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Instruction Manual

Tektronix

TMSSY1 and TMSMD1
479-Pin PGA Mobile Socket Hardware Supports

(Includes installation instructions for the TMSMPH1, TMSMPH2, and TMSMPH3 probe heads)

071-1605-00

www.tektronix.com

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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.

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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:

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

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Preface

This instruction manual contains specific information about the TMSSY1 and TMSMD1 479-Pin PGA Mobile Socket support packages 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, you need only this instruction manual to set up and run the support package.

If you are not familiar with operating microprocessor support packages on your logic analyzer, you may need to supplement this instruction manual with microprocessor support package basic operation information in the Tektronix logic analyzer online help.

Manual Conventions

This manual uses the following conventions:

- The phrase “information on basic operations” refers to information in the Tektroninx logic analyzer online help.
- The term “LAI” is an acronym for Logic Analyzer Interface.
- The term “interposer” refers to the probe head that is located between the target system and the microprocessor for the purpose of aquiring signals for circuit analysis.

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Getting Started

This section contains information about configuring the probe adapter for the TMSSY1 and TMSMD1 support products.

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 is connected to the probe head. Signals from the microprocessor-based system flow through the probe adapter, the probe cables, and then to the logic analyzer.

Software

The following software acquires signals for viewing state and timing signals. Software included with the TMSSY1 and TMSMD1 479-Pin PGA Mobile Socket probe adapter is:

PUB32G13	TMSSY1 product acquires state and timing signals with three or four modules (800 MT/s)
PUB32G14	TMSMD1 product acquires state signals with three modules (533 MT/s)

NOTE. *The TMSSY1 and TMSMD1 products are compatible with the TMS130 software package and the TMSMD1 product is compatible with the TMS129 software package. These software support packages are available only to customers with a valid, restricted, and secret nondisclosure agreement (RS-NDA) with Intel.*

Probe Adapters

The TMSSY1 probe adapter product includes only the preprocessor unit and not a probe head, but is compatible with the TMSMPH1, TMSMPH2, and TMSMPH3 probe heads.

The TMSMD1 probe adapter product includes a preprocessor unit and the TMSMPH1 probe head. The TMSMD1 preprocessor unit is not compatible with any other probe head.

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Logic Analyzer Configuration

To use the probe adapter to acquire state signals, you need a Tektronix logic analyzer equipped with a minimum of three, 136-channel, 235 MHz merged modules. To also acquire timing signals, you need four, 136-channel, 235 MHz merged modules.

The modules must be configured and merged as shown in Figure 1. The memory depth is chosen automatically based on the shallowest memory depth of the four modules.

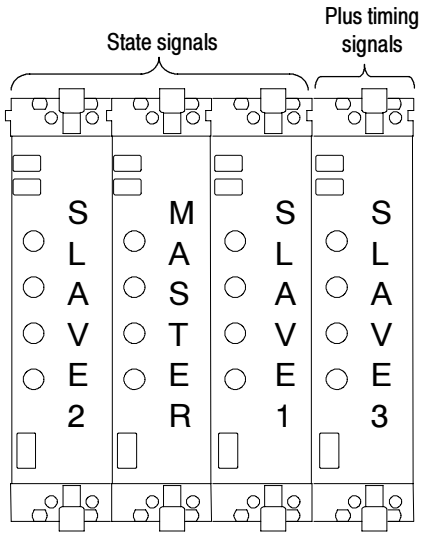


Figure 1: Master and Slave module configuration

Figure 1 shows the configuration for a 3- or 4-wide module merge.

P6960 Probes

You can use the TLA7AXX, 235 MHz logic analyzer modules and the P6960 probes to connect the TMSSY1 or TMSMD1 probe adapters.



CAUTION. *To prevent damage to the P6960 connectors on the preprocessor unit, we recommend that you use the strain relief method that is described in the* P6960 and P6980 High-density Logic Analyzer Probes with D-Max Probing Technology Design Guide, *Tektronix part number 071-1521-XX, after connecting the P6960.*

You can access the *P6960 and P6980 High-density Logic Analyzer Probes with D-Max Probing Technology Design Guide* from the Tektronix.com Web site. You can also find information about the P6960 probes in the Tektronix logic analyzer online help.

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For general information on connecting the P6960 Probes from the Tektronix logic analyzer modules to the preprocessor unit, see page 14.

Labeling P6960 Probes

The probe adapter relies on the default channel mapping and labeling scheme for the probes. Apply labels using the instructions described in *P6960 High Density Differential Logic Analyzer Probe with D-Max Probing Technology Labeling and Installation,* Tektronix part number 071-1539-XX. This manual can be accessed from the Tektronix Web site.

LAI Cables

You can use the TLA7AXX, 235 MHz logic analyzer modules and the logic analyzer interface (LAI) cables to connect to the TMSSY1 and TMSMD1 probe adapters. The LAI cables (Tektronix part number 012-1661-XX) are specifically designed for use with the TMSSY1 and TMSMD1 probe adapters.

For more information on connecting your LAI cables to the preprocessor unit, see page 14.

Labeling LAI Cables

To apply labels to the LAI cables, see page 13.

Replaceable Parts and Accessories

A complete list of standard and optional accessories is provided in the *Replaceable Parts List* on page 36.

Probe Adapter Review

Along with the TMSSY1 and TMSMD1 instruction manual, the Tektronix logic analyzer online help includes additional microprocessor basic support information.

Review electrical, environmental, and mechanical specifications in the *Specifications* section on page 23 as they pertain to the target system, as well as the following information.

System Clock Rate

The TMSSY1 product can acquire data from the microprocessor operating at speeds of up to 200 MHz. The TMSMD1 product can acquire data at speeds up to 133 MHz. Contact your Tektronix sales representative for current information on the fastest devices supported.

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Acquisition before Reset If data is acquired just before a power-on reset signal is observed by the target system, the data acquired by the logic analyzer will be inaccurate.

Data Bus The TMSSY1 and TMSMD1 probe adapters support only a quad-pumped data bus.

Address Bus The TMSSY1 and TMSMD1 probe adapters support 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 so that they are acquired and displayed and correctly disassembled.

Connecting the Logic Analyzer to a Target System

The TMSSY1 and TMSMD1 products each come with three different heat sink attachment kits. Use Table 1 to determine which attachment kit to use for your platform.

Read the following instructions before removing or installing parts.



WARNING. *To prevent static damage to the microprocessor, the probe adapters, 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.*

To prevent harm to yourself or damage to the preprocessor unit, do not open 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.



CAUTION. *To prevent damage to the product when storing or shipping, retain the the cardboard cartons and packing material shipped with the probe adapter, and the case for the probe head.*

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You must allow airflow clearance for the preprocessor unit. Refer to the dimensions on page 27 for the required clearance.

Tools

Following is a list of required tools:

- **Required.** Use a flatbladed screwdriver (0.1-in tip width) to tighten the probe head to the target system.
- **Optional.** A torque wrench helps to ensure reliable connections by meeting the nominal torque values that may be listed in these instructions. When attaching screws to the probe head use 2 in-lbs (0.226 Newton meters) of torque, unless stated otherwise.

Connect the Logic Analyzer

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 (preprocessor units) that may be attached to your target system.
3. Remove the heat sink and any retention brackets from the target system.



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 on the bottom of the probe head when the probe head is not in use.*

Spacer Socket

Before attaching your heat sink hardware, refer to the optional *Spacer Socket* on page 11.

Heat Sink Attachment Hardware

4. To install the probe head and heat sink hardware, choose your heat sink attachment kit from Table 1, and then go to the listed figure and follow those steps.

