Instruction Manual

Tektronix

TMS S2A
SC330 Hardware Support

071-0477-01

Warning
The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

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Tektronix, Inc., P.O. Box 1000, Wilsonville, OR 97070–1000

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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.

Connect and Disconnect Properly. Connect the probe output to the measurement instrument before connecting the probe to the circuit under test. Disconnect the probe input and the probe ground from the circuit under test before disconnecting the probe from the measurement instrument.

Ground the Product. This product is indirectly grounded through the grounding conductor of the mainframe 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.

Use Proper AC Adapter. Use only the AC adapter specified for this product.

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.*

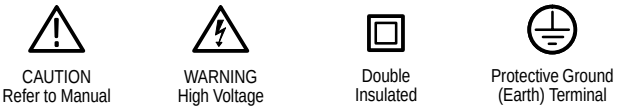
Terms on the Product. These terms may appear on the product:

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:



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 TMS S2A SC330 hardware 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 TMS S2A SC330 Hardware support package was purchased, you will only need this instruction manual to set up and run the support.

If you are not familiar with operating microprocessor support packages, you will need to supplement this instruction manual with information on basic operations to set up and run the support.

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 your online help.
- The term “HI module” refers to the module in the higher-numbered slot and the term “LO module” refers to the module in the lower-numbered slot.

Contacting Tektronix

Product Support	For questions about using Tektronix measurement products, call toll free in North America: 1-800-TEK-WIDE (1-800-835-9433 ext. 2400) 6:00 a.m. – 5:00 p.m. Pacific time Or contact us by e-mail: tm_app_supp@tektronix.com For product support outside of North America, contact your local Tektronix distributor or sales office.
Service Support	Tektronix offers extended warranty and calibration programs as options on many products. Contact your local Tektronix distributor or sales office. For a listing of worldwide service centers, visit our web site.
For other information	In North America: 1-800-TEK-WIDE (1-800-835-9433) An operator will direct your call.
To write us	Tektronix, Inc. P.O. Box 1000 Wilsonville, OR 97070-1000 USA
Website	Tektronix.com

Getting Started

Getting Started

This chapter contains the following information for the TMS S2A SC330 hardware support product:

- Configuring the probe adapter
- Connecting the logic analyzer to the system under test
- Applying power and operating the probe adapter

Support Package Description

The SC330 probe adapter is nonintrusive hardware that allows the logic analyzer to acquire data from a microprocessor in its own operating environment with little effect on that system.

The SC330 probe adapter is an interposer design. Using this design, the probe adapter connects to the system under test, and then the microprocessor connects to the probe adapter. Signals from the microprocessor module flow through the probe adapter into the P6434 probes and through the probe cables to the logic analyzer.

Support Software Compatibility

The SC330 probe adapter is compatible with software products that provide timing analysis capabilities, and synchronous transactions and instruction decode. These support software are only available to customers with a valid restricted secret nondisclosure agreement (RS–NDA) with Intel.

At the time of printing, the compatible software support product is the TMS113. When using the SC330 probe adapter with the TMS113 software, choose any one of the SC330 custom clocking options.

However, for customers without RS-NDAs, Tektronix offers a basic clocking software for the SC330 probe adapter at no cost. This clocking software allows customers to conduct timing analysis by predefining channel assignments and configuring the logic analyzer to acquire all bus cycles. Contact you Tektronix representative to obtain this complementary software or to determine which latest software support products are compatible with the TMS S2A SC330 product.

Logic Analyzer Configuration

To use the TMS S2A SC330 hardware support package you need a Tektronix logic analyzer (TLA) equipped with one of the following:

- A 102 channel and 136-channel module
- Two 102 channel modules
- Two 136 channel modules

NOTE. *To debug front side buses running faster than 100 MHz, you need a 200 MHz module pair from the above list.*

The modules must be in adjacent slots and merged.

References to a 204 channel module include the two 102-channel modules that are merged and any other merged module combination of a minimum of 204-channels (for the merged combination).

You can acquire debug and APIC bus activity through the SC330 probe adapter. Probing the APIC bus requires the TMS 801 APIC bus support package, a third 102-channel acquisition module, and standard probes. See *Alternate Connections* on page 1–16 for more details.

Logic Analyzer Setup and Hold Adjustment for IA32G4 (TMS113) Software Support

The logic analyzer setup and hold adjustment is recommended for adjusting channel group setup and hold windows in the IA32G4 (TMS113) software support. To ensure that the logic analyzer acquires synchronous data correctly, follow this procedure to make setup and hold adjustments.

However, if you are only planning to use the complementary clocking software with the TMS S2A SC330 probe adapter to acquire asynchronous timing data, then the following adjustment procedure is not needed.

NOTE. *You should perform this procedure each time you move the probe adapter to another system under test or a different slot in your system under test.*

A recommended starting point for determining your setup calibration is:

0 ns setup for the PAL group
1 ns setup for all other groups

Some figures only show the relevant parts of setup windows and dialog boxes.

There are three parts to the setup and hold calibration procedure:

- Select a channel group, and then have that group trigger the Tektronix logic analyzer using the setup and hold violation feature.
- Calibrate the setup and hold value for the channel group with a timing violation.
- Transfer the adjusted setup and hold value to the Setup and Hold window.

You may want to repeat this procedure for channel groups that fail the setup and hold violation test.

Selecting a Channel Group

1. From the System window, in the File menu, load the support package.
2. From the System widow, click the Trigger button, and then click the If-Then button.
3. From the Clause Definition window, open the If-clause pulldown menu, select S&H fault, and then click on the Define Violation button (see Figure 1–1).

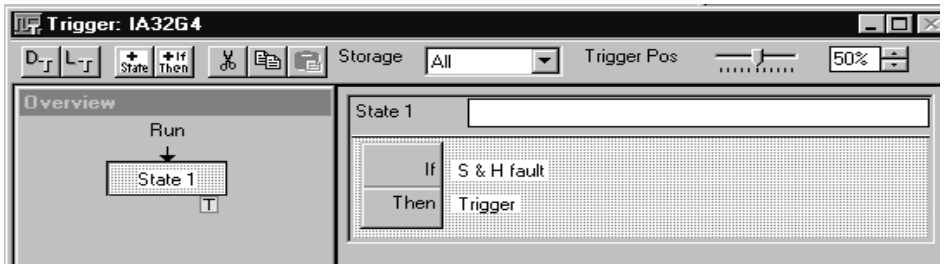


Figure 1–1: Trigger setup for the channel group

NOTE. *The default setup and hold value for the SC330 support is 2.5 ns setup and 0 ns hold for all groups, with the exception of PAL, which is 0 ns setup and 2.5 ns hold.*

4. From the Setup and Hold Event window, all defined channel groups are shown, along with their respective Setup and Hold windows. Uncheck . all boxes except the group you want to calibrate. Enter the setup and hold values for that channel group, and click OK to return to the System window.
5. From the system window, click RUN and wait for the TLA to trigger on a setup and hold violation. If after a delay with the system under test running, there is no trigger, then the selected group is calibrated correctly.
6. Repeat steps 3 through 5 to check for another channel group that needs calibrating.

