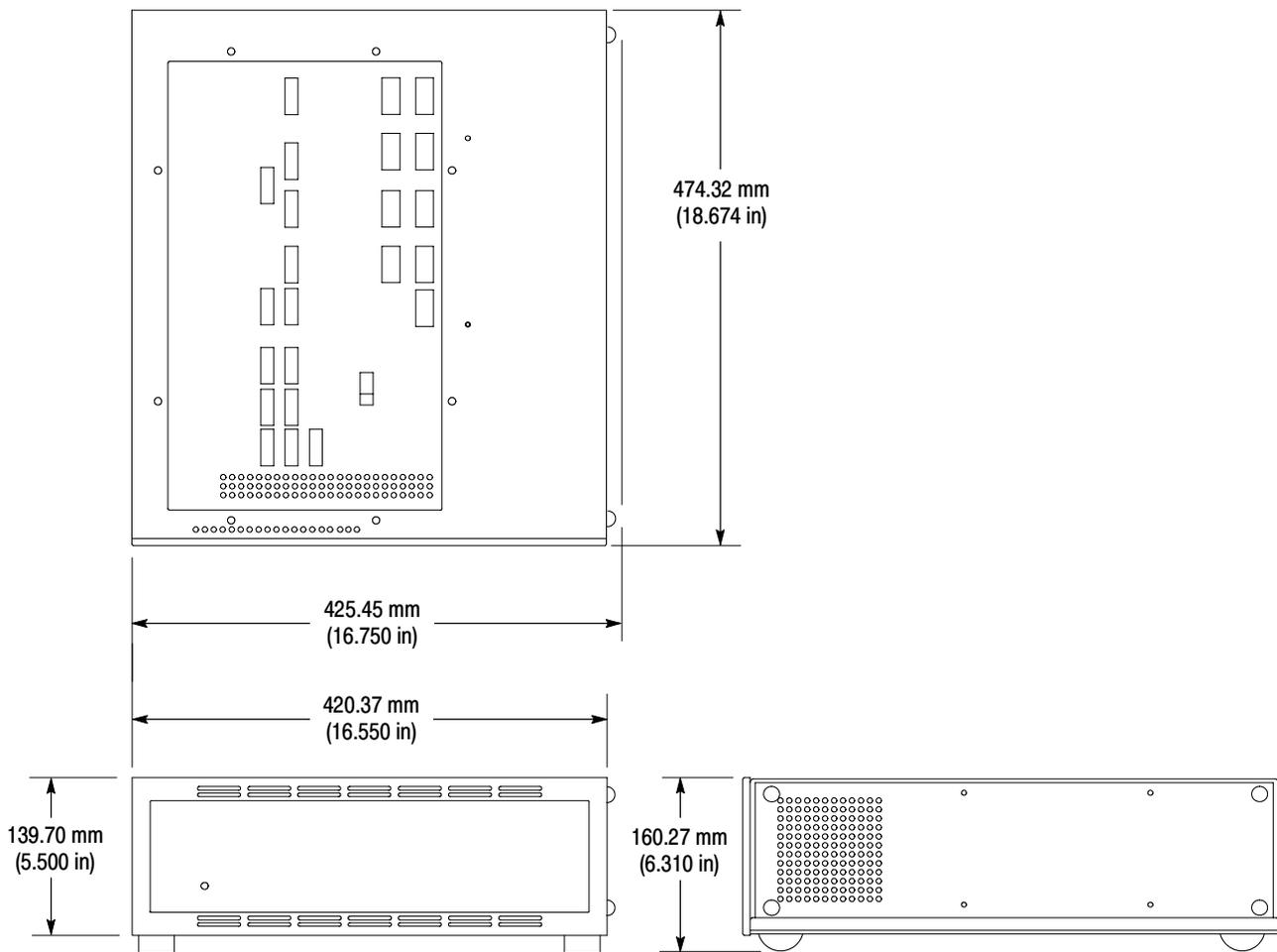
Figure 3‑7: Dimensions of the preprocessor unit

Reference

Channel Assignment Tables

This section contains the Channel Group Assignment Tables.

Channel assignments Tables use the following conventions:

- A pound sign (#) following a signal name indicates an active low signal.

- All signals are required by the support unless indicated otherwise.

- Channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB).

- An @ sign indicates that this signal is derived on the probe adapter.

- The term master module refers to the middle module of a 5-wide module merge. The term slave module refers to the modules directly to the right of the master module of a 4 or 5-wide module merge. Figure 4-1 shows the configuration for 4 and 5-wide merged modules.
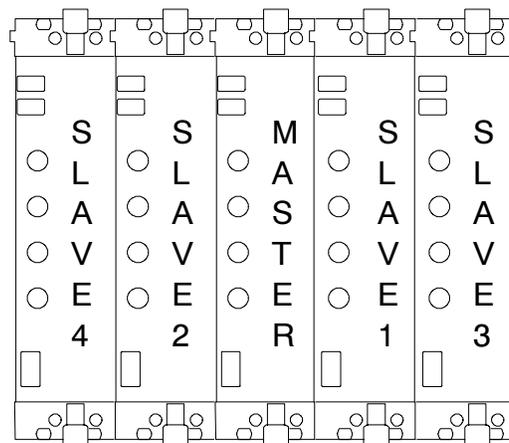
Figure 4- 1: Configuration for master and slave modules

Clock Channel Assignments   Table 4-1 lists the Clock channel assignments and the corresponding support signal.

Table 4- 1: PUB32G8 clock channel assignments

Logic analyzer acquisition channel	Clock, Qual, or Data	PUB32G8 support signal name
M_Clock:3	Data	DBI1_T
M_Clock:2	Qual	PHASE_D

Table 4- 1: PUB32G8 clock channel assignments (cont.)

Logic analyzer acquisition channel	Clock, Qual, or Data	PUB32G8 support signal name
M_Clock:1	Unused	Unused
M_Clock:0	Clock	BCLK
S_Clock:3	Clock	ADSTB1
S_Clock:2	Data	ADS_LL
S_Clock:1	Data	DRDY
S_Clock:0	Clock	ADSTB0
S2_Clock:3	Data	D2_D27
S2_Clock:2	Data	D1_DBI0
S2_Clock:1	Data	D0_DBI0
S2_Clock:0	Data	D2_D10
S3_Clock:3	Data	D2_D33
S3_Clock:2	Data	D1_DBI3
S3_Clock:1	Data	D0_DBI3
S3_Clock:0	Data	D2_D57

Qual Channel Assignments

Table 4-2 lists the Qual channel assignments and the corresponding support signal.

Table 4- 2: PUB32G8 Qual channel assignments

Logic analyzer acquisition channel	Clock, Qual, or Data	PUB32G8 support signal name
M_Qual:3	Data	D49_T
M_Qual:2	Data	DBI2_T
M_Qual:1	Data	DPSLP
M_Qual:0	Data	D03_T
S_Qual:3	Unused	Unused
S_Qual:2	Unused	Unused
S_Qual:1	Data	STPCLK
S_Qual:0	Data	ADS
S2_Qual:3	Data	D3_DBI1
S2_Qual:2	Data	D1_DBI1
S2_Qual:1	Data	D0_DBI1

Table 4‑2: PUB32G8 Qual channel assignments (cont.)

Logic analyzer acquisition channel	Clock, Qual, or Data	PUB32G8 support signal name
S2_Qual:0	Data	D3_DBI0
S3_Qual:3	Data	D3_DBI2
S3_Qual:2	Data	D1_DBI2
S3_Qual:1	Data	D0_DBI2
S3_Qual:0	Data	D3_DBI3

Table 4–3 lists the channel assignments for the Address group and the corresponding support signal.

Table 4‑3: Master Address Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
M_A3:7	Unused
M_A3:6	Unused
M_A3:5	Unused
M_A3:4	Unused
M_A3:3	Unused
M_A3:2	Unused
M_A3:1	Unused
M_A3:0	Unused
M_A2:7	Unused
M_A2:6	Unused
M_A2:5	Unused
M_A2:4	Unused
M_A2:3	Unused
M_A2:2	Unused
M_A2:1	Unused
M_A2:0	Unused
M_A1:7	Unused
M_A1:6	Unused
M_A1:5	BINIT
M_A1:4	Unused

Table 4‑3: Master Address Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
M_A1:3	Unused
M_A1:2	Unused
M_A1:1	VID2
M_A1:0	VID5
M_A0:7	INIT
M_A0:6	Reserved
M_A0:5	FSBSEL0
M_A0:4	VID0
M_A0:3	FSBSEL1
M_A0:2	VID1
M_A0:1	VID3
M_A0:0	VID4

Table 4–4 lists the channel assignments for the Control group and the corresponding support signal.

Table 4‑4: Master Control Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
M_C3:7	D23_T
M_C3:6	D21_T
M_C3:5	D22_T
M_C3:4	D19_T
M_C3:3	D17_T
M_C3:2	D26_T
M_C3:1	D25_T
M_C3:0	D20_T
M_C2:7	D31_T
M_C2:6	D29_T
M_C2:5	D30_T
M_C2:4	D18_T

Table 4‑4: Master Control Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
M_C2:3	D16_T
M_C2:2	D24_T
M_C2:1	D27_T
M_C2:0	D28_T
M_C1:7	STBN0
M_C1:6	STBP0
M_C1:5	DP0
M_C1:4	DP1
M_C1:3	STBP1
M_C1:2	STBN1
M_C1:1	STBP3
M_C1:0	STBN3
M_C0:7	RESET
M_C0:6	SLP
M_C0:5	Unused
M_C0:4	Unused
M_C0:3	DP3
M_C0:2	DP2
M_C0:1	STBN2
M_C0:0	STBP2

Table 4‑5 lists the channel assignments for the Data group and the corresponding support signal.

Table 4‑5: Master Data Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
M_D3:7	D02_T
M_D3:6	D09_T
M_D3:5	D06_T
M_D3:4	D00_T

Table 4‑5: Master Data Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
M_D3:3	D01_T
M_D3:2	D12_T
M_D3:1	D08_T
M_D3:0	D07_T
M_D2:7	D04_T
M_D2:6	D05_T
M_D2:5	D15_T
M_D2:4	D13_T
M_D2:3	D11_T
M_D2:2	D10_T
M_D2:1	D14_T
M_D2:0	DBI0_T
M_D1:7	Unused
M_D1:6	Unused
M_D1:5	Unused
M_D1:4	Unused
M_D1:3	Unused
M_D1:2	Unused
M_D1:1	Unused
M_D1:0	Unused
M_D0:7	Unused
M_D0:6	Unused
M_D0:5	Unused
M_D0:4	Unused
M_D0:3	Unused
M_D0:2	Unused
M_D0:1	Unused
M_D0:0	Unused

Table 4–6 lists the channel assignments for the Extend group and the corresponding support signal.

Table 4‑6: Master Extend Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
M_E3:7	D55_T
M_E3:6	D48_T
M_E3:5	D54_T
M_E3:4	D58_T
M_E3:3	D63_T
M_E3:2	D59_T
M_E3:1	D56_T
M_E3:0	D61_T
M_E2:7	D50_T
M_E2:6	D53_T
M_E2:5	D52_T
M_E2:4	D60_T
M_E2:3	D62_T
M_E2:2	D51_T
M_E2:1	D57_T
M_E2:0	DBI3_T
M_E1:7	D44_T
M_E1:6	D38_T
M_E1:5	D32_T
M_E1:4	D35_T
M_E1:3	D36_T
M_E1:2	D42_T
M_E1:1	D33_T
M_E1:0	D34_T
M_E0:7	D45_T
M_E0:6	D37_T
M_E0:5	D39_T
M_E0:4	D41_T
M_E0:3	D43_T

Table 4‑6: Master Extend Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
M_E0:2	D47_T
M_E0:1	D40_T
M_E0:0	D46_T

Table 4–7 lists the channel assignments for the Slave Address group and the corresponding support signal.