Table 1: Heat sink attachment kits

Target system	Probe head	Heat sink attachment kit	To install, see Figure(s)
Chipcool 1&2 (formerly mobile)	PH1, PH2, PH3	020-2616-XX	2 and 3 (starting on page 6)
Desktop	PH2, PH3	020-2617-XX	4 and 5 (starting on page 8)
Cooler Master	PH3	020-2618-XX	6 (see page 10)

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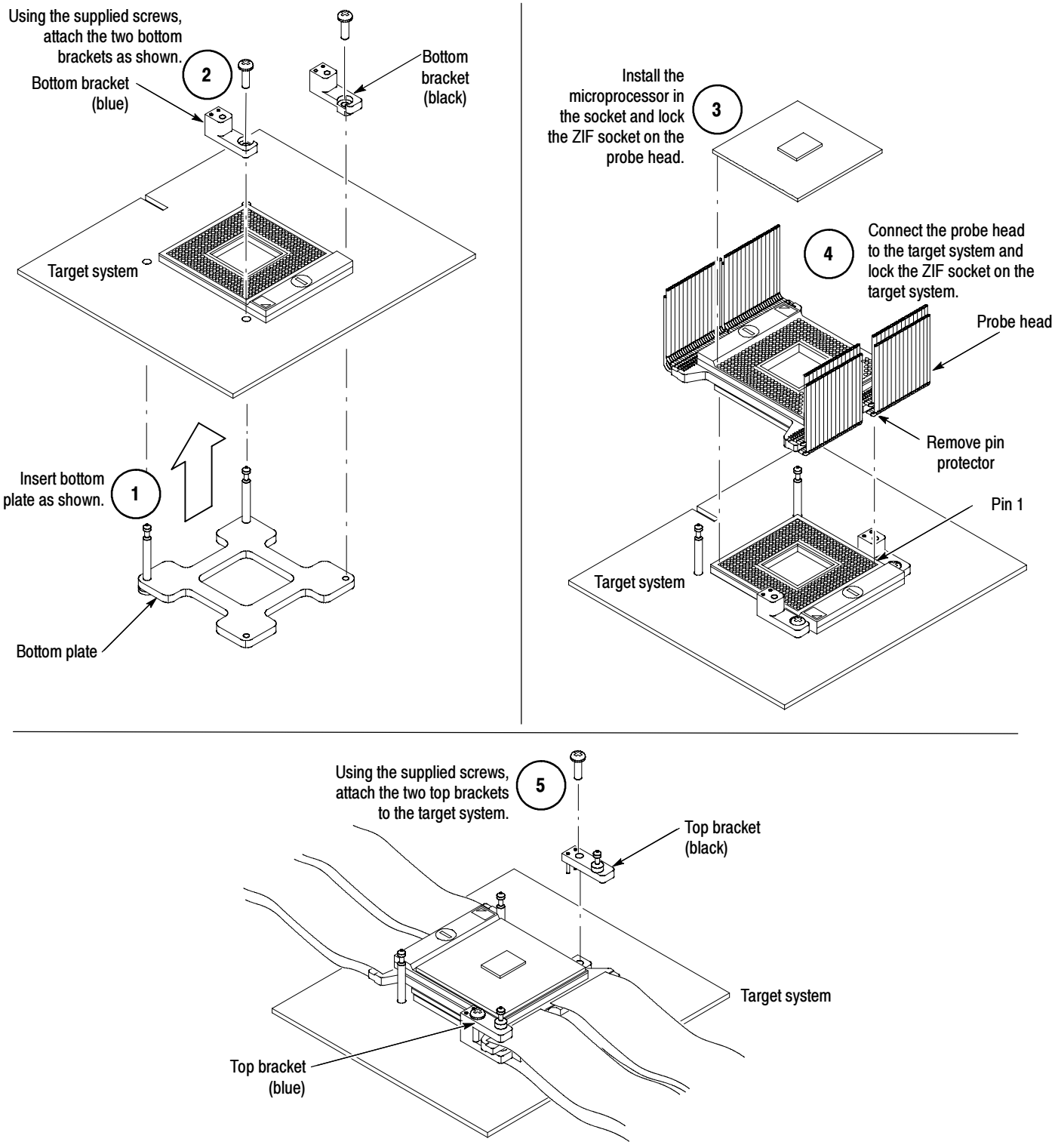


Figure 2: Probe head installation using Chipcool 1 & 2 heat sink hardware

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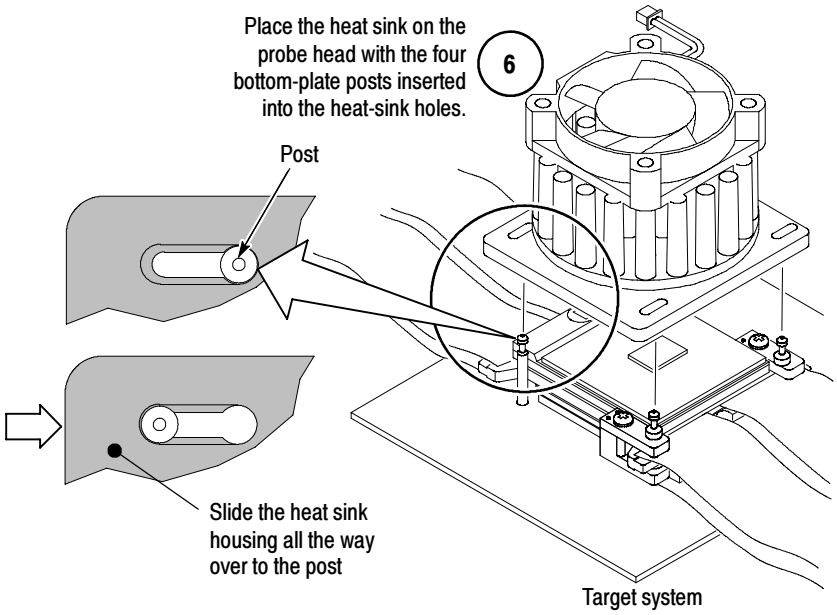


Figure 3: Install heat sink (Chipcool 1 & 2)

Removing the Probe Head from the Target System

Follow these steps to remove the probe head from the target system:

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. Reverse the steps in Figures 2 and 3 on pages 6 and 7 to remove the probe head.
3. Store the probe head in the original packing material.

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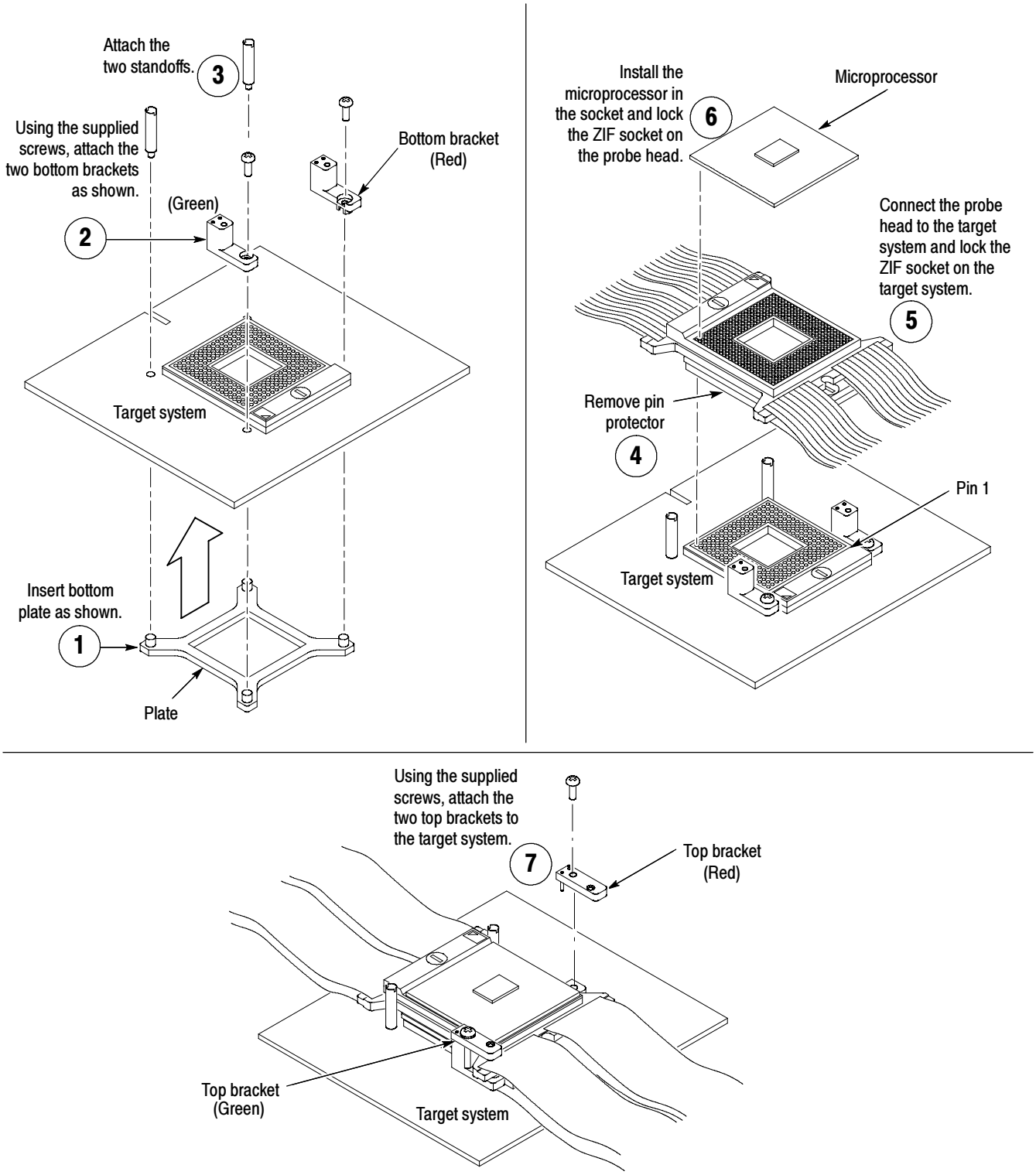