Calibrating a Channel Group

7. If the TLA is triggered by a violation, open a MagniVu Waveform window, clear all visible waveforms, and add the following three waveforms:

   MagniVu BCLK (CLK3)
   MagniVu channel group (Mag_XXX)
   NonMagniVu channel group (selected from the data source window)

NOTE. *The nonMagniVu waveform is added because the trigger is based on acquisition memory from the Tektronix logic analyzer, not the MagniVu memory.*

8. Select the GoTo button to find the trigger point in the MagniVu window. The trigger point is centered at the transition of the nonMagniVu selected group (see Figure 1–2, d).

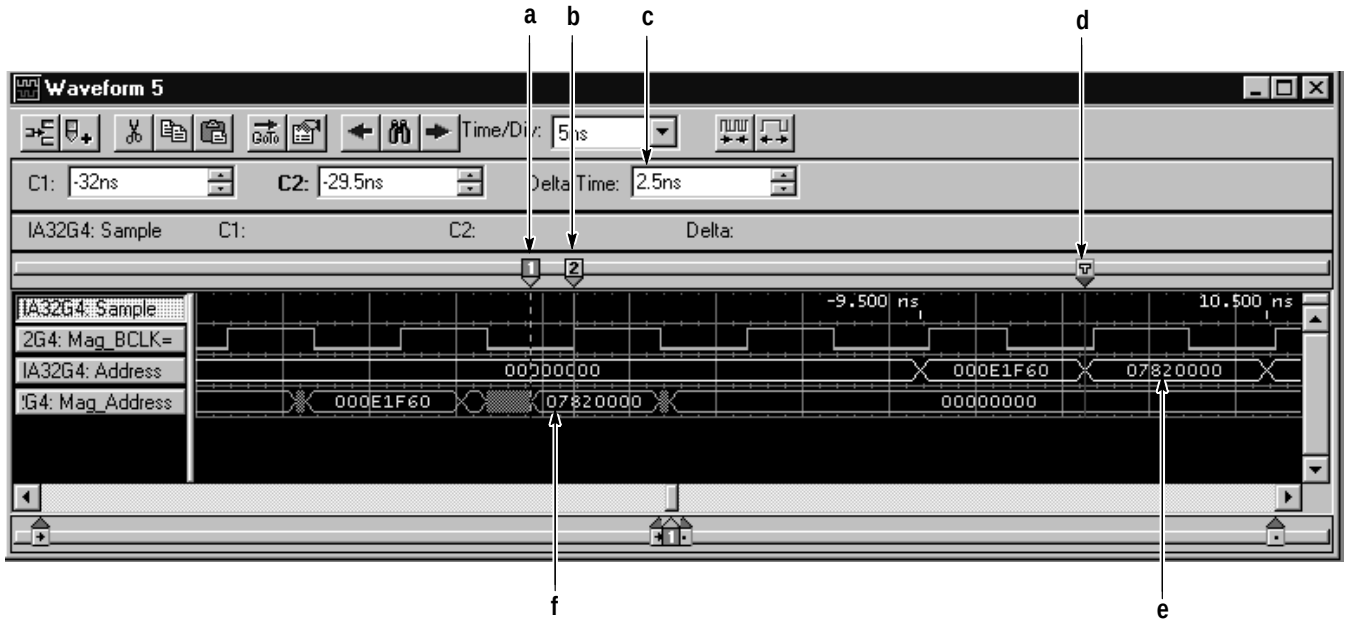


Figure 1–2: MagniVu Waveform window

9. Change the nonMagniVu group to hexadecimal radix, since the MagniVu group is displayed in hexadecimal. Zoom in to view the hexadecimal value of the displayed group, if necessary.

10. Check for where the transition information (see Figure 1–2, e) of the selected nonMagniVu group matches the MagniVu waveform value (see Figure 1–2, f).

NOTE. *Use your judgement to find the transition point, since it is possible to have the group transition up to and even past the appropriate rising BLCK edge. Also, some of the bits in the nonMagniVu group may not match the bits in the MagniVu group (this is due to pipelining).*

11. At the violation point in the MagniVu group (see Figure 1–2, f), do the following:

    a. Position cursor 1 on the last transition point of the MagniVu group before the hexadecimal value of interest (see Figure 1–2, a).

    b. Position cursor 2 on the next rising BCLK edge (see Figure 1–2, b).

c. Read the Delta Time (see Figure 1–2, c). This is the setup time.

12. From the Setup and Hold Event window, in the Trigger menu enter the setup time with a margin of 0.5 ns.

13. Click OK in the Setup and Hold window, this saves the setup and hold settings, and then click the RUN button. If after a delay a trigger violation is not found, then the selected group is calibrated correctly, and you can proceed to step 15.

14. If a trigger violation is found, adjust the timing margin again by repeating steps 10 through 13.

Transferring the Setup Values

15. From the Setup and Hold window, make a list of the adjusted setup values, click OK.

16. From the System window, click the Setup button, and then click the More button.

17. In the Custom Clocking options menu, select SC330 Active Phase or SC330 Clock-by-Clock Demux. You will see a list of channel groups. Find the channel group you adjusted and enter that adjusted setup time; click OK (see Figure 1–3).

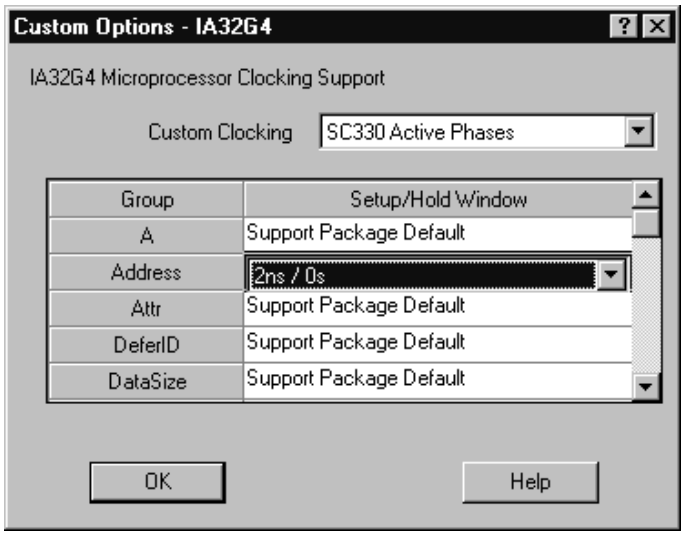


Figure 1–3: Entering the adjusted setup time

18. Repeat steps 3 through 17 to find the timing violation in the next channel group.

Requirements and Restrictions

CAUTION. *To keep the microprocessor from overheating, forced air cooling must be used*

Review the general requirements and restrictions of the microprocessor support packages in the information on basic operations as they pertain to your system under test.