Table 4‑7: Slave Address Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S_A3:7	A15
S_A3:6	A14
S_A3:5	A11
S_A3:4	A07
S_A3:3	REQa2
S_A3:2	BR0
S_A3:1	A09
S_A3:0	A03
S_A2:7	A04
S_A2:6	REQa3
S_A2:5	HITM
S_A2:4	BPRI
S_A2:3	IGNNE
S_A2:2	A20M
S_A2:1	Unused
S_A2:0	Unused
S_A1:7	BNR
S_A1:6	HIT
S_A1:5	LOCK
S_A1:4	DBSY
S_A1:3	A12

Table 4‑7: Slave Address Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S_A1:2	A16
S_A1:1	A10
S_A1:0	A08
S_A0:7	A05
S_A0:6	REQa1
S_A0:5	RS1
S_A0:4	RS2
S_A0:3	A13
S_A0:2	A06
S_A0:1	REQa0
S_A0:0	REQa4

Table 4‑8 lists the channel assignments for the Slave Control group and the corresponding support signal.

Table 4‑8: Slave Control Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S_C3:7	A28
S_C3:6	A17
S_C3:5	A30
S_C3:4	A25
S_C3:3	A32
S_C3:2	A31
S_C3:1	A34
S_C3:0	A29
S_C2:7	A26
S_C2:6	A33
S_C2:5	A21
S_C2:4	A27
S_C2:3	A23

Table 4‑8: Slave Control Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S_C2:2	A22
S_C2:1	Unused
S_C2:0	Unused
S_C1:7	A28b
S_C1:6	A17b
S_C1:5	A30b
S_C1:4	A25b
S_C1:3	A32b
S_C1:2	A31b
S_C1:1	A34b
S_C1:0	A29b
S_C0:7	A26b
S_C0:6	A33b
S_C0:5	A21b
S_C0:4	A27b
S_C0:3	A23b
S_C0:2	A22b
S_C0:1	Unused
S_C0:0	Unused

Table 4‑9 lists the channel assignments for the Slave Data group and the corresponding support signal.

Table 4‑9: Slave Data Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S_D3:7	A15b
S_D3:6	A14b
S_D3:5	A11b
S_D3:4	A07b
S_D3:3	REQb2

Table 4‑9: Slave Data Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S_D3:2	THERMTRIP
S_D3:1	A09b
S_D3:0	A03b
S_D2:7	A04b
S_D2:6	REQb3
S_D2:5	FERR
S_D2:4	TRDY
S_D2:3	SMI
S_D2:2	RS0
S_D2:1	Unused
S_D2:0	Unused
S_D1:7	LINT1
S_D1:6	LINT0
S_D1:5	FORCEPR
S_D1:4	DEFER
S_D1:3	A12b
S_D1:2	A16b
S_D1:1	A10b
S_D1:0	A08b
S_D0:7	A05b
S_D0:6	REQb1
S_D0:5	PROCHOT
S_D0:4	PSMI
S_D0:3	A13b
S_D0:2	A06b
S_D0:1	REQb0
S_D0:0	REQb4

Table 4–10 lists the channel assignments for the Slave Extend group and the corresponding support signal.

Table 4- 10: Slave Extend Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S_E3:7	Unused
S_E3:6	IERR
S_E3:5	AP0
S_E3:4	RSP
S_E3:3	A35
S_E3:2	Unused
S_E3:1	Unused
S_E3:0	Unused
S_E2:7	Unused
S_E2:6	Unused
S_E2:5	Unused
S_E2:4	Unused
S_E2:3	A20
S_E2:2	A18
S_E2:1	A24
S_E2:0	A19
S_E1:7	MCERR
S_E1:6	Unused
S_E1:5	Unused
S_E1:4	Unused
S_E1:3	A35b
S_E1:2	AP1
S_E1:1	BPM4
S_E1:0	BPM5
S_E0:7	BPM2
S_E0:6	BPM3
S_E0:5	BPM0
S_E0:4	BPM1
S_E0:3	A20b

Table 4-10: Slave Extend Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S_E0:2	A18b
S_E0:1	A24b
S_E0:0	A19b

Table 4-11 lists the channel assignments for the Slave2 Address group and the corresponding support signal.

Table 4-11: Slave2 Address Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S2_A3:7	D2_D05
S2_A3:6	D2_D13
S2_A3:5	D2_D04
S2_A3:4	D2_D11
S2_A3:3	D2_D14
S2_A3:2	D2_D15
S2_A3:1	D2_D12
S2_A3:0	D2_D07
S2_A2:7	D2_D00
S2_A2:6	D2_D08
S2_A2:5	D2_D01
S2_A2:4	D2_D09
S2_A2:3	D2_D02
S2_A2:2	D2_D03
S2_A2:1	D2_DBI0
S2_A2:0	D2_D06
S2_A1:7	D0_D03
S2_A1:6	D0_D06
S2_A1:5	D0_D01
S2_A1:4	D0_D02
S2_A1:3	D0_D09
S2_A1:2	D0_D08

Table 4‑11: Slave2 Address Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S2_A1:1	D0_D12
S2_A1:0	D0_D00
S2_A0:7	D0_D07
S2_A0:6	D0_D15
S2_A0:5	D0_D04
S2_A0:4	D0_D14
S2_A0:3	D0_D11
S2_A0:2	D0_D13
S2_A0:1	D0_D05
S2_A0:0	D0_D10

Table 4–12 lists the channel assignments for the Slave2 Control group and the corresponding support signal.

Table 4‑12: Slave2 Control Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S2_C3:7	D2_D28
S2_C3:6	D2_D24
S2_C3:5	D2_D18
S2_C3:4	D2_D16
S2_C3:3	D2_D31
S2_C3:2	D2_D30
S2_C3:1	D2_D20
S2_C3:0	D2_D29
S2_C2:7	D2_D26
S2_C2:6	D2_D25
S2_C2:5	D2_D17
S2_C2:4	D2_D23
S2_C2:3	D2_D22
S2_C2:2	D2_D21

Table 4‑12: Slave2 Control Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S2_C2:1	D2_DBI1
S2_C2:0	D2_D19
S2_C1:7	D0_D21
S2_C1:6	D0_D19
S2_C1:5	D0_D17
S2_C1:4	D0_D22
S2_C1:3	D0_D23
S2_C1:2	D0_D25
S2_C1:1	D0_D20
S2_C1:0	D0_D26
S2_C0:7	D0_D29
S2_C0:6	D0_D30
S2_C0:5	D0_D18
S2_C0:4	D0_D31
S2_C0:3	D0_D16
S2_C0:2	D0_D24
S2_C0:1	D0_D28
S2_C0:0	D0_D27

Table 4–13 lists the channel assignments for the Slave2 Data group and the corresponding support signal.

Table 4‑13: Slave2 Data Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S2_D3:7	D3_D03
S2_D3:6	D3_D09
S2_D3:5	D3_D02
S2_D3:4	D3_D00
S2_D3:3	D3_D05
S2_D3:2	D3_D12

Table 4‑13: Slave2 Data Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S2_D3:1	D3_D08
S2_D3:0	D3_D07
S2_D2:7	D3_D01
S2_D2:6	D3_D04
S2_D2:5	D3_D11
S2_D2:4	D3_D06
S2_D2:3	D3_D15
S2_D2:2	D3_D14
S2_D2:1	D3_D13
S2_D2:0	D3_D10
S2_D1:7	D1_D03
S2_D1:6	D1_D02
S2_D1:5	D1_D06
S2_D1:4	D1_D09
S2_D1:3	D1_D00
S2_D1:2	D1_D12
S2_D1:1	D1_D07
S2_D1:0	D1_D08
S2_D0:7	D1_D01
S2_D0:6	D1_D04
S2_D0:5	D1_D15
S2_D0:4	D1_D11
S2_D0:3	D1_D05
S2_D0:2	D1_D14
S2_D0:1	D1_D10
S2_D0:0	D1_D13

Table 4–14 lists the channel assignments for the Slave2 Extend group and the corresponding support signal.

Table 4-14: Slave2 Extend Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S2_E3:7	D3_D19
S2_E3:6	D3_D21
S2_E3:5	D3_D23
S2_E3:4	D3_D20
S2_E3:3	D3_D22
S2_E3:2	D3_D25
S2_E3:1	D3_D26
S2_E3:0	D3_D31
S2_E2:7	D3_D17
S2_E2:6	D3_D27
S2_E2:5	D3_D29
S2_E2:4	D3_D16
S2_E2:3	D3_D18
S2_E2:2	D3_D28
S2_E2:1	D3_D30
S2_E2:0	D3_D24
S2_E1:7	D1_D19
S2_E1:6	D1_D23
S2_E1:5	D1_D20
S2_E1:4	D1_D21
S2_E1:3	D1_D22
S2_E1:2	D1_D25
S2_E1:1	D1_D31
S2_E1:0	D1_D26
S2_E0:7	D1_D17
S2_E0:6	D1_D27
S2_E0:5	D1_D18
S2_E0:4	D1_D16
S2_E0:3	D1_D29

Table 4‑14: Slave2 Extend Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S2_E0:2	D1_D28
S2_E0:1	D1_D24
S2_E0:0	D1_D30

Table 4–15 lists the channel assignments for the Slave3 Address group and the corresponding support signal.

Table 4‑15: Slave3 Address Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S3_A3:7	D2_D52
S3_A3:6	D2_D51
S3_A3:5	D2_D53
S3_A3:4	D2_D62
S3_A3:3	D2_D61
S3_A3:2	D2_D60
S3_A3:1	D2_D59
S3_A3:0	D2_D50
S3_A2:7	D2_D54
S3_A2:6	D2_D58
S3_A2:5	D2_D56
S3_A2:4	D2_D49
S3_A2:3	D2_D48
S3_A2:2	D2_D55
S3_A2:1	D2_DBI3
S3_A2:0	D2_D63
S3_A1:7	D0_D55
S3_A1:6	D0_D63
S3_A1:5	D0_D56
S3_A1:4	D0_D48
S3_A1:3	D0_D49

Table 4‑15: Slave3 Address Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S3_A1:2	D0_D58
S3_A1:1	D0_D59
S3_A1:0	D0_D54
S3_A0:7	D0_D50
S3_A0:6	D0_D60
S3_A0:5	D0_D53
S3_A0:4	D0_D61
S3_A0:3	D0_D62
S3_A0:2	D0_D51
S3_A0:1	D0_D52
S3_A0:0	D0_D57

Table 4–16 lists the channel assignments for the Slave3 Data group and the corresponding support signal.

Table 4‑16: Slave3 Data Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S3_D3:7	D3_D49
S3_D3:6	D3_D54
S3_D3:5	D3_D48
S3_D3:4	D3_D55
S3_D3:3	D3_D58
S3_D3:2	D3_D59
S3_D3:1	D3_D56
S3_D3:0	D3_D61
S3_D2:7	D3_D63
S3_D2:6	D3_D50
S3_D2:5	D3_D53
S3_D2:4	D3_D51
S3_D2:3	D3_D52

Table 4‑16: Slave3 Data Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S3_D2:2	D3_D57
S3_D2:1	D3_D60
S3_D2:0	D3_D62
S3_D1:7	D1_D49
S3_D1:6	D1_D48
S3_D1:5	D1_D55
S3_D1:4	D1_D54
S3_D1:3	D1_D58
S3_D1:2	D1_D59
S3_D1:1	D1_D61
S3_D1:0	D1_D56
S3_D0:7	D1_D63
S3_D0:6	D1_D50
S3_D0:5	D1_D52
S3_D0:4	D1_D51
S3_D0:3	D1_D53
S3_D0:2	D1_D57
S3_D0:1	D1_D62
S3_D0:0	D1_D60

Table 4–17 lists the channel assignments for the Slave3 Control group and the corresponding support signal.