Figure 4: Install probe head using Cool Master heat sink hardware

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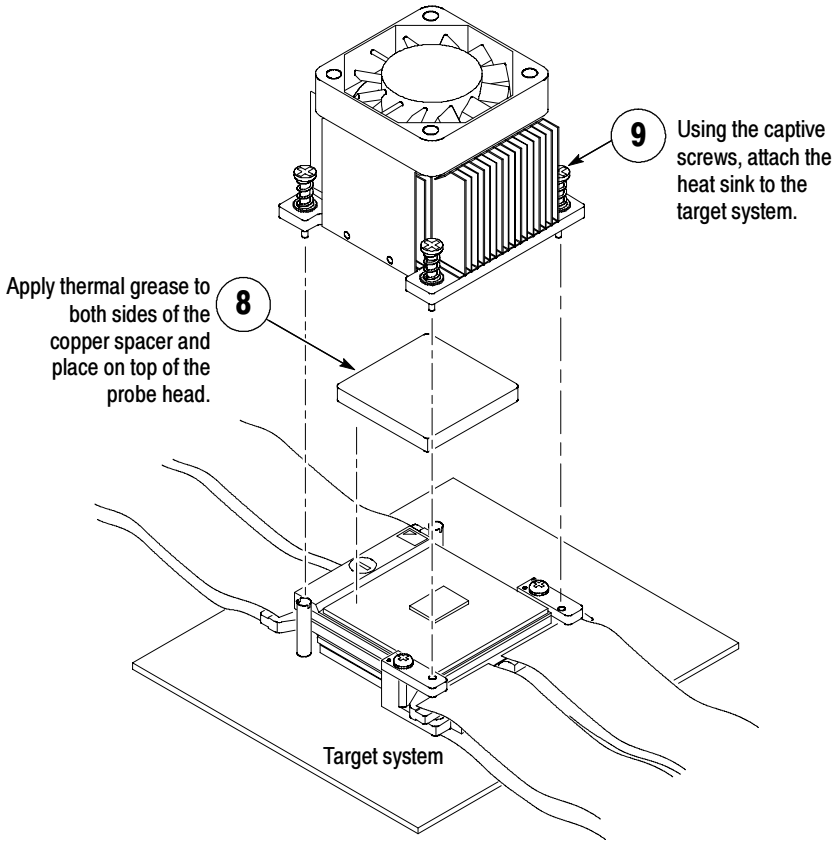


Figure 5: Install heat sink (Cooler Master)

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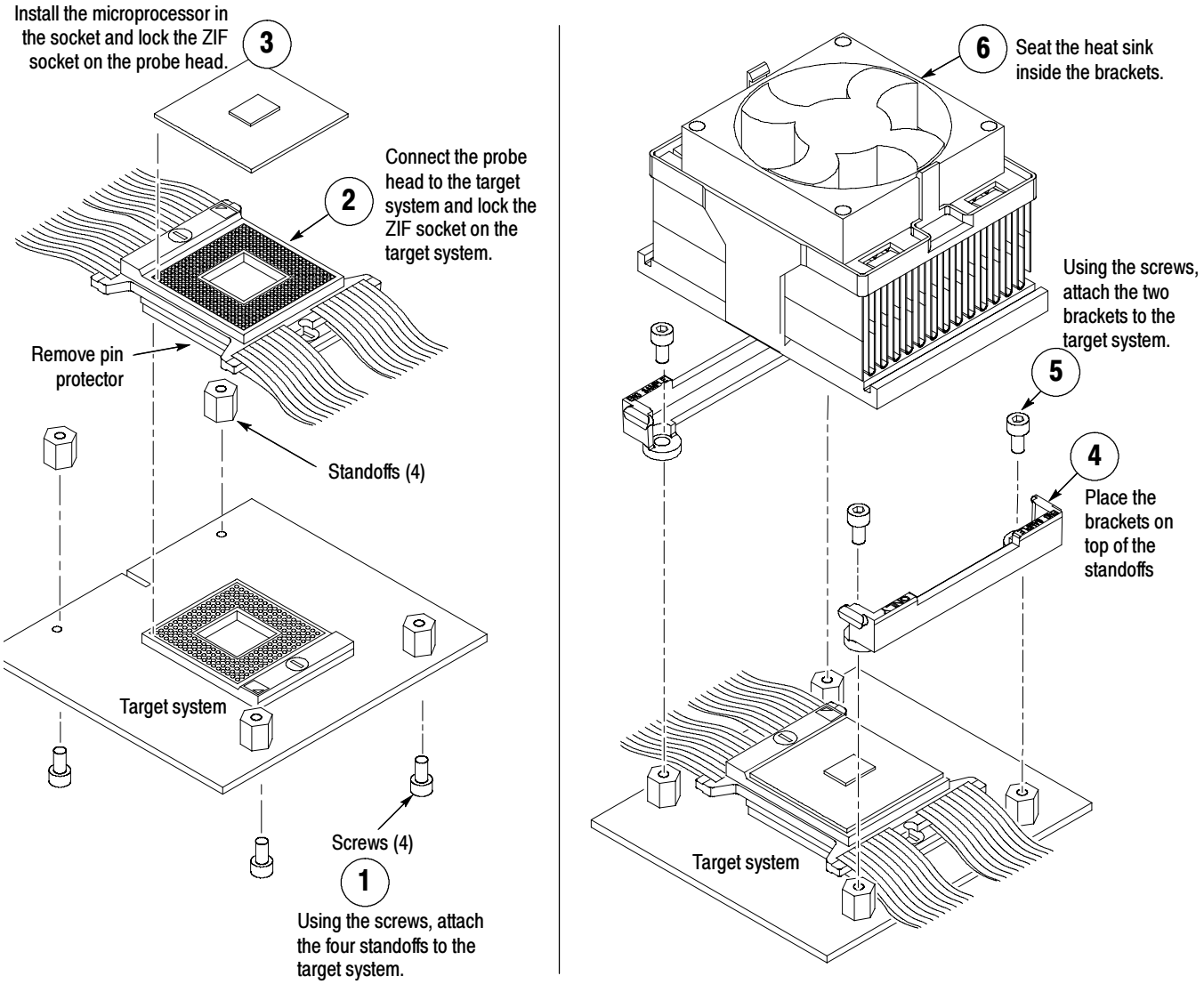


Figure 6: Install probe head using Desktop heat sink hardware

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Optional Spacer Socket

NOTE. *Some target systems may have insufficient electrical margins to use the Spacer Socket. The Spacer Socket is an optional standard accessory and is not intended to be used with a Tektronix heat sink attachment kit. See* Standard Accessories *on page 36 for part number information.*

We recommend that you consider using the Spacer Socket:

- To clear obstructions on the target system; the Spacer Socket raises the probe head 0.250-in above the target socket.
- To prevent damage to the pins on the probe head; the Spacer Socket is less costly and easier to replace.