Also review electrical, environmental, and mechanical specifications in *Specifications* on page 2–1 as they pertain to your system under test, as well as the following descriptions of other TMS S2A SC330 hardware support requirements and restrictions.

System Clock Rate

The TMS S2A SC330 Hardware support package can acquire data from the front side bus operating at speeds up to 133 MHz. The TMS S2A SC330 Hardware support package has been tested at 100 MHz.

The operating clock rate specifications were measured at the time of printing. Contact your Tektronix sales representative for current information on the fastest devices supported.

BCLK

Refer to the BCLK specifications and restrictions listed in Table 2–4 on page 2–5, in the *Specifications* chapter.

System Under Test Power

Whenever you power off the system under test, remove power from the probe adapter. Refer to *Applying and Removing Power* on page 1–18.

Signals Supported

The following signals are supported by the SC330 probe adapter:

A[35:32]#	FLUSH#	STPCLK#
A[31:3]#	HIT#	TCK
A20M#	HITM#	TDI
ADS#	IERR#	TDO
BCLK	IGNNE#	THERMTRIP#
BNR#	INIT#	TMS
BP[3:2]#	LINT[1:0]	TRDY#
BPM[1:0]#	LOCK#	TRST#
BPRI#	PICCLK	
BR0#	PICD[1:0]	
BR1#	PRDY#	
BR2#	PREQ#	
BR3#	PWRGOOD	
D[63:0]#	REQ[4:0]#	
DBSY#	RESET#	
DEFER#	RS[2:0]#	
DRDY#	SLP#	
FERR#	SMI#	

Labeling P6434 Probes

The TMS S2A SC330 hardware support package relies on the standard channel mapping and labeling scheme for P6434 probes. Apply labels using the standard method described in the *P6434 Mass Termination Probe Instructions*.

Configuring the Probe Adapter

Jumpers

The probe adapter uses jumpers to acquire data for disassembly or for timing. Figure 1–4 shows the location of the jumpers.

TIMING/NORMAL Jumper. Place the TIMING/NORMAL jumper, J0430, in the NORMAL position to acquire and disassemble data. Place the TIMING/NORMAL jumper in the TIMING position to acquire timing data.

NOTE. *The TIMING/NORMAL jumper, J0430, controls pipeline delay for the A3# signal. It does not affect any other functionality of the probe adapter.*

MFG_TEST Jumper. To acquire data at frequencies below 40 MHz on the probe adapter, short together the two pins on J0450. This disables the PLL signal and buffers the BCLK signal to all clocked components.

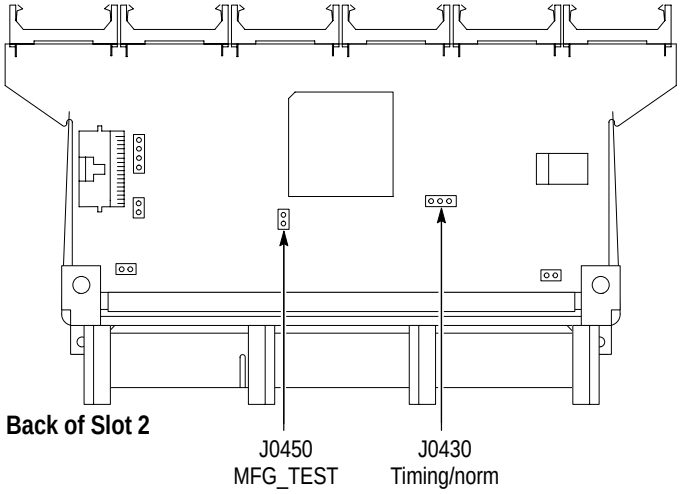


Figure 1–4: Jumper locations on the SC330 probe adapter

Test Points

Additional test points on the SC330 probe adapter allow alternate ways of probing for information as shown on Figure 1–5. Table 1–1 lists the test points on the SC330 probe adapter.

Table 1–1: Test point information

SC330 microprocessor pin number	SC330 microprocessor pin name	Test points
A7	SELFSB1	J0580 PIN 1
A9	SELFSB0	J0580 PIN 2
A159	SA2	J810 PIN 1
A162	SA1	J810 PIN 2
A163	SA0	J810 PIN 3
B160	SMBCLK	J0510 PIN 1
B161	SMBDATA	J0510 PIN 2