Table 4‑17: Slave3 Control Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S3_C3:7	D2_D40
S3_C3:6	D2_D46
S3_C3:5	D2_D41
S3_C3:4	D2_D47
S3_C3:3	D2_D44

Table 4‑17: Slave3 Control Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S3_C3:2	D2_D43
S3_C3:1	D2_D37
S3_C3:0	D2_D39
S3_C2:7	D2_D42
S3_C2:6	D2_D45
S3_C2:5	D2_D34
S3_C2:4	D2_D38
S3_C2:3	D2_D35
S3_C2:2	D2_D32
S3_C2:1	D2_DBl2
S3_C2:0	D2_D36
S3_C1:7	D0_D32
S3_C1:6	D0_D36
S3_C1:5	D0_D34
S3_C1:4	D0_D35
S3_C1:3	D0_D38
S3_C1:2	D0_D45
S3_C1:1	D0_D37
S3_C1:0	D0_D42
S3_C0:7	D0_D39
S3_C0:6	D0_D43
S3_C0:5	D0_D41
S3_C0:4	D0_D44
S3_C0:3	D0_D47
S3_C0:2	D0_D46
S3_C0:1	D0_D40
S3_C0:0	D0_D33

Table 4–18 lists the channel assignments for the Slave3 Extend group and the corresponding support signal.

Table 4‑18: Slave3 Extend Module 32-channel assignments

Logic analyzer acquisition channel	PUB32G8 support signal name
S3_E3:7	D3_D42
S3_E3:6	D3_D44
S3_E3:5	D3_D38
S3_E3:4	D3_D36
S3_E3:3	D3_D32
S3_E3:2	D3_D35
S3_E3:1	D3_D34
S3_E3:0	D3_D45
S3_E2:7	D3_D33
S3_E2:6	D3_D43
S3_E2:5	D3_D37
S3_E2:4	D3_D47
S3_E2:3	D3_D41
S3_E2:2	D3_D46
S3_E2:1	D3_D39
S3_E2:0	D3_D40
S3_E1:7	D1_D42
S3_E1:6	D1_D38
S3_E1:5	D1_D36
S3_E1:4	D1_D44
S3_E1:3	D1_D32
S3_E1:2	D1_D35
S3_E1:1	D1_D45
S3_E1:0	D1_D34
S3_E0:7	D1_D33
S3_E0:6	D1_D43
S3_E0:5	D1_D41
S3_E0:4	D1_D47
S3_E0:3	D1_D37

Table 4- 18: Slave3 Extend Module 32-channel assignments (Cont.)

Logic analyzer acquisition channel	PUB32G8 support signal name
S3_E0:2	D1_D46
S3_E0:1	D1_D40
S3_E0:0	D1_D39

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Channel Group Definition Tables

This section contains channel group definition tables.

All tables use the following conventions:

- A pound sign (#) following a signal name indicates an active low signal.

- Channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB).

Table 4--19 lists the group definitions for the A[35:32] channel group.

Table 4- 19: A[35:32] channel group definitions

Bit order	PUB32G8 support channel name
3	A35
2	A34
1	A33
0	A32

Table 4--20 lists the group definitions for the A[31:00] channel group.

Table 4- 20: A[31:00] channel group definitions

Bit order	PUB32G8 support channel name
31	A31
30	A30
29	A29
28	A28
27	A27
26	A26
25	A25
24	A24
23	A23
22	A22

Table 4‑20: A[31:00] channel group definitions (Cont.)

Bit order	PUB32G8 support channel name
21	A21
20	A20
19	A19
18	A18
17	A17
16	A16
15	A15
14	A14
13	A13
12	A12
11	A11
10	A10
9	A09
8	A08
7	A07
6	A06
5	A05
4	A04
3	A03
2	GND
1	GND
0	GND

Table 4–21 lists the group definitions for the Ab[35:32] channel group.

Table 4‑21: Ab[35:32] channel group definitions

Bit order	PUB32G8 support channel name
3	A35b
2	A34b
1	A33b
0	A32b

Table 4--22 lists the group definitions for the Ab[31:00] channel group.

Table 4- 22: Ab[31:00] channel group definitions

Bit order	PUB32G8 support channel name
31	A31b
30	A30b
29	A29b
28	A28b
27	A27b
26	A26b
25	A25b
24	A24b
23	A23b
22	A22b
21	A21b
20	A20b
19	A19b
18	A18b
17	A17b
16	A16b
15	A15b
14	A14b
13	A13b
12	A12b
11	A11b
10	A10b
9	A09b
8	A08b
7	A07b
6	A06b
5	A05b
4	A04b

Table 4‑22: Ab[31:00] channel group definitions (Cont.)

Bit order	PUB32G8 support channel name
3	A03b
2	GND
1	GND
0	GND

Table 4–23 lists the group definitions for the AddrParity channel group.

Table 4‑23: AddrParity channel group definitions

Bit order	PUB32G8 support channel name
1	AP1
0	AP0

Table 4–24 lists the group definitions for the Request channel group.

Table 4‑24: Request channel group definitions

Bit order	PUB32G8 support channel name
9	REQa4
8	REQa3
7	REQa2
6	REQa1
5	REQa0
4	REQb4
3	REQb3
2	REQb2
1	REQb1
0	REQb0

Table 4–25 lists the group definitions for the Response channel group.

Table 4‑25: Response channel group definitions

Bit order	PUB32G8 support channel name
4	RS2
3	RS1
2	RS0
1	RSP

Table 4-26 lists the group definitions for the Data channel group.

Table 4-26: Data channel group definitions

Bit order	PUB32G8 support signal name	Bit order	PUB32G8 support signal name
63	D3_63	31	D3_31
62	D3_62	30	D3_30
61	D3_61	29	D3_29
60	D3_60	28	D3_28
59	D3_59	27	D3_27
58	D3_58	26	D3_26
57	D3_57	25	D3_25
56	D3_56	24	D3_24
55	D3_55	23	D3_23
54	D3_54	22	D3_22
53	D3_53	21	D3_21
52	D3_52	20	D3_20
51	D3_51	19	D3_19
50	D3_50	18	D3_18
49	D3_49	17	D3_17
48	D3_48	16	D3_16
47	D3_47	15	D3_15
46	D3_46	14	D3_14
45	D3_45	13	D3_13
44	D3_44	12	D3_12
43	D3_43	11	D3_11
42	D3_42	10	D3_10
41	D3_41	9	D3_09
40	D3_40	8	D3_08
39	D3_39	7	D3_07
38	D3_38	6	D3_06
37	D3_37	5	D3_05
36	D3_36	4	D3_04
35	D3_35	3	D3_03
34	D3_34	2	D3_02
33	D3_33	1	D3_01
32	D3_32	0	D3_00

Table 4‑26: Data channel group definitions (Cont)

Bit order	PUB32G8 support signal name	Bit order	PUB32G8 support signal name
63	D2_63	31	D2_31
62	D2_62	30	D2_30
61	D2_61	29	D2_29
60	D2_60	28	D2_28
59	D2_59	27	D2_27
58	D2_58	26	D2_26
57	D2_57	25	D2_25
56	D2_56	24	D2_24
55	D2_55	23	D2_23
54	D2_54	22	D2_22
53	D2_53	21	D2_21
52	D2_52	20	D2_20
51	D2_51	19	D2_19
50	D2_50	18	D2_18
49	D2_49	17	D2_17
48	D2_48	16	D2_16
47	D2_47	15	D2_15
46	D2_46	14	D2_14
45	D2_45	13	D2_13
44	D2_44	12	D2_12
43	D2_43	11	D2_11
42	D2_42	10	D2_10
41	D2_41	9	D2_09
40	D2_40	8	D2_08
39	D2_39	7	D2_07
38	D2_38	6	D2_06
37	D2_37	5	D2_05
36	D2_36	4	D2_04
35	D2_35	3	D2_03
34	D2_34	2	D2_02
33	D2_33	1	D2_01
32	D2_32	0	D2_00

Table 4-26: Data channel group definitions (Cont)

Bit order	PUB32G8 support signal name	Bit order	PUB32G8 support signal name
63	D1_63	31	D1_31
62	D1_62	30	D1_30
61	D1_61	29	D1_29
60	D1_60	28	D1_28
59	D1_59	27	D1_27
58	D1_58	26	D1_26
57	D1_57	25	D1_25
56	D1_56	24	D1_24
55	D1_55	23	D1_23
54	D1_54	22	D1_22
53	D1_53	21	D1_21
52	D1_52	20	D1_20
51	D1_51	19	D1_19
50	D1_50	18	D1_18
49	D1_49	17	D1_17
48	D1_48	16	D1_16
47	D1_47	15	D1_15
46	D1_46	14	D1_14
45	D1_45	13	D1_13
44	D1_44	12	D1_12
43	D1_43	11	D1_11
42	D1_42	10	D1_10
41	D1_41	9	D1_09
40	D1_40	8	D1_08
39	D1_39	7	D1_07
38	D1_38	6	D1_06
37	D1_37	5	D1_05
36	D1_36	4	D1_04
35	D1_35	3	D1_03
34	D1_34	2	D1_02
33	D1_33	1	D1_01
32	D1_32	0	D1_00

Table 4- 26: Data channel group definitions (Cont)

Bit order	PUB32G8 support signal name	Bit order	PUB32G8 support signal name
63	D0_63	31	D0_31
62	D0_62	30	D0_30
61	D0_61	29	D0_29
60	D0_60	28	D0_28
59	D0_59	27	D0_27
58	D0_58	26	D0_26
57	D0_57	25	D0_25
56	D0_56	24	D0_24
55	D0_55	23	D0_23
54	D0_54	22	D0_22
53	D0_53	21	D0_21
52	D0_52	20	D0_20
51	D0_51	19	D0_19
50	D0_50	18	D0_18
49	D0_49	17	D0_17
48	D0_48	16	D0_16
47	D0_47	15	D0_15
46	D0_46	14	D0_14
45	D0_45	13	D0_13
44	D0_44	12	D0_12
43	D0_43	11	D0_11
42	D0_42	10	D0_10
41	D0_41	9	D0_09
40	D0_40	8	D0_08
39	D0_39	7	D0_07
38	D0_38	6	D0_06
37	D0_37	5	D0_05
36	D0_36	4	D0_04
35	D0_35	3	D0_03
34	D0_34	2	D0_02
33	D0_33	1	D0_01
32	D0_32	0	D0_00

Table 4--27 lists the group definitions for the Data channel group.

Table 4- 27: D0[63:32] and D0[31:00] channel group definitions

D0[63:32]		D0[31:00]	
Bit order	**PUB32G8 support signal name**	**Bit order**	**PUB32G8 support signal name**
63	D0_63	31	D0_31
62	D0_62	30	D0_30
61	D0_61	29	D0_29
60	D0_60	28	D0_28
59	D0_59	27	D0_27
58	D0_58	26	D0_26
57	D0_57	25	D0_25
56	D0_56	24	D0_24
55	D0_55	23	D0_23
54	D0_54	22	D0_22
53	D0_53	21	D0_21
52	D0_52	20	D0_20
51	D0_51	19	D0_19
50	D0_50	18	D0_18
49	D0_49	17	D0_17
48	D0_48	16	D0_16
47	D0_47	15	D0_15
46	D0_46	14	D0_14
45	D0_45	13	D0_13
44	D0_44	12	D0_12
43	D0_43	11	D0_11
42	D0_42	10	D0_10
41	D0_41	9	D0_09
40	D0_40	8	D0_08
39	D0_39	7	D0_07
38	D0_38	6	D0_06
37	D0_37	5	D0_05
36	D0_36	4	D0_04
35	D0_35	3	D0_03
34	D0_34	2	D0_02
33	D0_33	1	D0_01
32	D0_32	0	D0_00

Table 4‑27: Data channel group definitions (Cont)

D0[63:32]		D0[31:00]	
Bit order	**PUB32G8 support signal name**	**Bit order**	**PUB32G8 support signal name**
63	D1_63	31	D1_31
62	D1_62	30	D1_30
61	D1_61	29	D1_29
60	D1_60	28	D1_28
59	D1_59	27	D1_27
58	D1_58	26	D1_26
57	D1_57	25	D1_25
56	D1_56	24	D1_24
55	D1_55	23	D1_23
54	D1_54	22	D1_22
53	D1_53	21	D1_21
52	D1_52	20	D1_20
51	D1_51	19	D1_19
50	D1_50	18	D1_18
49	D1_49	17	D1_17
48	D1_48	16	D1_16
47	D1_47	15	D1_15
46	D1_46	14	D1_14
45	D1_45	13	D1_13
44	D1_44	12	D1_12
43	D1_43	11	D1_11
42	D1_42	10	D1_10
41	D1_41	9	D1_09
40	D1_40	8	D1_08
39	D1_39	7	D1_07
38	D1_38	6	D1_06
37	D1_37	5	D1_05
36	D1_36	4	D1_04
35	D1_35	3	D1_03
34	D1_34	2	D1_02
33	D1_33	1	D1_01
32	D1_32	0	D1_00