Following these steps to attach the Spacer Socket:

1. Clip the pins on the Spacer Socket to match the target system pin configuration.
2. Before you attach the probe head to the target system, attach the Spacer Socket to the bottom of the probe head. To correctly seat the Spacer Socket, you may need to apply sufficient force directly over the top of the Spacer Socket with the probe head underneath.

NOTE. *When not in use, attach the pin protector to the bottom of the Spacer Socket.*

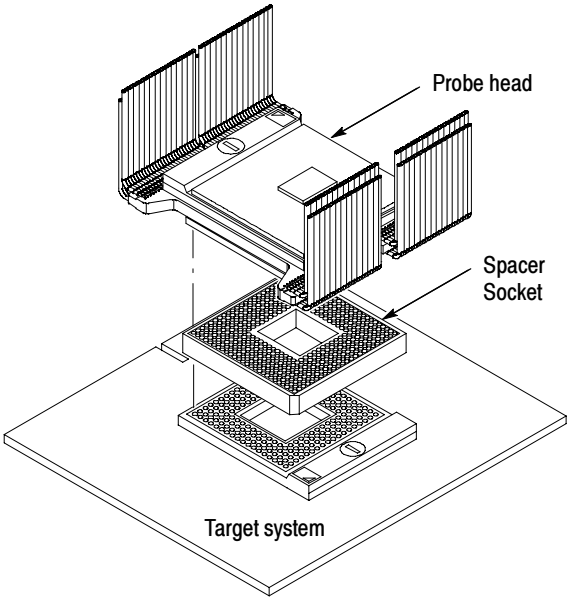


Figure 7: Spacer Socket

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Removing the Spacer Socket

Use the optional Extractor tool to remove the Spacer Socket from the bottom of the probe head. See Figure 8. To purchase this extraction tool (Advanced Interconnections part number 8049), see the *Replaceable Part List* on page 35 for the manufacturers address.

CAUTION. *To prevent damage to the probe head pins, use an extraction tool to remove the Spacer Socket from the bottom of the probe head socket.*

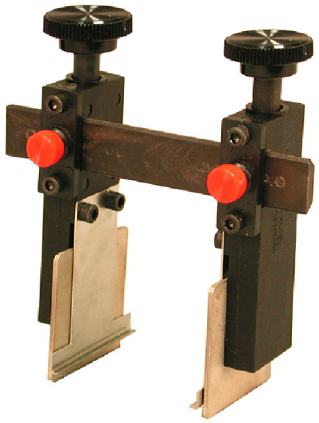


Figure 8: Extraction tool

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Applying LAI Labels

You may need to attach labels to both the module and preprocessor ends of the LAI cables. Read the following note before you begin attaching labels.

***NOTE**. Always use flat-nosed tweezers to remove the labels from the sheet of labels. Never peel labels with your fingers. The labels are made of soft vinyl and can stretch and distort easily. To avoid stretching the label, always grasp it from the top right corner while removing it from the sheet of labels.*

The adhesive on the vinyl labels is extremely strong. Carefully align the label to the indented outline on the module end and preprocessor unit end. Once labels are placed on the LAI cables, they become very difficult to remove.

To attach labels, perform the following steps:

1. Determine which channel groups (shown on the preprocessor unit and module labels) that you are planning to use, and identify the matching labels.
2. Follow the steps in Figure 9 while attaching the labels.

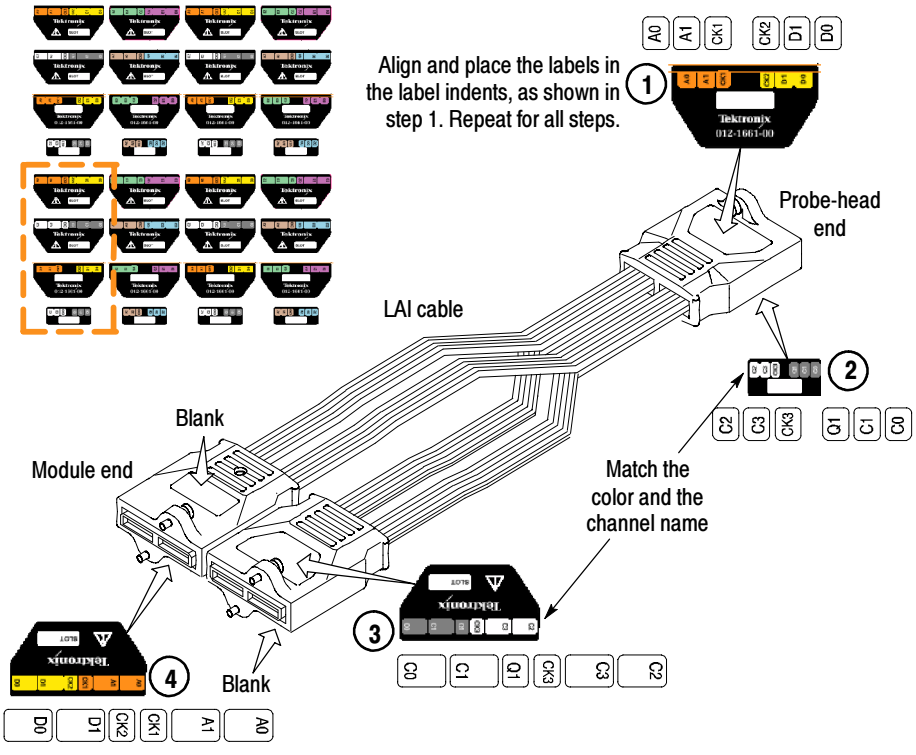


Figure 9: Apply LAI labels

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Connect the Probes and LAI Cables

To configure the P6960 probes and LAI cables for the disassembly and timing support functions, you must determine if you are using a 3-wide or a 4-wide module configuration (see Table 2 on page 15). Then follow the steps on page 15. Figure 10 shows a P6960 probe, an LAI Cable, and a preprocessor unit.

If you need to apply labels to the LAI cables, see page 13.

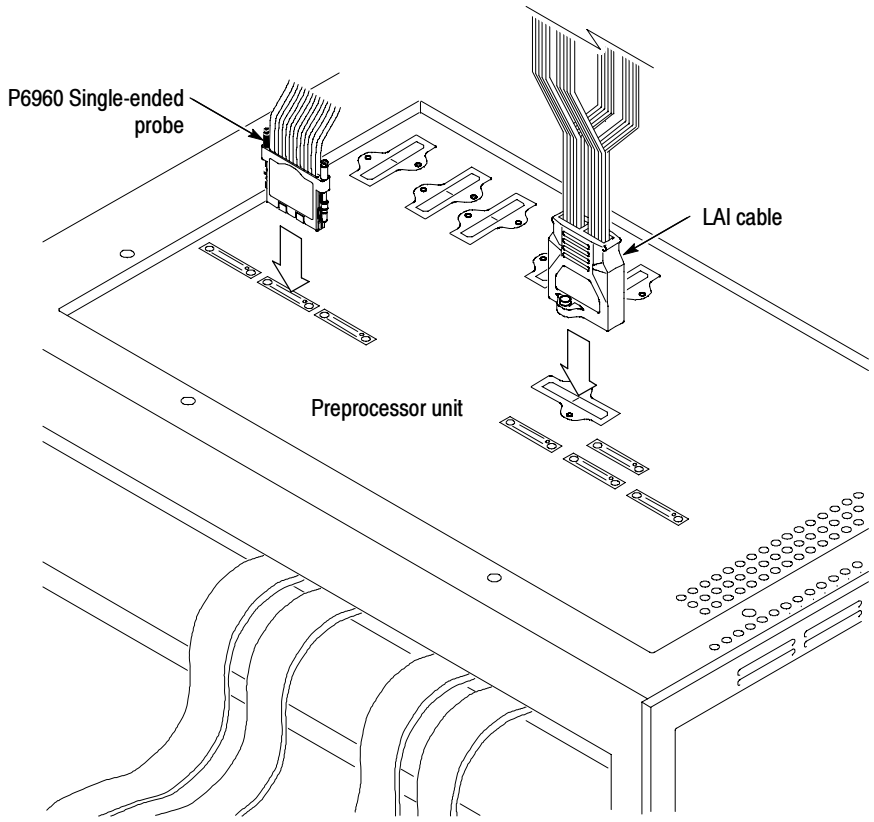


Figure 10: LAI cable, P6960 probe, and preprocessor unit

CAUTION. *To prevent damage to the P6960 connectors on the preprocessor unit, we recommend that you use the strain relief method that is described in the* P6960 and P6980 High-density Logic Analyzer Probes with D-Max Probing Technology Design Guide, *Tektronix part number 071-1521-XX, after connecting the P6960.*

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Table 2 lists the P6960 probe and LAI Cable configurations for a 3-wide or 4-wide module configuration.