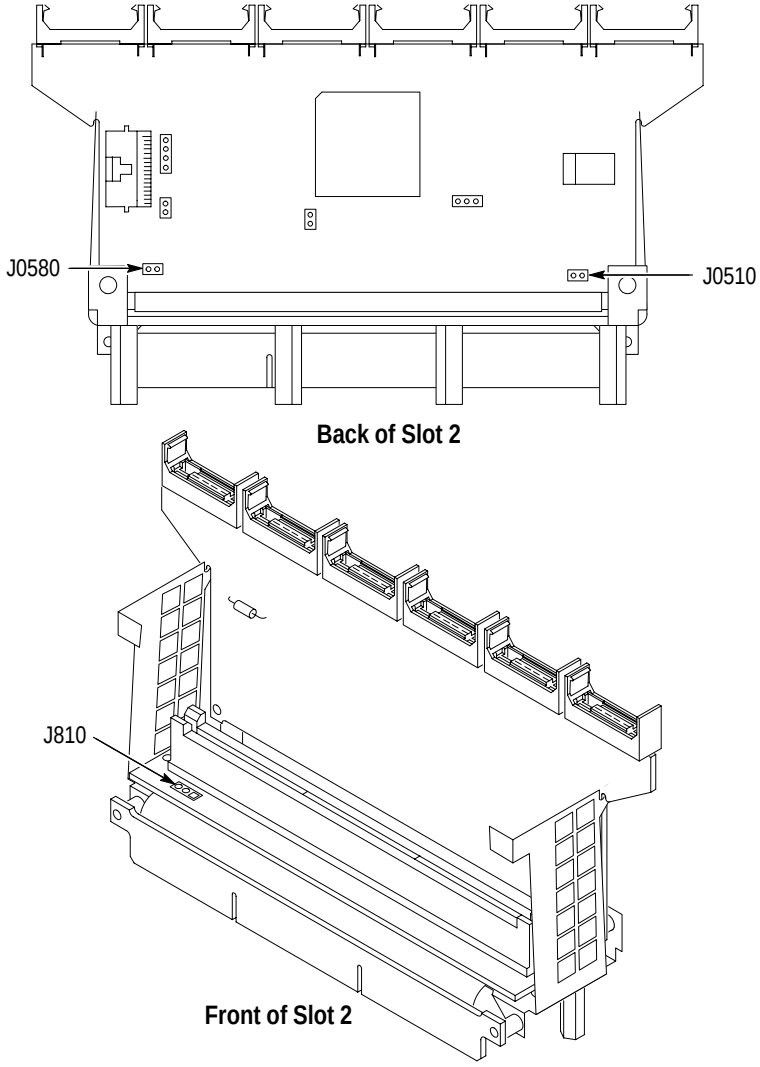


Figure 1–5: Test point locations on the probe adapter

Connecting the Logic Analyzer to a System Under Test

Before you connect the probe adapter to the system under test, connect three P6434 probes to the HI module and three P6434 probes to the LO module. The module in the higher-numbered slot is referred to as the HI module, and the module in the lower-numbered slot is referred to as the LO module.

The portable logic analyzer has the lower numbered slots on the top and the benchtop logic analyzer has the lower numbered slots on the left.

Your system under test must allow clearance for the probe adapter. Refer to Figure 2–5 on page 2–6 for dimensions for the required clearances.

To connect the logic analyzer to your system under test, follow these steps:

1. Power off your system under test. It is not necessary to power off the logic analyzer.

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

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

2. Match the A, C, and D probes from the HI module with the corresponding HI_A, HI_C, and HI_D probe connectors on the probe adapter. Align the pin 1 indicator on the probe label with the pin 1 indicator of the connector on the probe adapter.

CAUTION. *To prevent damage to the probe and probe adapter, always position the probe perpendicular to the mating connector and gently connect the probe. Incorrect handling of the P6434 probe while connecting it to the probe adapter can result in damage to the probe or to the mating connector on the probe adapter.*

3. Position the probe tip perpendicular to the mating connector and gently connect the probe (see Figure 1–6).

4. When connected, push down the latch releases on the probe to set the latch.

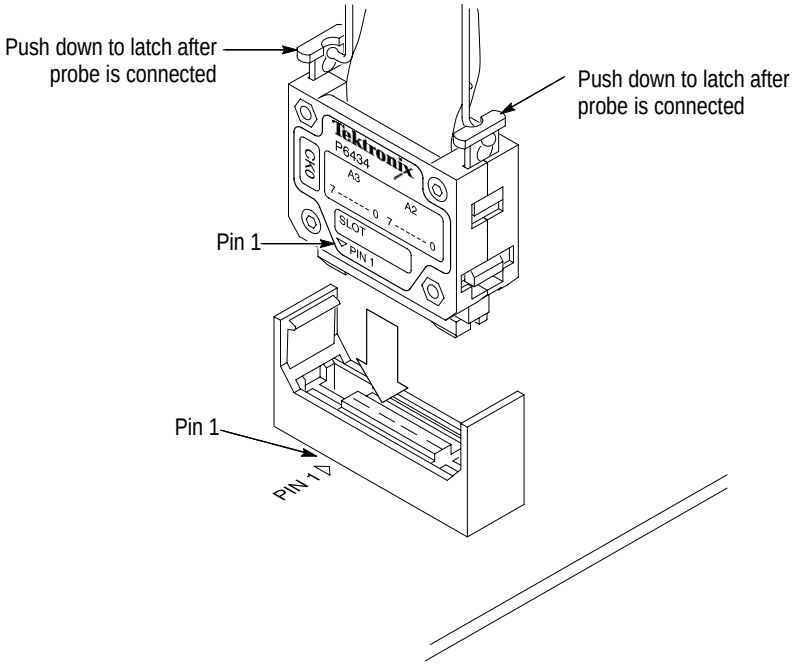


Figure 1–6: Connecting a probe to the probe adapter

5. Match the A, C, and D probes from the LO module with the corresponding LO_A, LO_C, and LO_D probe connectors on the probe adapter. Align the pin 1 indicator on the probe label with the pin 1 of the connector on the probe adapter.
6. Repeat steps 3 and 4.
7. Follow the procedure from the microprocessor vendor to remove the microprocessor from the SC330 connector on your system under test.

Attaching the Heat Pipe

A heat pipe is provided with the probe adapter package. The heat pipe provides the necessary clearance to insert the microprocessor module into the SC330 probe adapter (see Figure 1–8 on page 1–15).

8. Remove five screws, and then the heat sink from the microprocessor module. Retain the five screws and set aside the heat sink. Reattach this heat sink when you are finished using the probe adapter.
9. Remove the clear plastic cover from the thermal pad on the heat pipe, and then attach the heat pipe to the microprocessor module using the same five screws.

Leveling the Probe Adapter

The probe adapter is designed with four threaded posts for mechanical support of the probe adapter. The threaded posts are located on the bottom of the probe adapter (see Figure 1–7). The probe adapter package also comes with four threaded spacers and nylon screws for leveling your probe adapter.

***NOTE**. You may need to trim or remove the threaded post or spacer for the probe adapter to sit evenly on the system under test.*

10. Thread a spacer on at least two separate posts located on the bottom of the probe adapter. If further leveling is needed, thread a nylon screw into the spacer.

11. Insert the probe adapter into the system under test as shown in Figure 1–7. Check that the probe adapter sits evenly and is seated firmly on your system under test.