Table 4‑27: Data channel group definitions (Cont)

D0[63:32]		D0[31:00]	
Bit order	PUB32G8 support signal name	Bit order	PUB32G8 support signal name
63	D2_63	31	D2_31
62	D2_62	30	D2_30
61	D2_61	29	D2_29
60	D2_60	28	D2_28
59	D2_59	27	D2_27
58	D2_58	26	D2_26
57	D2_57	25	D2_25
56	D2_56	24	D2_24
55	D2_55	23	D2_23
54	D2_54	22	D2_22
53	D2_53	21	D2_21
52	D2_52	20	D2_20
51	D2_51	19	D2_19
50	D2_50	18	D2_18
49	D2_49	17	D2_17
48	D2_48	16	D2_16
47	D2_47	15	D2_15
46	D2_46	14	D2_14
45	D2_45	13	D2_13
44	D2_44	12	D2_12
43	D2_43	11	D2_11
42	D2_42	10	D2_10
41	D2_41	9	D2_09
40	D2_40	8	D2_08
39	D2_39	7	D2_07
38	D2_38	6	D2_06
37	D2_37	5	D2_05
36	D2_36	4	D2_04
35	D2_35	3	D2_03
34	D2_34	2	D2_02
33	D2_33	1	D2_01
32	D2_32	0	D2_00

Table 4-27: Data channel group definitions (Cont)

D0[63:32]		D0[31:00]	
Bit order	**PUB32G8 support signal name**	**Bit order**	**PUB32G8 support signal name**
63	D3_63	31	D3_31
62	D3_62	30	D3_30
61	D3_61	29	D3_29
60	D3_60	28	D3_28
59	D3_59	27	D3_27
58	D3_58	26	D3_26
57	D3_57	25	D3_25
56	D3_56	24	D3_24
55	D3_55	23	D3_23
54	D3_54	22	D3_22
53	D3_53	21	D3_21
52	D3_52	20	D3_20
51	D3_51	19	D3_19
50	D3_50	18	D3_18
49	D3_49	17	D3_17
48	D3_48	16	D3_16
47	D3_47	15	D3_15
46	D3_46	14	D3_14
45	D3_45	13	D3_13
44	D3_44	12	D3_12
43	D3_43	11	D3_11
42	D3_42	10	D3_10
41	D3_41	9	D3_09
40	D3_40	8	D3_08
39	D3_39	7	D3_07
38	D3_38	6	D3_06
37	D3_37	5	D3_05
36	D3_36	4	D3_04
35	D3_35	3	D3_03
34	D3_34	2	D3_02
33	D3_33	1	D3_01
32	D3_32	0	D3_00

Table 4-28 lists the group definitions for the DataInvert channel group.

Table 4-28: DataInvert channel group definitions

Bit order	PUB32G8 support channel name
15	D0_DBI3
14	D0_DBI2
13	D0_DBI1
12	D0_DBI0
11	D1_DBI3
10	D1_DBI2
9	D1_DBI1
8	D1_DBI0
7	D2_DBI3
6	D2_DBI2
5	D2_DBI1
4	D2_DBI0
3	D3_DBI3
2	D3_DBI2
1	D3_DBI1
0	D3_DBI0

Table 4-29 lists the group definitions for the DataParity channel group.

Table 4-29: DataParity channel group definitions

Bit order	PUB32G8 support channel name
3	DP3
2	DP2
1	DP1
0	DP0

Table 4–30 lists the group definitions for the Execution channel group.

Table 4‑30: PUB32G8 Execution channel group definitions

Bit order	PUB32G8 support channel name
5	RESET
4	INIT
3	STPCLK
2	SLP
1	LINT1
0	LINT0

Table 4–31 lists the group definitions for the Error channel group.

Table 4‑31: Error channel group definitions

Bit order	PUB32G8 support channel name
2	BINIT
1	MCERR
0	IERR

Table 4–32 lists the group definitions for the Compatible channel group.

Table 4‑32: Compatible channel group definitions

Bit order	PUB32G8 support channel name
3	FERR
2	IGNNE
1	A20M
0	SMI

Table 4–33 lists the group definitions for the Diagnostic channel group.

Table 4‑33: Diagnostic channel group definitions

Bit order	PUB32G8 support channel name
7	THERMTRIP
6	PROCHOT
5	BPM5
4	BPM4
3	BPM3
2	BPM2
1	BPM1
0	BPM0

Table 4–34 lists the group definitions for the Misc channel group.

Table 4‑34: Misc channel group definitions

Bit order	PUB32G8 support channel name
11	BR0
10	BPRI
9	BNR
8	DEFER
7	DRDY
6	DBSY
5	FSBSEL1
4	FSBSEL0
3	HIT
2	HITM
1	LOCK
0	TRDY

Table 4‑35 lists the group definitions for the D[63:48] channel group.

Table 4‑35: D[63:48] channel group definitions

Bit order	PUB32G8 support channel name
15	D63_T
14	D62_T
13	D61_T
12	D60_T
11	D59_T
10	D58_T
9	D57_T
8	D56_T
7	D55_T
6	D54_T
5	D53_T
4	D52_T
3	D51_T
2	D50_T
1	D49_T
0	D48_T

Table 4‑35 lists the group definitions for the D[47:32] channel group.

Table 4‑36: D[47:32] channel group definitions

Bit order	PUB32G8 support channel name
15	D47_T
14	D46_T
13	D45_T
12	D44_T
11	D43_T
10	D42_T
9	D41_T
8	D40_T

Table 4‑36: D[47:32] channel group definitions (Cont.)

Bit order	PUB32G8 support channel name
7	D39_T
6	D38_T
5	D37_T
4	D36_T
3	D35_T
2	D34_T
1	D33_T
0	D32_T

Table 4–35 lists the group definitions for the D[15:00] channel group.

Table 4‑37: D[15:00] channel group definitions

Bit order	PUB32G8 support channel name
15	D15_T
14	D14_T
13	D13_T
12	D12_T
11	D11_T
10	D10_T
9	D09_T
8	D08_T
7	D07_T
6	D06_T
5	D05_T
4	D04_T
3	D03_T
2	D02_T
1	D01_T
0	D00_T

WARNING

The following servicing instructions are for use only by qualified personnel. To avoid injury, do not perform any servicing other than that stated in the operating instructions unless you are qualified to do so. Refer to all safety summaries before performing any service.

Maintenance

Maintenance

This section contains fuse information for the TMSSP1 478-Pin Socket Hardware Support probe adapter.

The TMSSP1 478-Pin Socket probe adapter consists of the probe head, cables, and preprocessor unit, and does not require scheduled or periodic maintenance. However, to keep good electrical contact and efficient heat dissipation, keep the probe adapter free of dirt, dust, and contaminants. When not in use, store the probe adapter in the original shipping bags and shipping boxes (see *Storage* on page 1-17).

⚠️ *WARNING. To prevent personal injury or damage to the preprocessor unit, there are no operator serviceable parts inside the cover of the preprocessor unit. Refer servicing of internal parts in the preprocessor unit to Tektronix authorized personnel only.*

Fuses

There are eight fuses in the preprocessor unit:

- Logic board (7):
  F1, F2, F3, F4, F5, F6, F7: 7A, 125 V Fast blow

- Power Supply (1)
  10 A, 250 V, Fast blow, 0.25 x 1.25 inches

  The part number for fuses F1 through F7 are located in the *Replaceable Parts List* section on page 6-6.

Removal and Installation Procedures

This section contains removal and installation procedures for the cables and fans in the TMSSP1 478-Pin Socket preprocessor unit.

⚠️ **WARNING.** *To prevent personal injury or damage to the preprocessor unit, cables and fans should be replaced by qualified service personnel only.*

There are no operator serviceable parts inside the cover of the preprocessor unit. Refer servicing of internal parts in the preprocessor unit to Tektronix authorized personnel only.

Removing the Cables

The information in this section is designed for use by qualified service personnel. Read the Safety Summary at the front of this manual before attempting any procedures in this section.

Tools   Following are the tools for the removal procedures:

- POZIDRIV screwdriver (PZ2) to remove the bottom cover

- Flat-bladed screwdriver to loosen the screws on the paddle boards, remove the snap rivets from the fan guards, and remove the probe head cables

- **Optional Tools.** A torque wrench helps to ensure reliable connections by meeting the nominal torque values listed in these instructions.

⚠️ **CAUTION.** *Static discharge can damage the microprocessor, the probe adapter, the probes, and the module. To prevent static damage, you must handle components only in a static-free environment.*

Always wear a grounding wrist strap, heel strap, or similar device while handling the microprocessor and probe adapter.

Please read the following general instructions before removing parts.

Removing Cables from the Preprocessor Unit   You may need to remove the cables from the preprocessor unit to replace the probe head. To remove the cables follow these steps.

1. Power off the preprocessor unit. The power switch is located on the back of the preprocessor unit (see Figure 5–1).

2. Unplug the AC power cord from the preprocessor unit.

Power switch

AC Power cord

Figure 5-1: Remove AC power cord

3. If necessary, remove the P6860 probes, and then turn the preprocessor unit onto its topside (see Figure 5-2). To disconnect the P6860 probes, refer to the *P6810, P6860, and P6880 Logic Analyzer Probes Instruction manual*, Tektronix part number 071-1059-XX, for more information.

⚠ *WARNING. To prevent serious injury or death, check that the power cord is disconnected from the line voltage source.*

4. With a POZIDRIV screwdriver (PZ2), remove the screws from the bottom cover of the preprocessor unit, and set them aside.
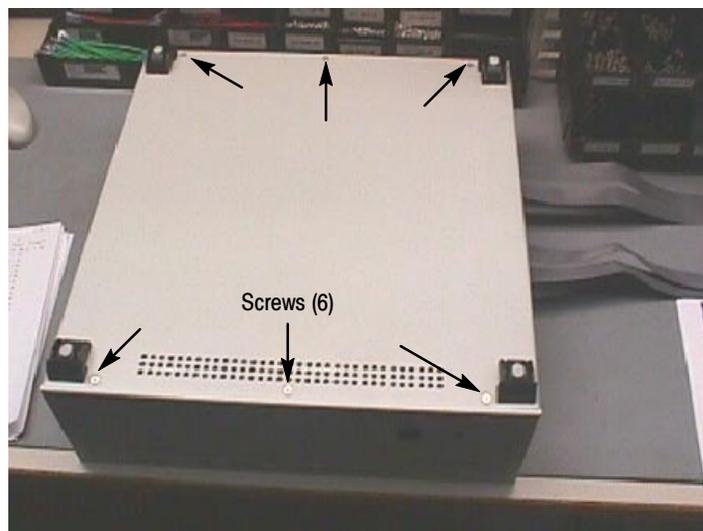
Screws (6)

Figure 5-2: Remove the attaching screws

5. Remove the fan plug from the logic board.

Figure 5-3: Remove the fan plug

6. Remove the LED cable from the gold pins on the front of the Logic board.
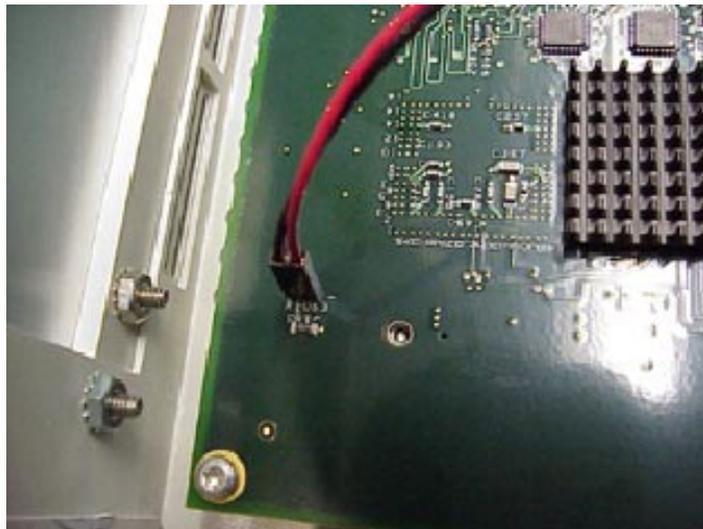
Figure 5-4: Remove the LED cable