Table 2: P6960 probe and LAI cable configurations

Software support	Modules	LAI cables	P6960 probes	Probe adapter acquires
PUB32G14*	3	5 (M,S1,S2)	2 (M)	State signals (TMSMD1 or TMSSY1)
PUB32G13†	4	5 (M,S1,S2)	6 (M,S3)	Timing and state signals (TMSSY1)

* **For the TMS129 software, use this module configuration**

† **For the TMS130 software, use this module configuration**

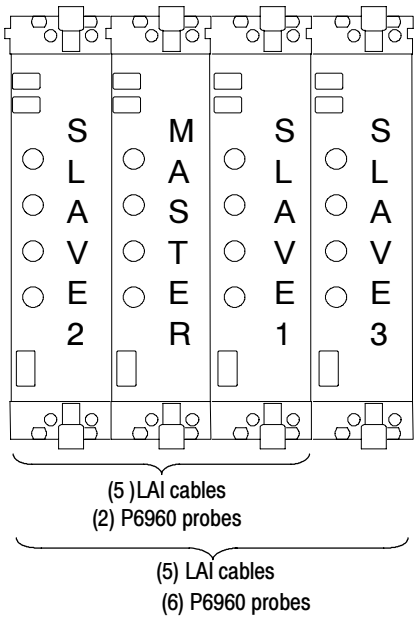


Figure 11: LAI cable, P6960 probe, and module configurations

LAI Cable and P6960 Probe Connections (Three Modules)

1. Match and connect the A, D, C, and E LAI cables from the Master module with the corresponding D3/D2 and A3/A2, D1/D0 and A1/A0, C1/C0 and C3/C2, and E3/E2 and E1/E0 connectors on the preprocessor unit. The LAI cable connector is keyed for correct alignment to the preprocessor unit.
2. Repeat step 1 to match and connect an LAI cable between Slave1 and Slave2 modules and the connectors on the preprocessor unit.
3. Repeat step 1 to match and connect a P6960 probe between the Master module and the connectors on the preprocessor unit.

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CAUTION. *To prevent damage to the P6960 connectors on the preprocessor unit, you must always position the probes perpendicular to the connector on the preprocessor unit. Incorrect handling of the P6960 probe while connecting to or disconnecting from the preprocessor unit can damage the probe or preprocessor unit connector.*

Fourth Module

4. Match and connect the A, D, C, and E P6960 probes from the Master module with the corresponding D3/D2 and A3/A2, D1/D0 and A1/A0, C1/C0 and C3/C2, and E3/E2 and E1/E0 connector on the preprocessor unit.
5. Repeat step 4 to match and connect a P6960 probe between the Slave3 module and the connectors on the preprocessor unit.

NOTE*. For more information about how to attach a P6960 probe to the preprocessor unit, refer to the P6960 probe information on page 2.*

Applying and Removing Power

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

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.
4. Power on the probe adapter at the back of 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.

To remove power from the target system and the probe adapter, reverse the preceding steps. You can skip step 1.

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Logic Analyzer Software Compatibility

Version 4.3 SP1+ logic analyzer software is compatible with the PUB32G13 and the PUB32G14 software.

Installing the Software

Now you are ready to install the software. If you have not used a support product, you may want to refer to information on general tasks and functions in the Tektronix logic analyzer online help or the user manual.

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

To install the software on your Tektronix logic analyzer, follow these steps:

1. Insert the CD-ROM 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 disk.

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

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Care and Maintenance

Before cleaning this product, read the following information:



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.

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.

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 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.*

Fuses

There are no user-replaceable fuses in the preprocessor unit. If the probe adapter is not functioning correctly, contact your Tektronix sales representative.

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Short-Term Storage

Follow steps 1 through 4 for short-term storage of the probe head:



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.

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. To remove the probe head, reverse the probe installation instructions (starting on page 6) that apply to your heat sink attachment hardware.



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

3. Using antistatic nongenerating tape, tape the pin-protector board onto the pin header on the bottom of the probe head.
4. Store the probe head in an antistatic bag.

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Long-Term Storage

Follow these steps using the existing cardboard carton and packaging:

1. Disconnect the preprocessor unit from the logic analyzer by removing the probes and LAI cables from the top of the preprocessor unit.
2. Place the preprocessor unit and probe head in static-shielding bags.



Figure 12: Preprocessor unit and probe head in static-shielding bags

3. Place the foam in the bottom of the cardboard carton.
4. Place the foam end caps on both sides of the preprocessor unit.
5. Place the preprocessor unit in the cardboard carton.



Figure 13: Folded cables

6. Place the probe-head cables carefully over the preprocessor unit.
7. Place foam on top of the preprocessor unit and lay the probe-head cables on top of the foam.

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8. Place the accessory tray in the cardboard carton.
9. Close and tape the cardboard carton.

To ship the probe adapter, refer to *Shipping the Probe Adapter*.

Shipping the Probe Adapter

To commercially transport the TMSSY1 and TMSMD1 probe adapter, package as follows:

1. Use the existing cardboard shipping carton and cushioning material to ship the probe adapter.

   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 a 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

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Specifications

This section contains specifications for the TMSSY1 and TMSMD1 hardware support products.

Circuit Description

The probe adapter hardware uses a custom ASIC to preprocess the 4x (Quad Pumped) Signals 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

All other signals are buffered and amplified in the probe adapter hardware before being captured by the logic analyzer.

Latched Operation

The microprocessor signals are processed in the probe adapter according to their type. Following is a description of each type:

4x Quad-Pumped Signals. These signals include D[63:00]#, DEP[7:0]#, and DBI[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[39:03]# and REQ[4:0]#. The logic analyzer 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 logic analyzer latches these signals using the rising edge of BCLK.

Signal Probing

The TMSSY1 and TMSMD1 probe adapters use passive series isolation to acquire data.

Bus Tracking Logic

The TMSSY1 and TMSMD1 probe adapter uses a bus tracking PAL to aid the disassembly software in linking various bus phases.