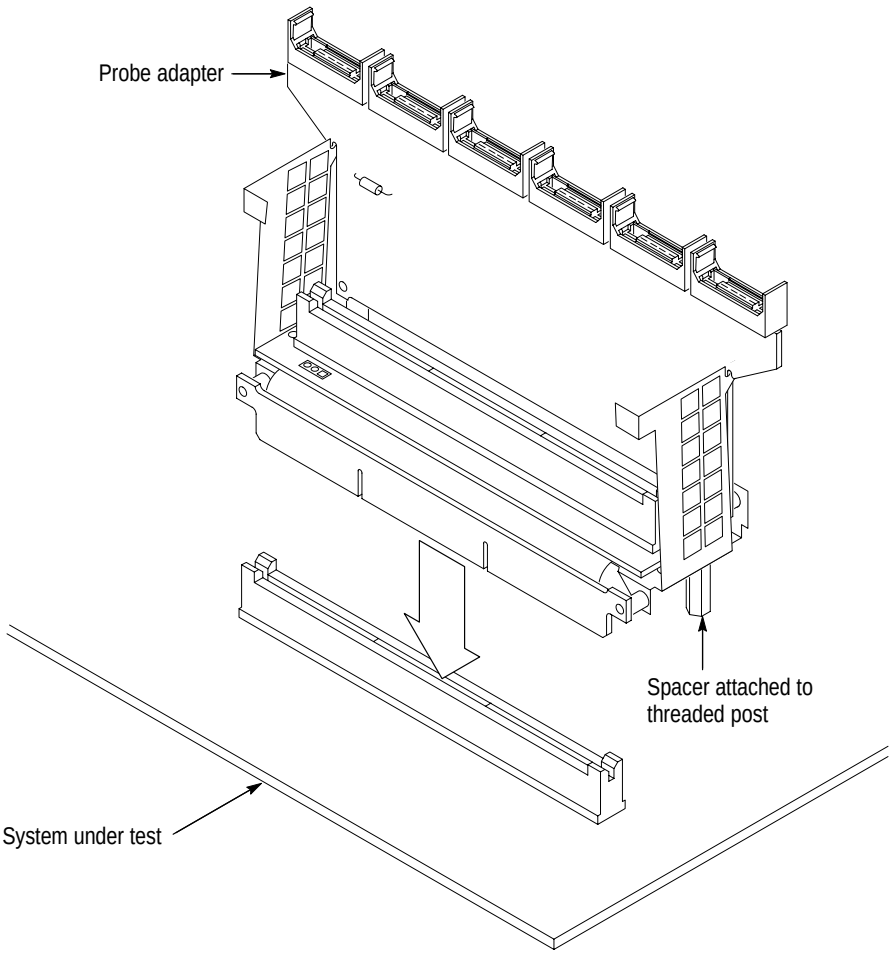


Figure 1–7: Inserting the probe adapter into the system under test

12. Insert the microprocessor module into the probe adapter as shown in Figure 1–8. Check that the microprocessor module is seated firmly in the probe adapter.

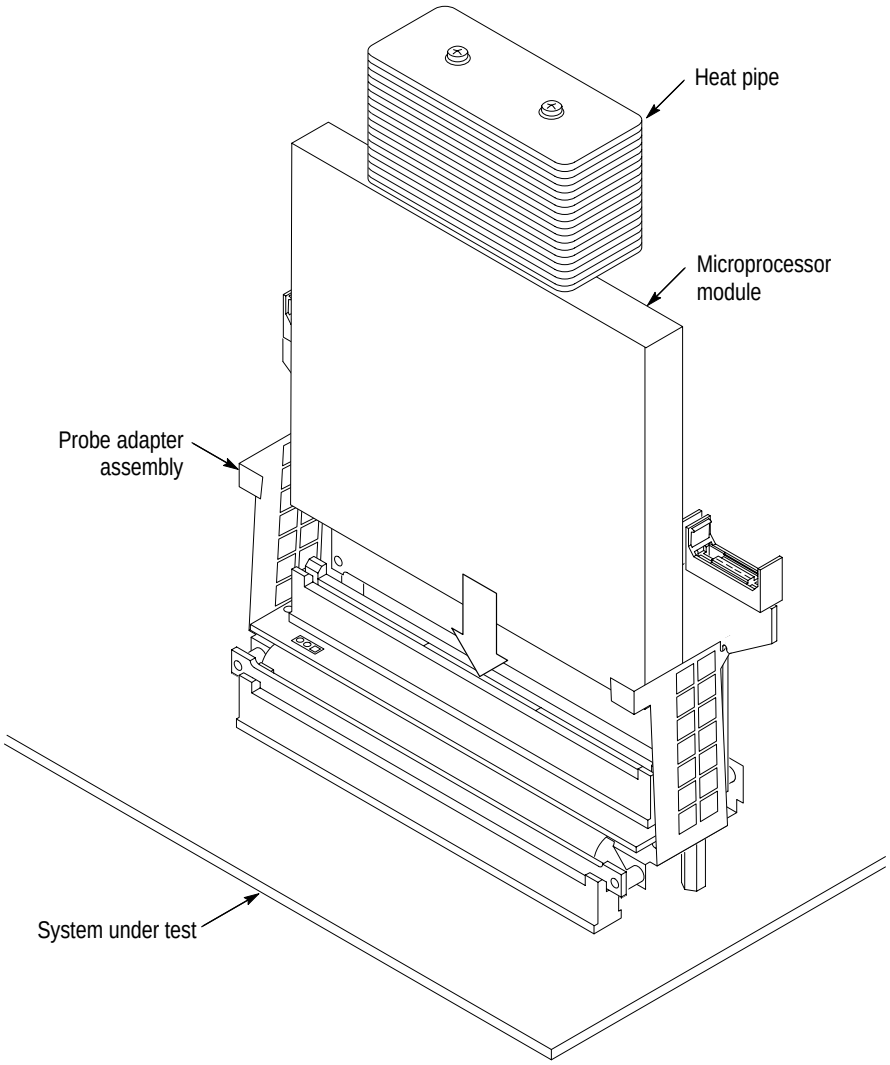


Figure 1–8: Inserting the microprocessor module into the probe adapter

13. Apply forced air cooling across the microprocessor module and the condenser on the heat pipe to keep it from overheating.

Alternate Connections

You can connect to other signals that are not required by the support to analyze other signal activity in your system. The following paragraphs and tables list signals that are accessible on the probe adapter board.

APIC Four pins on J0380 are provided to connect the TMS 801 APIC bus probe adapter to the PICCLK, PICD0, and PICD1 signals for APIC bus support. See Table 1–2 for pin numbers and associated signals. See Figure 1–9 for the location of pins on the probe adapter.