7. Remove the power supply cables from the Logic board.
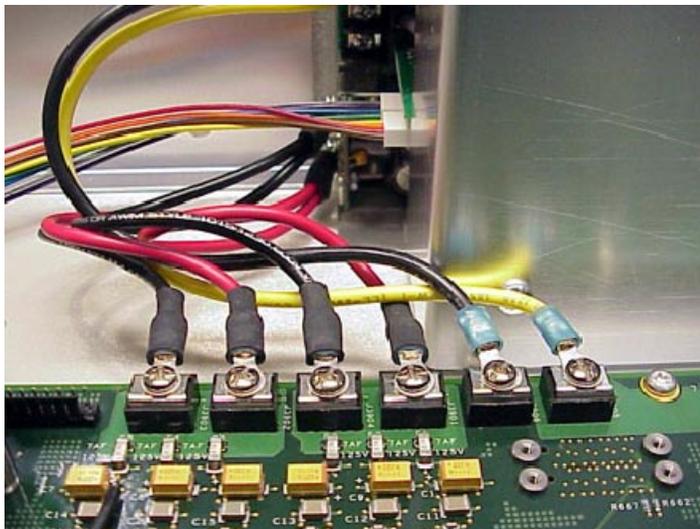
Figure 5-5: Remove power supply cables

8. Remove the power supply dual plug from the Logic board.
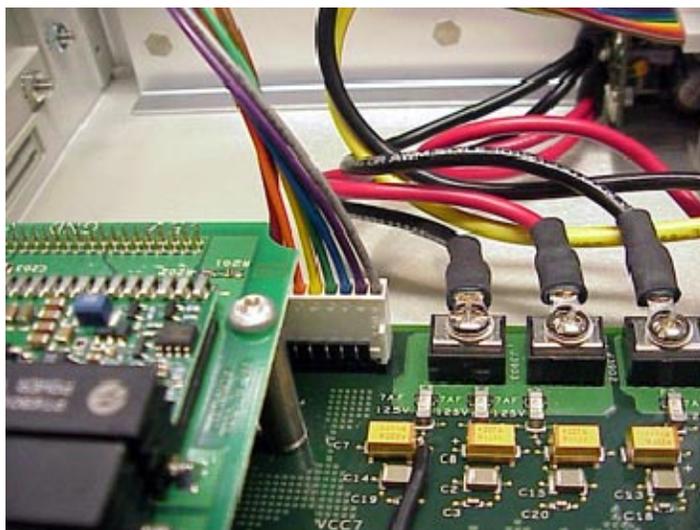
Figure 5-6: Remove the power supply dual plug

9. Remove four screws from the power supply shield, and then remove the power supply shield.
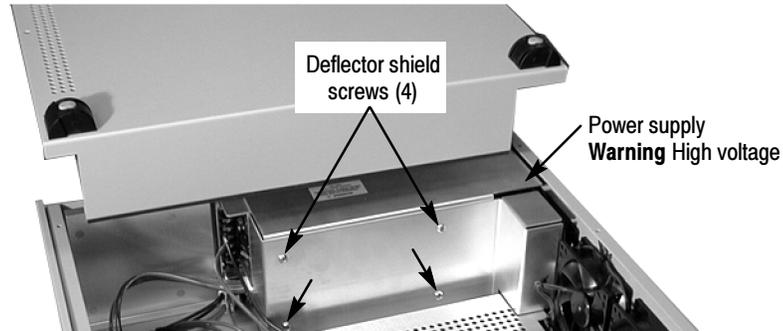
Figure 5-7: Remove the power supply shield

10. With a flat-bladed screwdriver, remove ten screws from the Logic board (see Figure 5-8) and set aside. Do not remove the two screws that attach the regulator board to the logic board.
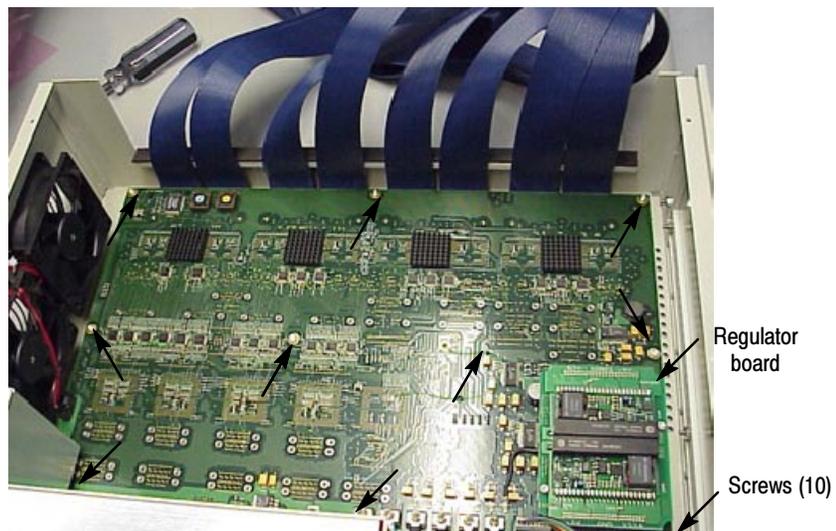
Figure 5-8: Remove the logic board from the chassis

11. With a flat-bladed screwdriver, remove eight screws and disconnect each probe head cable from the back of the Logic board (see Figure 5‑9).

Screws (8)
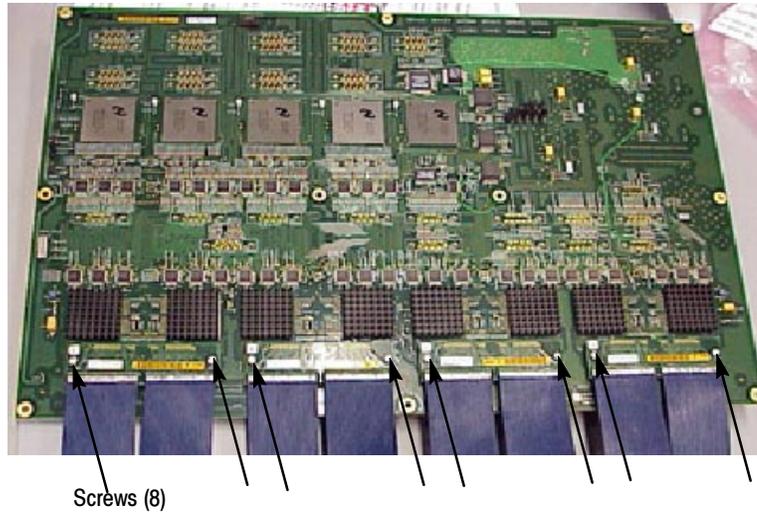
Figure 5‑9: Remove the cables from the back of the logic board

Reinstalling the Cables

This procedure assumes you have the logic board detached from the preprocessor unit. Follow these steps to reinstall the probe head cables to the logic board:

1. Power off the preprocessor unit and disconnect the power cord (see Figure 5-10 for power switch and power cord locations). Check that the P6860 probes are removed from the top of the preprocessor unit before turning it over.

2. Turn the preprocessor unit over.

⚠ **CAUTION.** *Static discharge can damage the microprocessor, the probe adapter, the probes, and the module. To prevent static damage, you must handle components only in a static-free environment.*

Always wear a grounding wrist strap, heel strap, or similar device while handling the microprocessor and probe adapter.

Power switch

Power cord

Figure 5-10: Power switch location

⚠ **WARNING.** *To prevent serious injury or death, disconnect the power cord from the preprocessor unit.*

3. With a POZIDRIV screwdriver (PZ2), remove the six screws from the bottom cover and set the button comer aside.
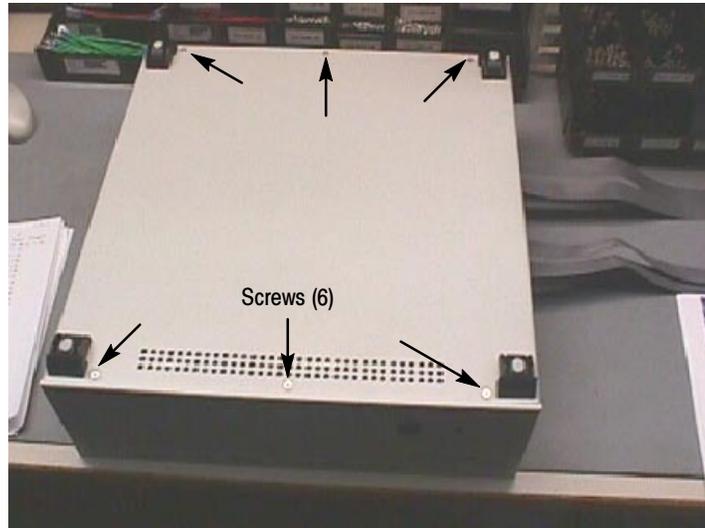
Figure 5‑11: Remove the attaching screws

4. Connect each cable to the corresponding location (A-A, B-B, C-C) on the Logic board (see Figure 5‑12). Secure the cables to the Logic board with the eight screws (Torque to 4 in/lbs).
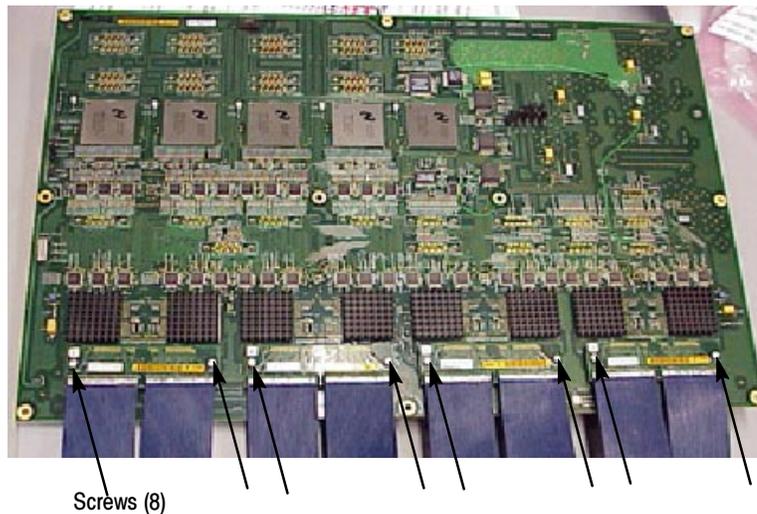
Figure 5‑12: Attach the cables to the logic board

5. Lay the logic board in the chassis as shown in Figure 5–13. Dress the cables through the notched side of the preprocessor unit.