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Loading Diagrams

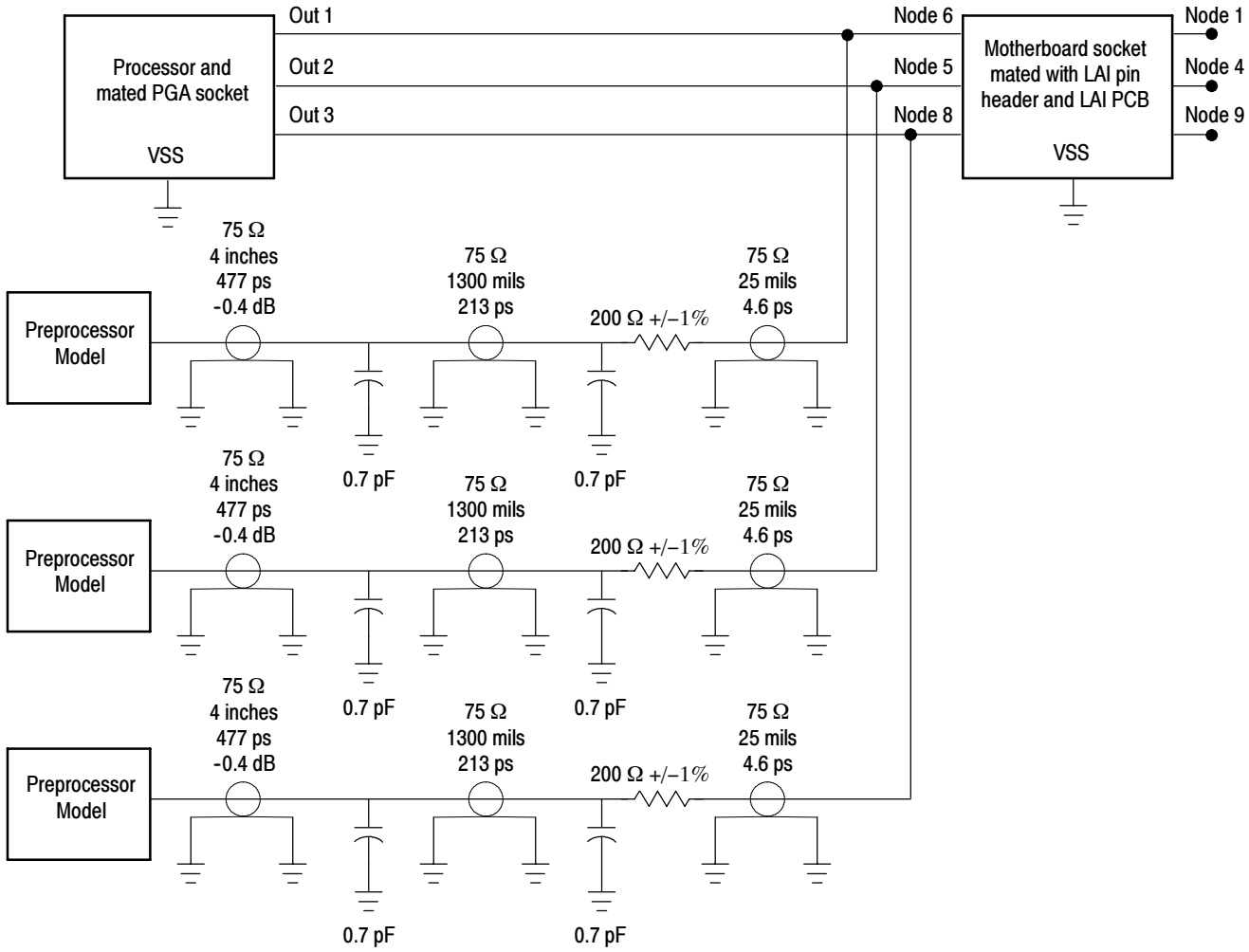


Figure 14: Probe adapter load model for typical signals

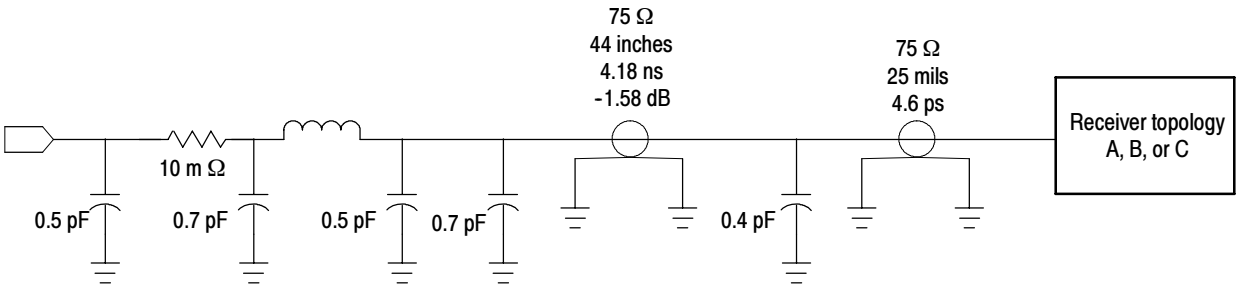


Figure 15: Processor load model for typical signals

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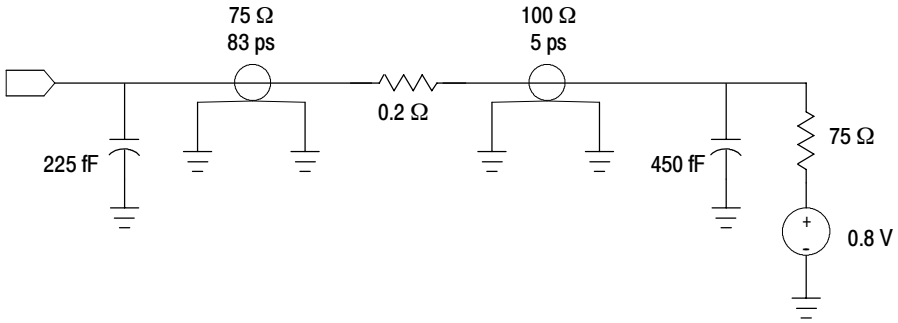


Figure 16: Receiver topology A

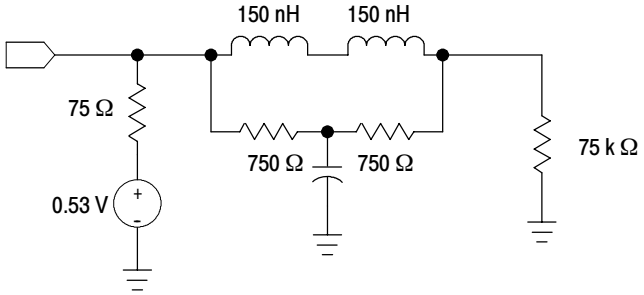


Figure 17: Receiver topology B

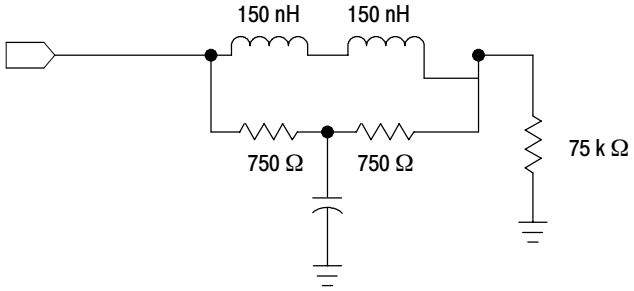


Figure 18: Receiver topology C

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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 200 mV_{p-p} around the GTL+ reference voltage.

Table 3 lists the electrical requirements of the target system. Table 4 on page 27 lists the electrical requirements for the power supply that provides power to the probe adapter. Table 5 on page 27 lists the BCLK timing and electrical specifications. Table 6 on page 27 lists the environmental specifications.

Table 3: Electrical specifications for the target system

Characteristics	Requirements (typical)
DC power requirements	
Voltage, V_{cc}	1.05 V ±5%
Current, GLT_{REF}	I maximum <15 nA, I typical <3 nA at 25 °C
Common clock rate	Maximum 200 MHz
Common clock capture	
Typical - V_{cc} = 1.05 V, V_{REF} = 0.7 V, V_{IH} = $V_{REF,}$ +100 mV, V_{IL} = V_{REF} -100 mV, at 25 °C	
Window	900 ps
T_{su}	900 ps
T_{hd}	0 ps
2x Source-Synchronous capture	
Window	750 ps
T_{su}	375 ps
T_{hd}	375 ps
4x Source-Synchronous capture (DBI disabled)	
Window	550 ps
T_{su}	250 ps
T_{hd}	300 ps

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Table 4: 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 5: BCLK timing and electrical specifications at 25 °C

Characteristics	Minimum	Maximum	Units	Notes
V_{in} (lo) min	-	V_{REF} -100 mV	V	
V_{in} (hi) max	V_{REF} +100 mV	-	V	
Duty Cycle	45	55	%	

Table 6: 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	
Front, top, left side	5.08 cm (2 in)
Back	7.62 cm (3 in)
Bottom, right side	0.635 cm (0.250 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.**

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Table 7: Certifications and compliances

Category	Standards or description	
EC Declaration of Conformity – Low Voltage	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Communities: Essential requirements of the Low Voltage Directive 73/23/EEC, amended by 93/68/EEC	
U.S. Nationally Recognized Testing Laboratory Listing	UL61010B:2003	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	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.
Equipment Type	Test and measuring	
Safety Class	Class 1 (as defined in IEC 61010-1, Annex H) – grounded product	
Overvoltage Category	Mains input: Overvoltage Category II (as defined in IEC 61010-1, Annex J) All other inputs and outputs: 5 V maximum	
Pollution Degree Descriptions	Pollution Degree 2 (as defined in IEC 61010-1). Note: Rated for indoor use only.	