Table 1–2: APIC information

J0380 pin number	SC330 connector pin number	APIC connector signal name
1	GND	——
2	B30	PICCLK
3	B31	PICD1
4	A29	PICD0

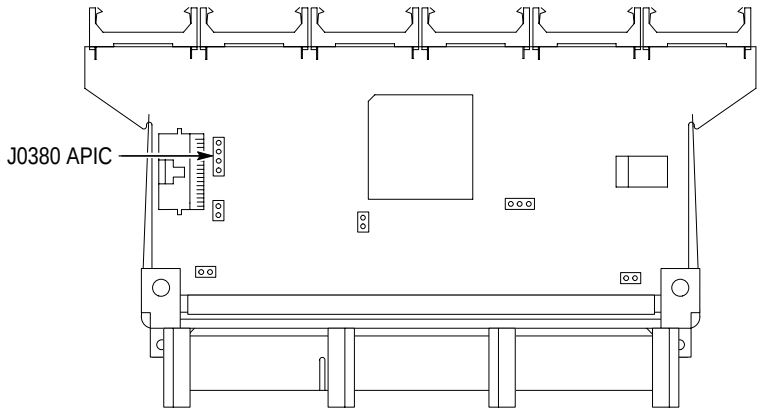


Figure 1–9: Location of APIC pins on the probe adapter

Debug Port

The SC330 probe adapter provides J0480 as a way to connect to the Run Control debugging hardware (see Figure 1–9). This Run Control hardware is not included with the TMS S2A SC330 hardware support package. Contact your microprocessor vendor for information on how to obtain debugging hardware.

***NOTE**. The debug circuitry on the Probe Adapter is active only when the debug probe cable is connected to J0480. If the debug probe cable is disconnected from J0480, all debug data and control lines on the Probe Adapter are tristated.*

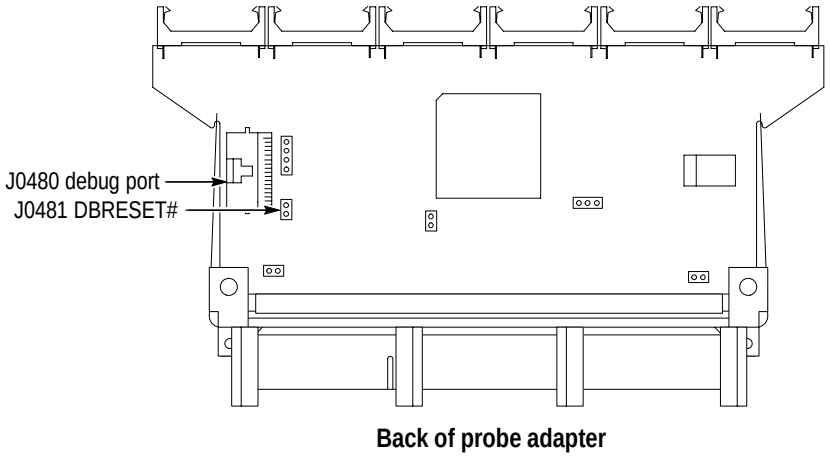


Figure 1–10: Location of debug port and DBRESET# pins on the probe adapter

Optional System Reset. The debug circuitry on the Probe Adapter does not allow external debugging hardware to induce a system reset through the DBRESET# signal on the Debug port. If you need to enable this feature, you must provide the connection to your system under test. Table 1–3 lists the signals on the J0481. Figure 1–9 shows the location of the pins on the probe adapter.

Table 1–3: Jumper (J0481) information

Pin number	debug port signal name
1	GND
2	DBRESET#

Applying and Removing Power

A power supply for the SC330 probe adapter is included with this TMS S2A SC330 hardware support. The power supply provides +5 volts to the probe adapter.

CAUTION. *To prevent damage to the probe adapter, remove power from the probe adapter whenever you power off the system under test.*

To apply power to the SC330 probe adapter and system under test, follow these steps:

CAUTION. *To prevent permanent damage to the probe adapter and microprocessor module, use the +5 V power supply provided by Tektronix. Do not mistake another power supply that looks similar for the +5 V power supply.*

1. Connect the +5 V power supply to the jack on the probe adapter. Figure 1–11 shows the location of the jack on the adapter board.

CAUTION. *To prevent damage to the microprocessor module and system under test, apply power to the probe adapter before applying power to your system under test.*

2. Plug the power supply for the probe adapter into an electrical outlet. When power is present on the probe adapter, an LED lights near the power jack.
3. Power on the system under test.

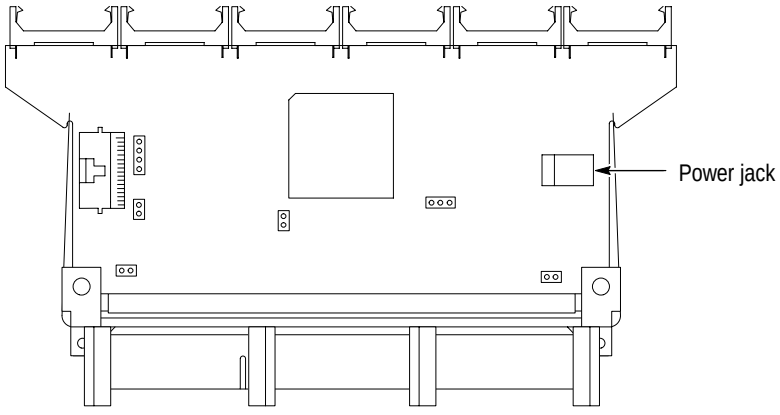


Figure 1–11: Location of the power jack

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

CAUTION. *To prevent damage to the microprocessor module and system under test, apply power to the probe adapter before applying power to your system under test.*

1. Power off the system under test.
2. Unplug the power supply for the probe adapter from the electrical outlet.

CPU To Mictor Connections

To probe the microprocessor, you will need to make connections between the CPU and the Mictor pins of the P6434 Mass Termination Probe. Refer to the *P6434 Mass Termination Probe* manual, Tektronix part number 070-9793-XX, for more information on mechanical specifications. Tables 1–4 through 1–11 show the CPU pin to Mictor pin connections.

Tektronix uses a counterclockwise pin assignment. Pin 1 is located at the top left, and pin 2 is located directly below it. Pin 20 is located on the bottom right, and pin 21 is located directly above it (see Figure1–12).

AMP uses an odd side-even side pin assignment. Pin 1 is located at the top left, and pin 3 is located directly below it. Pin 2 is located on the top right, and pin 4 is located directly below it (see Figure1–12).