Figure 5–13: Place logic board in the chassis

6. Attach the logic board to the chassis with the ten screws (torque to 4 in lbs).
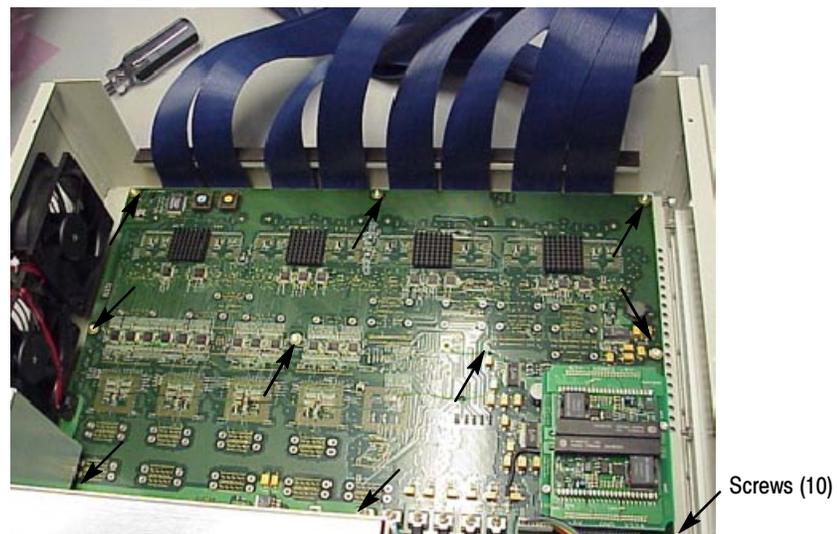
Screws (10)

Figure 5–14: Attach the logic board to the chassis

7. Attach the power supply cover to the power supply using the four screws (torque to 4 in lbs).
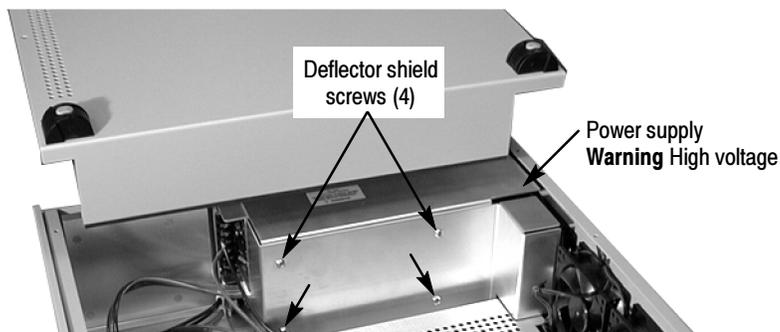
Figure 5‑15: Attach the power supply shield

8. Attach the fan plug to the logic board.

Figure 5‑16: Attach fan plug

9. Attach the LED cable to the gold pins on the Logic board.
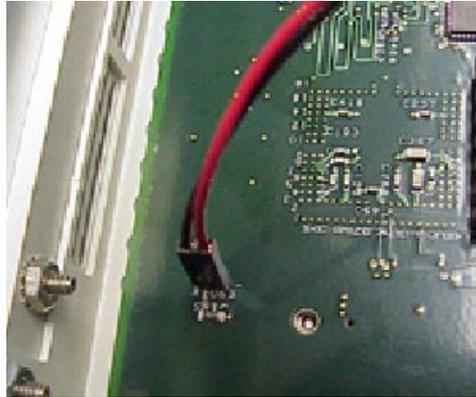
Figure 5-17: Attach the LED cable to the Logic board

10. Attach the power supply cables to the logic board using the following list.

Single Yellow	+12 V
Single Black	GND
Double Red	+5 V
Double Black	GND
Double Red	+5 V
Double Black	GND
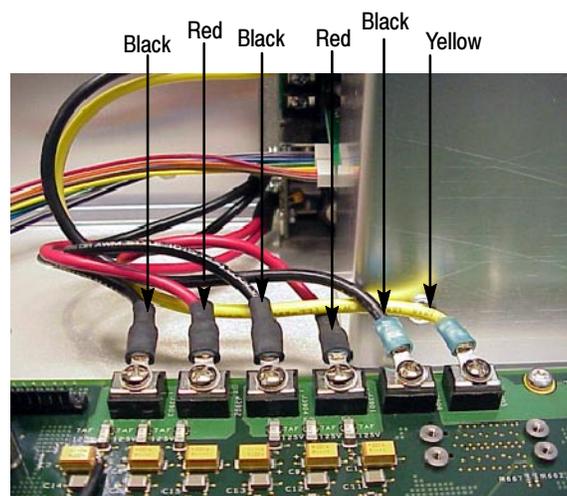
Figure 5-18: Attach the power supply cables
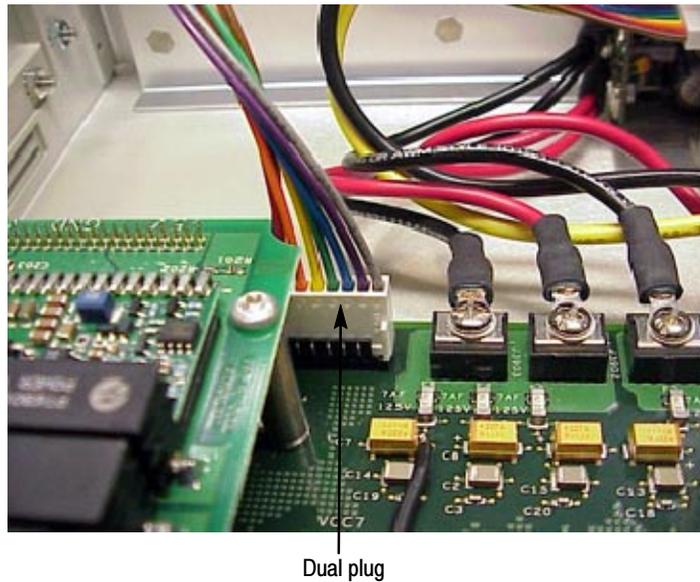
Dual plug

Figure 5‑19: Attach the power supply dual plug

11. Attach the power supply dual plug to the Logic board.

12. With a POZIDRIV screwdriver (PZ2), attach the bottom cover to the preprocessor unit (see Figure 5‑20), using the attaching screws (torque to 4 in/lbs).

Screws (6)
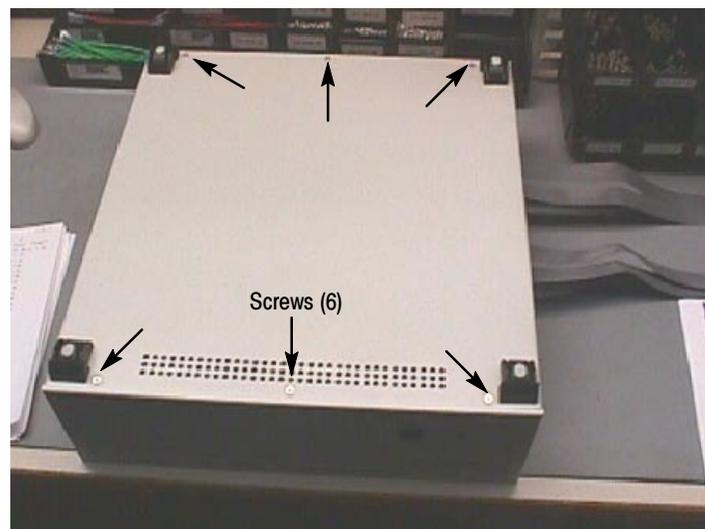
Figure 5‑20: Attach the bottom cover

13. Turn over the preprocessor unit.

14. Reconnect the P6860 probes (see pages 1–10 through 1–14) to the top of the preprocessor unit.

15. Plug the AC power cord into the back of the preprocessor unit.

Removing and Installing a Fan

You may need to remove and install a fan in the preprocessor unit for repair purposes. To replace a fan follow these steps:

If all three fans are not working, check that the power cord is connected to the preprocessor unit or the electrical outlet. If the power cord is connected, contact a Tektronix service representative.

⚠️ **CAUTION.** *Static discharge can damage the microprocessor, the probe adapter, the probes, and the module. To prevent static damage, you must handle components only in a static-free environment.*

Always wear a grounding wrist strap, heel strap, or similar device while handling the microprocessor and probe adapter.

1. Power off the preprocessor unit. The power switch is located on the back of the preprocessor unit (see Figure 5–21). To disconnect the P6860 probes, refer to the *P6810, P6860, and P6880 Logic Analyzer Probes Instruction Manual*, Tektronix part number 071-1059-XX, for more information on mechanical specifications.

2. Unplug the AC power cord from the preprocessor unit.

Figure 5–21: Power switch and AC power cord locations

⚠ **WARNING.** *To prevent serious injury or death, check that the power cord is disconnected from the preprocessor unit.*

3. Turn the preprocessor unit over, and remove the screws (see Figure 5-22) and bottom cover from the preprocessor unit. Set the bottom cover aside.
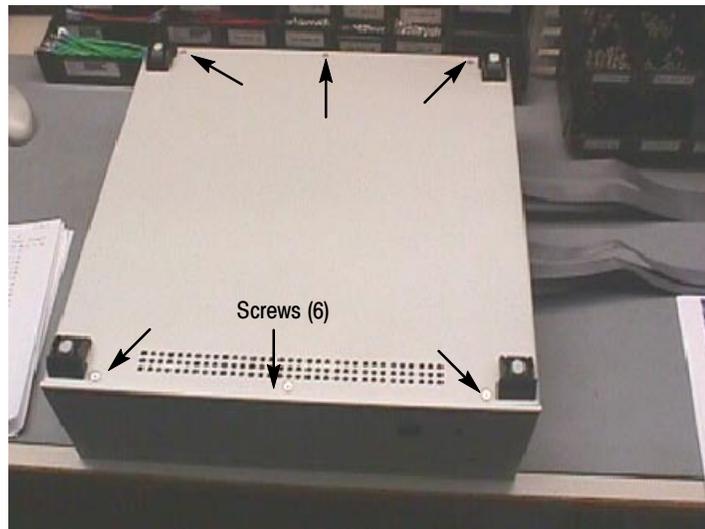
Screws (6)

Figure 5-22: Remove the bottom cover

Deflector shield
screws (4)

Power supply
Warning High voltage
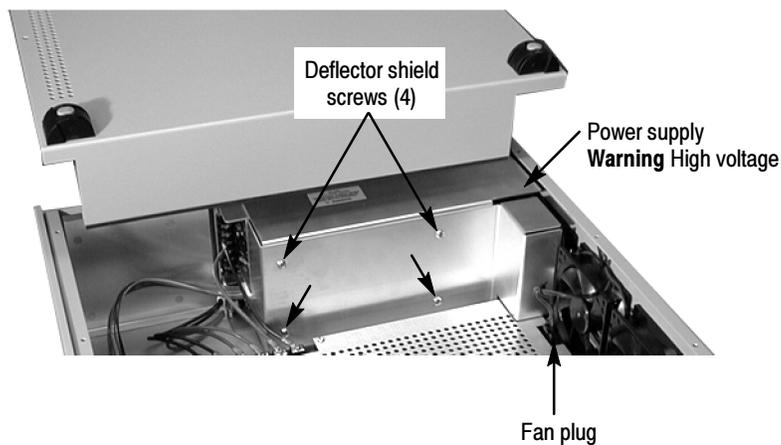
Fan plug

Figure 5-23: Remove the bottom cover

Removing a Fan

1. If you are replacing the fan behind the power supply, remove the screws and deflector shield from the power supply shield. If not, skip to step 2.

2. Disconnect the fan plug by pressing the release tab on the fan plug.

3. Cut the two cable ties that bundle the fan wires together.
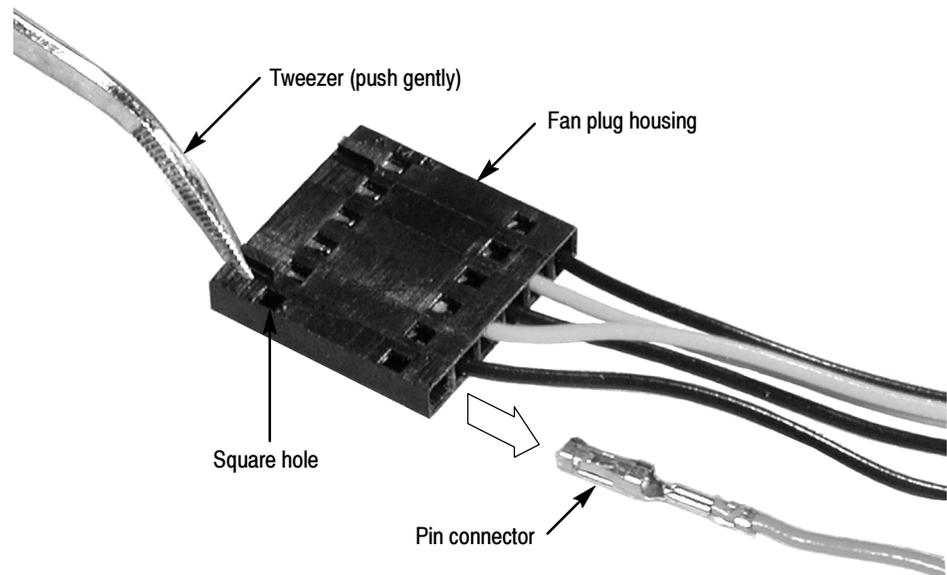
Figure 5--24: Remove the pin connectors

4. Remove the fan pin from the fan plug housing (see Figure 5--24) by following steps a through c:

   a. Using a dental pick (or tweezer point), place the tool point in the top square hole of the fan plug housing.

   b. Gently press and slide the pin a little with the tool point. This small movement releases the pin from the fan plug housing.