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Dimensions Figure 19 shows the dimensions of the probe head.

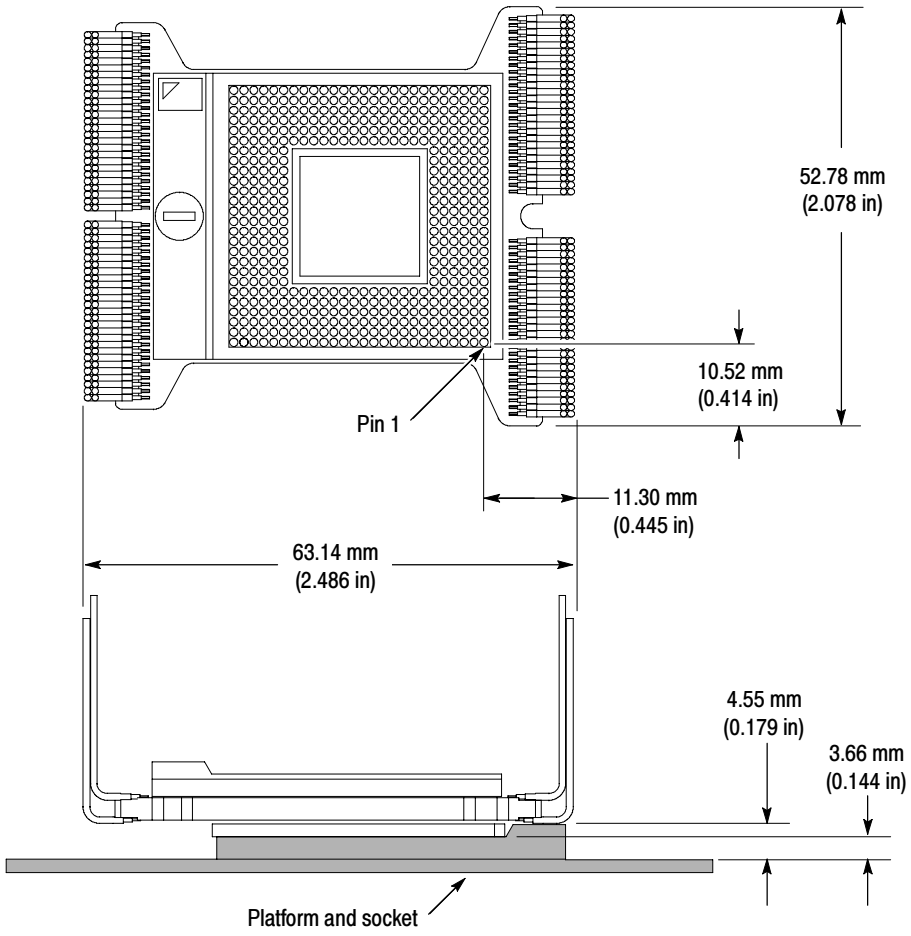


Figure 19: Dimensions of the probe head

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Figure 20 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 6 on page 27 (clearances are not shown in Figure 20).*

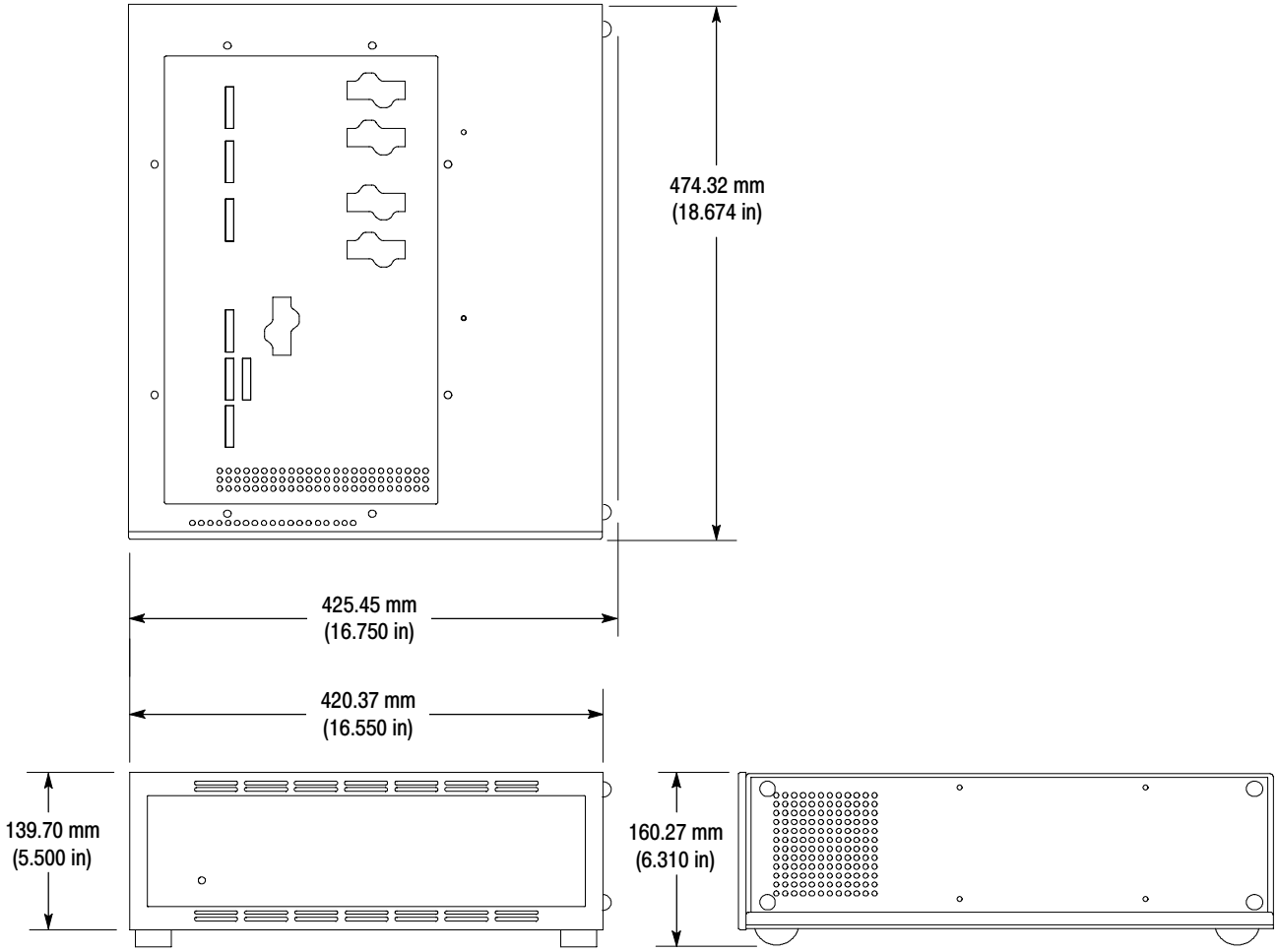


Figure 20: Dimensions of the preprocessor unit

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Reference Tables

You can view TMSSY1 and TMSMD1 reference tables. Viewing a table is not a requirement when preparing the module for use. You can view the reference tables without connecting the TLA to your target system.

- **Channel and Group Definition Tables** — The TMSSY1 and TMSMD1 software automatically defines channel groups. These groups define the channel assignments and the groups for a software support setup. If you want to know what the group definition is for a channel group or which signal is in which channel group, refer to these tables.
- **Symbol Tables** — Symbol files are files of alphanumeric symbol names and associated data values. Symbol files are used to map a channel group value to a text string and/or color. For example, a symbol file could map an address group value to a function name. This is faster and easier to interpret than a numeric value.

***NOTE**. The Color symbol table is not associated with any channel groups.*

Viewing Reference Tables

You must load your support and merge the modules before completing the following steps.

To View Symbol Tables

To view a symbol table using Tektronix logic analyzer software, follow these steps:

1. In the System window under System, select Symbol to display the Symbol window.
2. Select Load to display the Load Symbol File window.
3. Select and right click one of the .tsf files to display the Select menu.
4. Select Open and select the appropriate editor, (Word Pad for example) to view the symbol table.