NOTE. *When designing Mictor connectors into your system under test, always follow the Tektronix pin assignment.*

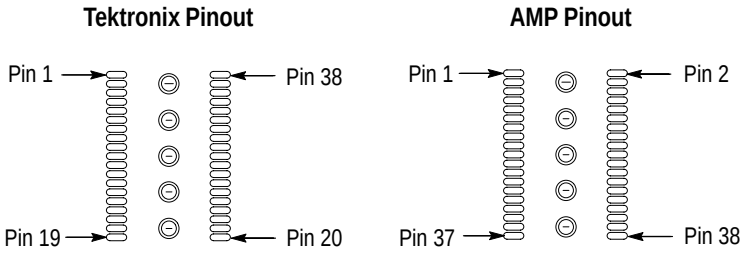


Figure 1–12: Pin assignments for a Mictor connector (component side)

Table 1–4: Clock Channels (stored in the acquisition memory)

Clock channel	CLK, QUAL, or DATA	Active CLK edge	Processor pin name	Processor pin number
LO_CLK:3	CLK	Rising	BCLK	A97
LO_CLK:2	DATA	X	—	—
LO_CLK:1	DATA	X	—	—
LO_CLK:0	—	X	—	—
HI_CLK:3	DATA	X	BCLK	A97
HI_CLK:2	DATA	X	—	—

Table 1–4: Clock Channels (stored in the acquisition memory) (cont.)

Clock channel	CLK, QUAL, or DATA	Active CLK edge	Processor pin name	Processor pin number
HI_CLK:1	DATA	X	—	—
HI_CLK:0	—	X	—	—

Table 1–5: Qualifier Channels (stored in the acquisition memory)

QUAL channel	QUAL, or DATA	Processor pin name	Processor pin number
LO_QUAL:3	—	—	—
LO_QUAL:2	—	—	—
LO_QUAL:1	DATA	—	—
LO_QUAL:0	DATA	—	—
HI_QUAL:3	—	—	—
HI_QUAL:2	—	—	—
HI_QUAL:1	DATA	—	—
HI_QUAL:0	DATA	—	—

***NOTE**. Dashes — indicates: the CLK or QUAL channel is not used, the channel is not supported by the support software, or the channel is not connected to the microprocessor.*

CLK and QUAL channels designated as DATA are logged in on the master strobe defined by the support software.

Table 1–6: CPU to Mictor connections for Mictor C pins (high)

Tektronix Mictor A pin number	AMP Mictor A pin number	LA channel	Processor pin name	Processor pin number
4	7	C3:7	FLUSH#	B10
8	15	C3:3	DEP#[0]	A36
12	23	C2:7	DEP#[3]	A39
16	31	C2:3[1]	RESET#	B98
5	9	C3:6	INIT#	B13
9	17	C3:2	DEP#[2]	B39

Table 1–6: CPU to Mictor connections for Mictor C pins (high) (cont.)

Tektronix Mictor A pin number	AMP Mictor A pin number	LA channel	Processor pin name	Processor pin number
13	25	C2:6	DEP#[7]	B42
17	33	C2:2[1]	BR1#	B143
6	11	C3:5	PRDY#	B36
10	19	C3:1	DEP#[1]	A38
14	27	C2:5	DEP#[5]	A41
18	35	C2:1[1]	BR0#	A142
7	13	C3:4	Not Specified	Not Specified
11	21	C3:0	Not Specified	Not Specified
15	29	C2:4	Not Specified	Not Specified
19	37	C2:0[1]	Derived	Derived
35	8	C1:7	Derived	Derived
31	16	C1:3	Derived	Derived
27	24	C0:7	Derived	Derived
23	32	C0:3	Derived	Derived
34	10	C1:6	Derived	Derived
30	18	C1:2	Derived	Derived
26	26	C0:6	Derived	Derived
22	34	C0:2	Derived	Derived
33	12	C1:5	SLP#	B18
29	20	C1:1	Derived	Derived
25	28	C0:5	Derived	Derived
21	36	C0:1	Derived	Derived
32	14	C1:4	Derived	Derived
28	22	C1:0	Derived	Derived
24	30	C0:4	Derived	Derived
20	38	C0:0	PWRGOOD	A21

[1] **Possible qualifier line**

Table 1–7: CPU to Mictor connections for Mictor A pins (high)

Tektronix Mictor A pin number	AMP Mictor A pin number	LA channel	Processor pin name	Processor pin number
4	7	A3:7	D#[62]	B43
5	9	A3:6	D#[61]	A44

Table 1–7: CPU to Mictor connections for Mictor A pins (high) (cont.)

Tektronix Mictor A pin number	AMP Mictor A pin number	LA channel	Processor pin name	Processor pin number
6	11	A3:5	D#[55]	A45
7	13	A3:4	D#[60]	A47
8	15	A3:3	D#[53]	A48
9	17	A3:2	D#[57]	A50
10	19	A3:1	D#[46]	A51
11	21	A3:0	D#[49]	A53
12	23	A2:7	D#[51]	A54
13	25	A2:6	D#[42]	A58
14	27	A2:5	VSS	A49
15	29	A2:4	D#[39]	A61
16	31	A2:3	D#[40]	B65
17	33	A2:2	D#[34]	B66
18	35	A2:1	D#[38]	B68
19	37	A2:0	D#[32]	B69
35	8	A1:7	D#[58]	B45
34	10	A1:6	D#[63]	B46
33	12	A1:5	D#[56]	B48
32	14	A1:4	D#[50]	B49
31	16	A1:3	D#[54]	B51
30	18	A1:2	D#[59]	B52
29	20	A1:1	D#[48]	B54
28	22	A1:0	D#[52]	B55
27	24	A0:7	D#[41]	B59
26	26	A0:6	D#[47]	B60
25	28	A0:5	D#[44]	B62
24	30	A0:4	D#[36]	B63
23	32	A0:3	D#[43]	A64
22	34	A0:2	D#[37]	A65
21	36	A0:1	D#[33]	A67
20	38	A0:0	D#[35]	A68

Table 1–8: CPU to Mictor connections for Mictor D pins (high)

Tektronix Mictor A pin number	AMP Mictor A pin number	LA channel	Processor pin name	Processor pin number
4	7	D3:7	D#[28]	B71
5	9	D3:6	D#[29]	B72
6	11	D3:5	D#[26]	B74
7	13	D3:4	D#[25]	B75
8	15	D3:3	D#[22]	B77
9	17	D3:2	D#[19]	B78
10	19	D3:1	D#[18]	B80
11	21	D3:0	D#[20]	B81
12	23	D2:7	D#[17]	B86
13	25	D2:6	D#[15]	B87
14	27	D2:5	D#[12]	B89
15	29	D2:4	D#[7]	B90
16	31	D2:3	D#[6]	B92
17	33	D2:2	D#[5]	A92
18	35	D2:1	D#[3]	A94
19	37	D2:0	D#[1]	A95
35	8	D1:7	D#[31]	A70
34	10	D1:6	D#[30]	A71
33	12	D1:5	D#[27]	A73
32	14	D1:4	D#[24]	A74
31	16	D1:3	D#[23]	A76
30	18	D1:2	D#[21]	A77
29	20	D1:1	D#[16]	A79
28	22	D1:0	D#[13]	A80
27	24	D0:7	D#[11]	A85
26	26	D0:6	D#[10]	A86
25	28	D0:5	D#[14]	A88
24	30	D0:4	D#[9]	A89
23	32	D0:3	D#[8]	B91
22	34	D0:2	D#[4]	B93
21	36	D0:1	D#[2]	B95
20	38	D0:0	D#[0]	B96