⚠️ *CAUTION. To prevent damage to the fan pin and the fan plug, do not gouge at the pin with the tool point.*

   c. Gently slide the pin from the fan plug housing using your hand. The pin removal procedure may take a couple of tries, unless you are experienced with pin removal.

5. Remove the rivets, fan guard, and fan from the preprocessor unit. When removing the rivets, pull the rivet center pin halfway out and then remove the whole rivet assembly.

NOTE. *To prevent a loose-rivet fastener, you may want to replace the rivets after each removal and replacement operation. The rivets also become difficult to reinsert after one use because of an expanded rivet tip.*

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6. Remove the fan from the preprocessor unit.
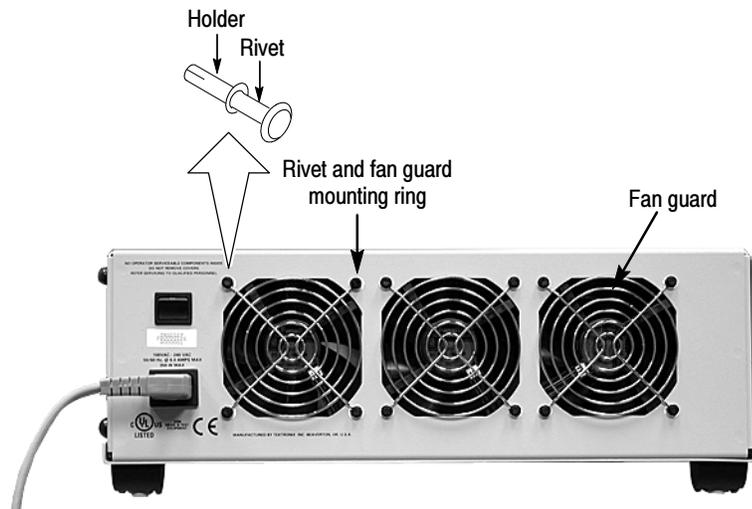
Figure 5‑25: Back of the preprocessor unit

Installing a Fan
1. Position the writing on the new fan hub to point toward the back of the preprocessor unit.

2. While holding the rivet assembly, pull the rivet pin halfway out of the rivet assembly. Insert the rivet assembly into the fan grill mounting ring, preprocessor unit and fan holes (see Figure 5‑25).

3. Press the rivet pin into the rivet assembly.

4. Repeat steps 2 and 3 to install the other rivets.

5. Slide and snap the new fan pin into the fan plug housing (see Figure 5‑24). Gently pull on the fan pin to insure the fan pin has seated in the fan plug housing.

Dress the fan wires through
the center fan notch
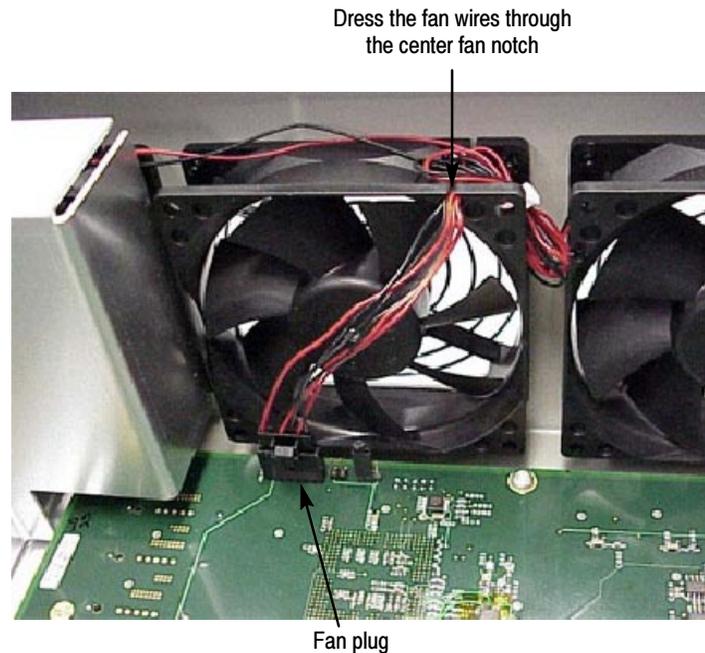
Fan plug

Figure 5-26: Location of fan plug

6. Connect the fan plug to the Logic board (see Figure 5-23 on page 5-16).

7. Dress the fan wire over the top of the fans and through the notch on the top of the center fan (see Figure 5-26).

8. Attach two cable ties to the bundle of fan wires securing the fan wires in place.

9. Attach the bottom cover to the preprocessor unit using the attaching screws (see Figure 5-22 on page 5-16).

10. Turn the preprocessor unit right-side up.

11. Plug the AC power cord into the preprocessor unit.

12. Power on the preprocessor unit and check that the fans are rotating.

If the replaced fan is not working:

■ Check that the fan pin is seated properly in the fan plug housing.

■ Check that the fan plug has snapped in place.

Replaceable Parts List

Replaceable Parts List

This section contains a list of the replaceable components or modules for the TMSSP1 478-Pin Socket Hardware Support package.

Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number

- Instrument type or model number

- Instrument serial number

- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Module Servicing   Modules can be serviced by selecting one of the following three options. Contact your local Tektronix service center or representative for repair assistance.

Part Number Revision Level   Tektronix part numbers contain two digits representing the revision level of the part. For some parts in this manual, you will find the letters XX in place of the revision level number.

Part Number Revision Level   Revision Level May Show as XX

670-7918-03   **670-7918-XX**

When you order parts, Tektronix will provide you with the most current part for your product type, serial number, and modification (if applicable). At the time of your order, Tektronix will determine the part number revision level needed for your product, based on the information you provide.

Module Exchange. In some cases you may exchange your module for a remanufactured module. These modules cost significantly less than new modules and meet the same factory specifications. For more information about the module exchange program, call 1-800-833-9200. Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices: www.tektronix.com.

Module Repair and Return. You may ship your module to us for repair, after which we will return it to you.

New Modules. You may purchase replacement modules in the same way as other replacement parts.

Using the Replaceable Parts List

This section contains a list of the mechanical and/or electrical components that are replaceable for the TMSSP1 478-Pin Socket Hardware Support package. Use this list to identify and order replacement parts. The following table describes each column in the parts list.

Parts list column descriptions

Column	Column name	Description
1	Figure & index number	Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.
2	Tektronix part number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entry indicates the part is good for all serial numbers.
5	Qty	This indicates the quantity of parts used.
6	Name & description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.
7	Mfr. code	This indicates the code of the actual manufacturer of the part.
8	Mfr. part number	This indicates the actual manufacturer's or vendor's part number.

Abbreviations   Abbreviations conform to American National Standard ANSI Y1.1–1972.

Mfr. Code to Manufacturer Cross Index   The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

Manufacturers cross index

Mfr. code	Manufacturer	Address	City, state, zip code
75915	LITTELFUSE INC	800 E NORTHWEST HWY	DES PLAINES, IL 60016-3049
06915	RICHCO	5825 N TRIPP AVE~P.O. BOX 804238	CHICAGO, IL 60646
0ADN8	DELTA PRODUCTS CORP-DPZ	4405 CUSHING PARKWAY	FREMONT, CA 94538
0C5R7	ALCOA FUJIKURA LTD	170 RIDGEVIEW CIRCLE	DUNCAN, SC 29334
0D1M6	NMB TECHNOLOGIES CORPORATION	9730 INDEPENDENCE AVE	CHATSWORTH, CA 91311
0J9P9	GEROME MFG CO INC	PO BOX 737~403 NORTH MAIN	NEWBERG, OR 97132
0KB01	STAUFFER SUPPLY CO	810 SE SHERMAN	PORTLAND, OR 97214-4657
26742	METHODE ELECTRONICS INC	7444 WEST WILSON AVE	CHICAGO, IL 60656-4548
2K262	BOYD CORPORATION	6136 NE 87TH AVENUE	PORTLAND, OR 97220
54407	POWER-ONE INC	740 CALLE PLANO	CAMARILLO, CA 93010
5Y400	TRIAX METAL PRODUCTS INC	1880 SW MERLO DRIVE	BEAVERTON, OR 97006
7W718	MARQUARDT SWITCHES	2711 ROUTE 20 EAST	CAZENOVIA, NY 13035
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR~PO BOX 500	BEAVERTON, OR 97077-0001
TK1547	MOORE ELECTRONICS INC	19500 SW 90TH CT~PO BOX 1030	TUALATIN, OR 97062
TK2548	XEROX CORPORATION	14181 SW MILLIKAN WAY	BEAVERTON, OR 97005
TK2565	VISION PLASTICS INC	26000 SW PARKWAY CENTER DRIVE	WILSONVILLE, OR 97070
TK6121	TUMBLER CORP	4241 BUSINESS CENTER DR	FREMONT, CA 94538

Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
6-1-1	672-5579-50			1	CIRCUIT BD. ASSEMBLY; CABLE INTERFACE/478 PIN PROBE W/CABLES;TMSSP1,TESTED	80009	672-5579-50
-2	211-0315-00			6	SCR,ASSEM WSHR; 4-40 X 0.437,PHN,STL CD PL POZ	0KB01	211-0315-00
-3	343-1686-00			1	CLAMP,CABLE; 64 MICRO INCHES;PLASTIC;DELRIN,WHITE	TK2565	343-1686-00
-4	343-1687-00			1	CLAMP,CABLE, STRAIN RELIEF; PLASTIC; DELRIN , WHITE	TK2565	343-1687-00
-5	407-4921-00			1	BRACKET, HEAT SINK, RIGHT, STAINLESS STEEL, .036", 20 GAUGE	0J9P9	407-4921-00
-6	211-0007-00			2	SCREW,MACHINE; 4-40 X 0.188,PNH,STL CD PL,POZ	0KB01	211-0007-00
-7	407-4922-00			1	BRACKET, HEAT SINK, LEFT, STAINLESS STEEL, .036", 20 GAUGE	0J9P9	407-4922-00
-8	344-0589-00			2	CLIP; SPRING,PROBE RETAINER,SST;TMSSN1	5Y400	344-0589-00
-9	441-2305-00			1	CHASSIS, MAIN, PROBE, 304 STAINLESS STEEL, 036", 20 GUAGE (DT)	0J9P9	441-2305-00
-10	441-2310-00			1	CHASSIS,MAIN; PROBE,304 SST,0.036,20 GAUGE,SAFETY CONTROLLED (SV)	0J9P9	441-2310-00
-11	441-2306-00			1	CHASSIS, FRONT, PROBE, 304 STAINLESS STEEL, .036", 20 GAUGE (DT)	0J9P9	441-2306-00
-12	441-2311-00			1	CHASSIS,FRONT; PROBE,304 SST,0.036,20 GAUGE,SAFETY CONTROLLED (SV)	0J9P9	441-2311-00
					STANDARD ACCESSORIES		
-13	214-4999-00			1	HEAT SINK,SEMIC:IC,PROCESSOR,FOLDED FIN HEAT SINK,W/FAN,FOR INTEL® PENTIUM 4™ PROCESSOR	0C5R7	ITTS-1028
	071-1136-XX			1	MANUAL,TECH; INSTRUCTION, HARDWARE;TMSSP1,DP	TK2548	071-1136-XX
	161-0104-00			1	CA ASSY,PWR:3,18 AWG,98 L,250V/10AMP,98 INCH,RTANG,IEC320,RCPT X STR,NEMA 15-5P,W/CORD GRIP	TK6121	ORDER BY DE-SCRIPTION
					OPTIONAL ACCESSORIES		
	----------			16	P6860 PROBE	80009	ORDER BY DESCRIPTION
	161-0104-05			1	CA ASSY,PWR:3,1.0MM SQ,250V/10A,2.5 METER,RTANG,IEC320,RCPT,AUSTRALIA,SAFTEY CONTROLLED	TK1373	ORDER BY DESCRIPTION
	161-0104-06			1	CA ASSY,PWR:3,1.0MM SQ,250V/10A,2.5 METER,RTANG,IEC320,RCPT,EUROPEAN,SAFTEY CONTROLLED	TK1373	ORDER BY DESCRIPTION
	161-0104-07			1	CA ASSY,PWR:3,1.0MM SQ,240V/10A,2.5 METER,RTANG,IEC320,RCPT X 13A,FUSED,UK PLUG,(13A FUSE),UK PLUG,(13A FUSE),UNITED KINGDOM,SAFTEY CONTROL	TK2541	ORDER BY DESCRIPTION
	161-0167-00			1	CA ASSY,PWR:3,0.75MM SQ,250V/10A,2.5 METER,RTANG,IEC320,RCPT,SWISS,NO CORD GRIP,SAFTEY CONTR	S3109	ORDER BY DESCRIPTION
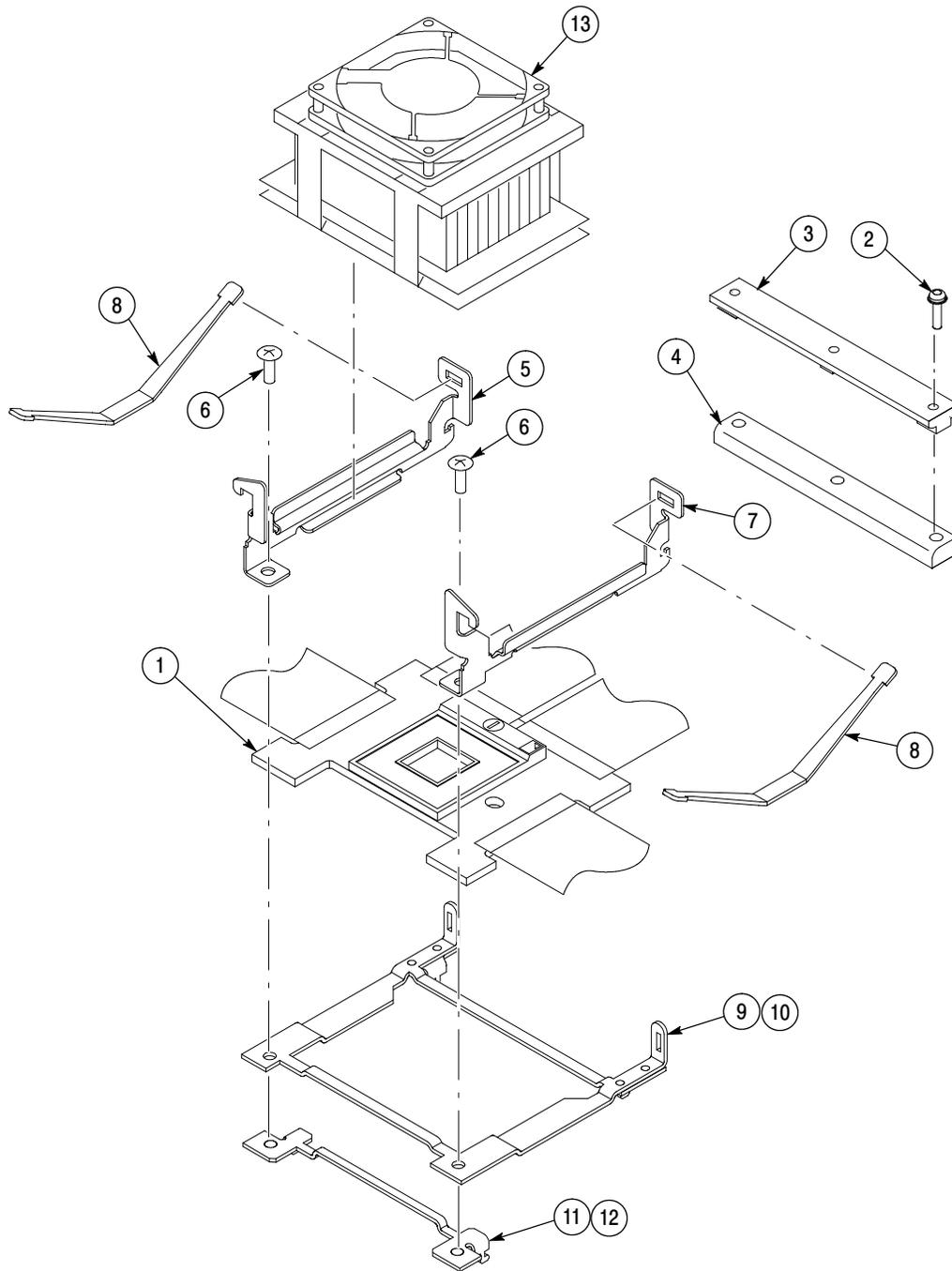
Figure 6-1: IA32G8 probe adapter exploded view

Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
6-2-1	671-5559-00			1	CIRCUIT BD ASSY; PRE-PROCESSOR, WIRED;TMSSP1	80009	671-5559-00
-2	174-2699-00			1	CA,ASSY SP:DISCRETE,SLDR/CRIMP,26 AWG,10.0 L,1 X 2,0.1 CTR RCPT X GRN LED	TK1547	174-2699-00
-3	210-0390-00			12	RIVET,SNAP:0.501 LONG,WHEN INSTALLED,BLACK,NYLON,SR-4100B	06915	SR-4100B
-4	119-5832-00			1	FILTER,RFI:LINE FILTER,6A,50/60 HZ,115/260 VAC,LEAKAGE CURRENT 0.4MA AT 250VAC/60HZ,06GENG	0ADN8	06GENG3E
-5	260-1961-00			1	SWITCH,ROCKER:DPST,6(4)A,250V UL APVD	7W718	1802.1121
-6	212-0023-00			14	SCREW,MACHINE:8-32 X 0.375,PNH,STL CD PL,POZ	93907	ORDER BY DESCRIPTION
-7	348-0430-00			4	BUMPER,PLASTIC:POLYURETHANE,BLACK	2K262	ORDER BY DESCRIPTION
-8	131-4356-00			6	CONN,SHUNT:SHUNT/SHORTING,FEMALE,1 X 2,0.1 CTR,0.63 H,BLK,W/HANDLE,JUMPER,30 GOLD,	26742	9618-302-50
-9	119-5637-00			1	POWER SUPPLY; 375W,CUSTOM AC-DC;85-264VRMS 47-63HZ IN,+5V@40A,5V@3A,+12V10A,12V@6A,ACTIVE PFC,300 LFM AIR REQ'D;OPEN FRAME,9 X 5 X 2.5 INCH;SAFETY CONTROLLED	54407	PFC375-4000
-10	211-0538-00			6	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL CD PL,POZ	93907	ORDER BY DESCRIPTION
-11	119-5935-00 †			3	FAN,TUBEAXIAL:DC,12V,0.15 A,1.8 W,48CFM,2450 RPM,30 DBA,SLEEVE,92MM X 92MM X 26 MM,10.6 LEAD,	61058	FBA09A12M1A
-12	378-0454-00 †			3	GUARD,FAN:4 POSITION,	0D1M6	055013
-13	212-0070-00			2	SCREW,MACHINE:8-32 X 0.312,FLH,100 DEG,STL CD PL,POZ	0KB01	ORDER BY DESCRIPTION
-14	211-1050-00			2	SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15	0KB01	OBD
-15	671-5604-00			1	CIRCUIT BD ASSY; MEZZANINE,389-3403-00 WIRED	80009	671-5604-00
---	159-5010-00			7	FUSE,SMD; 7A,125V,FAST BLOW,0.1 X 0.1X 0.24;UL REG,CSA CERT,SAFETY CONTROLLED	75915	451007

† **Replace the snap rivets whenever you replace a fan or fan guard.**
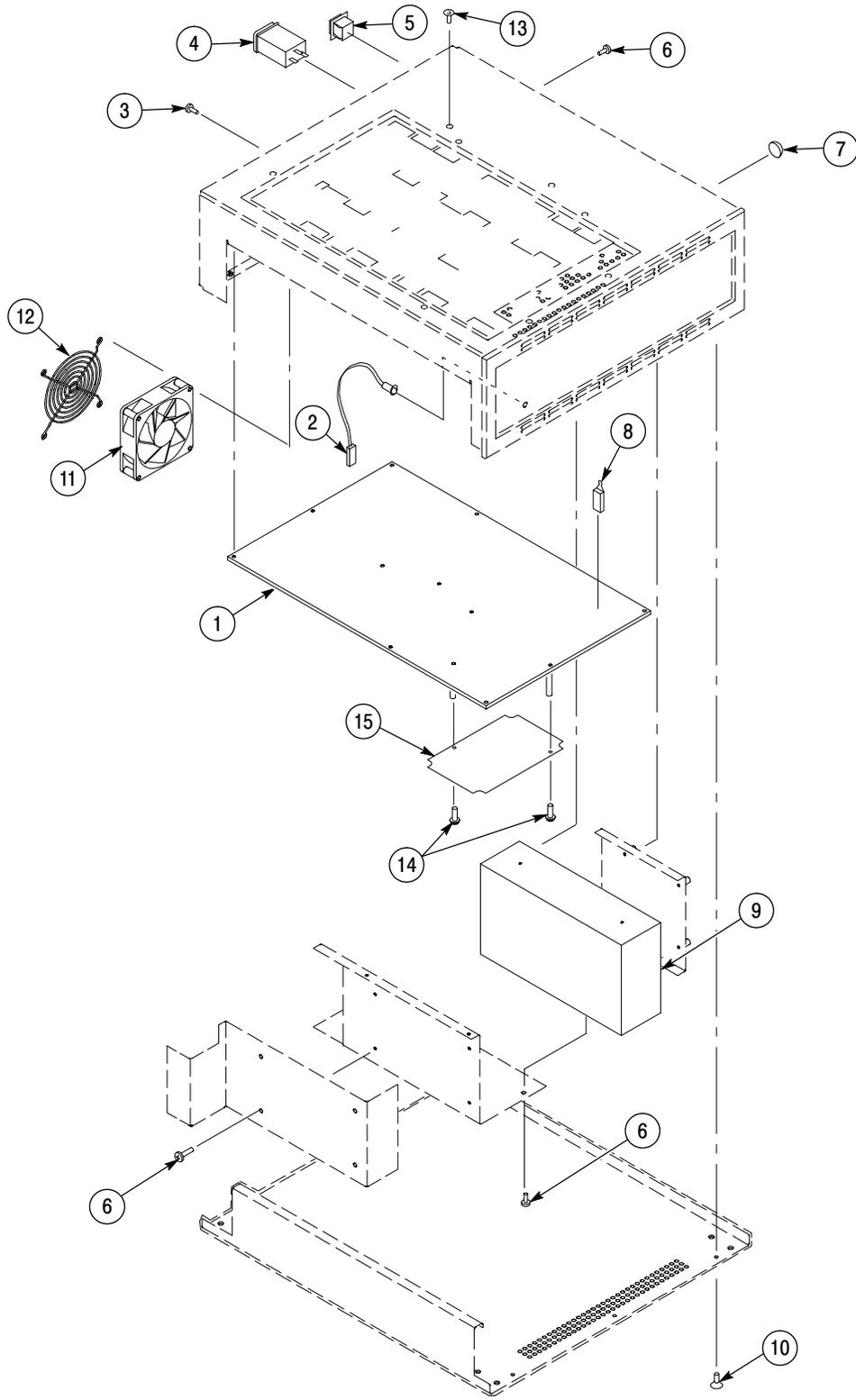
Figure 6-2: Preprocessor unit exploded view

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