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To Export Groups

To export a channel group or a group definition table, follow these steps:

1. Open a System window.
2. Select the Setup icon.
3. In the Setup window, open the Window menu and select Setup: <support file name>.
4. In the Setup window under Group Name, select a group.
5. Open File, select Export Channel Setup to display a Channel Setup Export window. Note the Export Path name to locate your exported file later.

   In the Channel Setup Export window under Export Selections, check that the Export Channel Information and the Export Group Information boxes are checked.

   The Field delimiter box controls how the tables are displayed. See the Tektronix logic analyzer online help for more information.
6. Select Export.

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Replaceable Parts List

This section contains a list of the replaceable components or modules for the TMSSY1 and TMSMD1 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.

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Using the Replaceable Parts List

This section contains a list of the mechanical and/or electrical components that are replaceable for the TMSSY1 and TMSMD1 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.

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Manufacturers cross index

Mfr. code	Manufacturer	Address	City, state, zip code
060D9	TENSOLITE COMPANY	PRECISION HARNESS AND ASSEMBLY 3000 COLUMBIA HOUSE BLVD~#120	VANCOUVER, WA 98661
0B445	ELECTRI-CORD MFG CO INC	312 EAST MAIN STREET	WESTFIELD, PA 16950
61638	ADVANCED INTERCONNECTIONS CORP	5 ENERGY WAY, PO BOX 1019	WEST WARWICK, RI 02893-1019
S3109	FELLER U.S. CORPORATION	10B VAN DYKE AVENUE	NEW BRUNSWICK, NJ 08901
TK1373	PATELEC-CEM	10156 TORINO~VAICENTALLO~62/456	ITALY,
TK2548	XEROX CORPORATION	7431 EVERGREEN PARKWAY	HILLSBORO, OR 97124
TK6121	TUMBLER CORP	4241 BUSINESS CENTER DR	FREMONT, CA 94538
80009	TEKTRONIX	14200 SW KARL BRAUN DRIVE P.O. BOX 500	BEAVERTON, OR 97077
65603	ADVANCED INTERCONNECTION TECH	181 FREEMAN AVE	ISLIP, NY 11751

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Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
21-1	672-5903-50			1	CIRCUIT BOARD ASSY; TMSMPH1 BOARD W/CABLES & PADDLE BD; TESTED	80009	672-5903-50
-1	672-5904-50			1	CIRCUIT BOARD ASSY; TMSMPH2 BOARD W/CABLES & PADDLE BOARD;TESTED	80009	672-5904-50
-1	672-5905-50			1	CIRCUIT BOARD ASSY; TMSMPH3 BOARD W/CABLES & PADDLE BD; TESTED	80009	672-5905-50
-2	136-1415-00			1	SOCKET; SPACER,BGA,MALE ADAPTER ASSY,478 POS,CUSTOM,SAFETY CONTROLLED	65603	136-1415-00
					STANDARD ACCESSORIES		
	071-1605-XX			1	MANUAL,TECH; INSTRUCTION,479-PIN SOCKET HARDWARE,PDF ON CD;TMSSY1,TMSMD1	TK2548	071-1605-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 DESCRIPTION
	003-1889-00			1	TOOL, EXTRACTION;PGA SOCKET,TWO-SIDED,19 TEETH PER SIDE;1710-19	61638	003-1889-00
	012-1661-51			7	CA ASSY; INTCON,SHLD RIBBON,MCP,72 L	060D9	012-1661-51
	020-2616-XX			1	ACCESSORY KIT; CHIPCOOL 1 & 2 HEATSINK,JEWEL CASE & HEAT SINK PARTS; TMSMPH1/2	80009	020-2616-XX
	020-2617-XX			1	ACCESSORY KIT; DESKTOP HEATSINK ATTACH, JEWEL CASE & HEAT SINK PARTS; TMSMPH1,TMSMPH2,TMSMPH3	80009	020-2617-XX
	020-2618-XX			1	HEATSINK KIT; COOLER MASTER HEATSINK ATTACH, JEWEL CASE & HEAT SINK PARTS; TMSMPH3	80009	020-2618-XX
					OPTIONAL ACCESSORIES		
	----------*			4-5	P6960 PROBE	80009	ORDER BY DESCRIPTION
	161-0104-14			1	CABLE ASSY,PWR; 3,1.0MM SQ,250V/10A,2.5 METER,RTANG,IEC320,RCPT,AUSTRALIA,SAFETY CONTROLLED, INSULATED PINS	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

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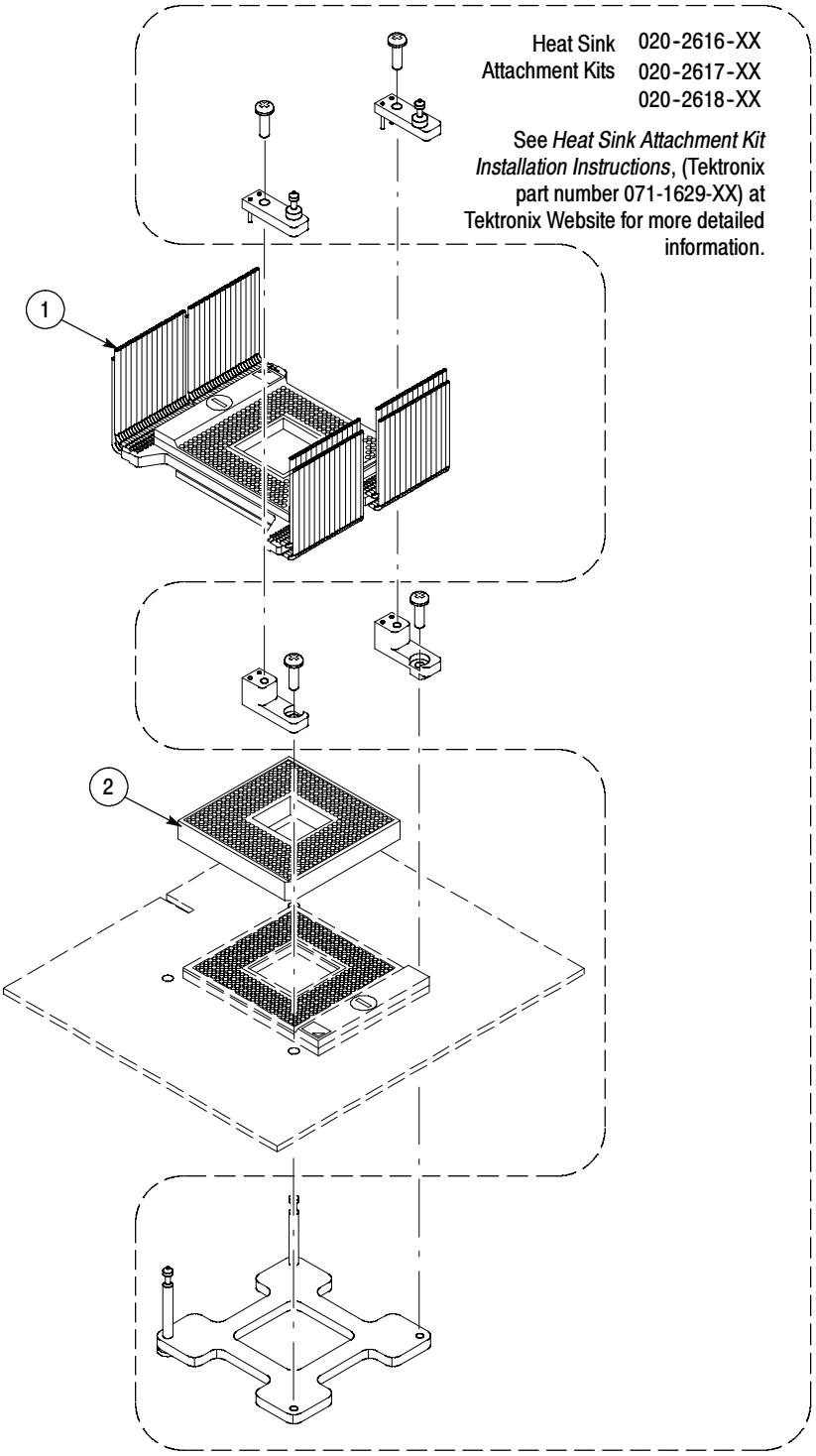


Figure 21: Probe adapter exploded view

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