Table 1–9: CPU to Mictor connections for Mictor C pins (Low)

Tektronix Mictor A pin number	AMP Mictor A pin number	LA channel	Processor pin name	Processor pin number
4	7	C3:7	RSP#	B145
8	15	C3:3	RP#	B140
12	23	C2:7	AP#[1]	B146
16	31	C2:3[1]	AP#[0]	A145
5	9	C3:6	BNR#	A127
9	17	C3:2	LOCK#	B133
13	25	C2:6	DBSY#	A138
17	33	C2:2[1]	AERR#	B127
6	11	C3:5	BPRI#	A129
10	19	C3:1	DRDY#	B134
14	27	C2:5	RS#[2]	B139
18	35	C2:1[1]	ADS#	A144
7	13	C3:4	BREQ2#	A141
11	21	C3:0	BREQ3#	B142
15	29	C2:4	Not Specified	Not Specified
19	37	C2:0[1]	Derived	Derived
35	8	C1:7	A#[35]	B101
31	16	C1:3	A#[34]	A103
27	24	C0:7	A#[33]	A101
23	32	C0:3	A#[32]	B102
34	10	C1:6	RS#[1]	A139
30	18	C1:2	RS#[0]	B136
26	26	C0:6	DEFER#	A132
22	34	C0:2	HITM#	A136
33	12	C1:5	BERR#	A100
29	20	C1:1	REQ#[4]	B131
25	28	C0:5	HIT#	B137
21	36	C0:1	TRDY#	A130
32	14	C1:4	REQ#[3]	A135
28	22	C1:0	REQ#[2]	A133
24	30	C0:4	REQ#[1]	B130
20	38	C0:0	REQ#[0]	B128

[1] **Possible qualifier line**

Table 1–10: CPU to Mictor connections for Mictor A pins (Low)

Tektronix Mictor A pin number	AMP Mictor A pin number	LA channel	Processor pin name	Processor pin number
4	7	A3:7	A#[31]	A106
5	9	A3:6	A#[30]	A104
6	11	A3:5	A#[29]	B104
7	13	A3:4	A#[28]	B108
8	15	A3:3	A#[27]	A107
9	17	A3:2	A#[26]	B105
10	19	A3:1	A#[25]	B113
11	21	A3:0	A#[24]	B107
12	23	A2:7	A#[23]	A110
13	25	A2:6	A#[22]	A109
14	27	A2:5	A#[21]	B111
15	29	A2:4	A#[20]	B110
16	31	A2:3	A#[19]	A112
17	33	A2:2	A#[18]	A113
18	35	A2:1	A#[17]	B116
19	37	A2:0	A#[16]	A115
35	8	A1:7	A#[15]	B114
34	10	A1:6	A#[14]	A118
33	12	A1:5	A#[13]	A116
32	14	A1:4	A#[12]	B119
31	16	A1:3	A#[11]	B117
30	18	A1:2	A#[10]	A120
29	20	A1:1	A#[09]	A123
28	22	A1:0	A#[08]	B121
27	24	A0:7	A#[07]	B122
26	26	A0:6	A#[06]	B125
25	28	A0:5	A#[05]	A121
24	30	A0:4	A#[04]	A124
23	32	A0:3	Derived	Derived
22	34	A0:2	Derived	Derived
21	36	A0:1	Derived	Derived
20	38	A0:0	Derived	Derived

Table 1–11: CPU to Mictor connections for Mictor D pins (Low)

Tektronix Mictor A pin number	AMP Mictor A pin number	LA channel	Processor pin name	Processor pin number
4	7	D3:7	Derived	Derived
5	9	D3:6	Derived	Derived
6	11	D3:5	Derived	Derived
7	13	D3:4	Derived	Derived
8	15	D3:3	TDO	A20
9	17	D3:2	THRMTRP#	A24
10	19	D3:1	LINT[0]	A27
11	21	D3:0	PICD[0]	A29
12	23	D2:7	PREQ#	A30
13	25	D2:6	BPM#[0]	A33
14	27	D2:5	BCLK	A97
15	29	D2:4	STPLK#	B15
16	31	D2:3	TCK	B16
17	33	D2:2	TDI	A18
18	35	D2:1	A20M#	A14
19	37	D2:0	BP#[3]	A32
35	8	D1:7	IERR#	A12
34	10	D1:6	FERR#	A15
33	12	D1:5	IGNNE#	A17
32	14	D1:4	TMS	B19
31	16	D1:3	TRST#	B21
30	18	D1:2	LINT1#	B28
29	20	D1:1	PICCLK#	B30
28	22	D1:0	BP#[2]	B33
27	24	D0:7	PICD[1]	B31
26	26	D0:6	BPM#[1]	B37
25	28	D0:5	FRCERR#	B99
24	30	D0:4	SMI#	B12
23	32	D0:3	BINIT#	A35
22	34	D0:2	DEP#[4]	B40
21	36	D0:1	DEP#[6]	A42
20	38	D0:0	Not Specified	Not Specified

Specifications

Specifications

This chapter contains information regarding the description of the probe adapter specifications and dimensions of the TMS S2A SC330 Hardware support package.

Probe Adapter Description

The probe adapter is nonintrusive hardware that allows the logic analyzer to acquire data from a microprocessor in its own operating environment with little effect on that system. The following paragraphs describe specific circuitry used in the SC330 probe adapter.

Signal Probing

The SC330 probe adapter acquires all signals except BCLK series isolation resistors. For some signals (see Table 2–2), the probe adapter also presents an active device load.

Debug Port

The SC330 probe adapter provides a connection point for a debug port. In addition to the standard debug port, the probe adapter contains circuitry to terminate the debug control and data signals to their appropriate voltage levels.

The debug circuitry on the probe adapter can only control the debug signals when an debug probe cable is plugged into the debug port on the logic board. The debug circuitry disconnects all debug signals from the system under test when an debug cable is plugged into J0480. When the cable is removed, all debug data and control lines are tristated, and the debugS connection between the SC330 microprocessor and system under test is restored.

Probe Adapter Loading Diagrams

Figures 2–1 through 2–3 are provided for loading reference.

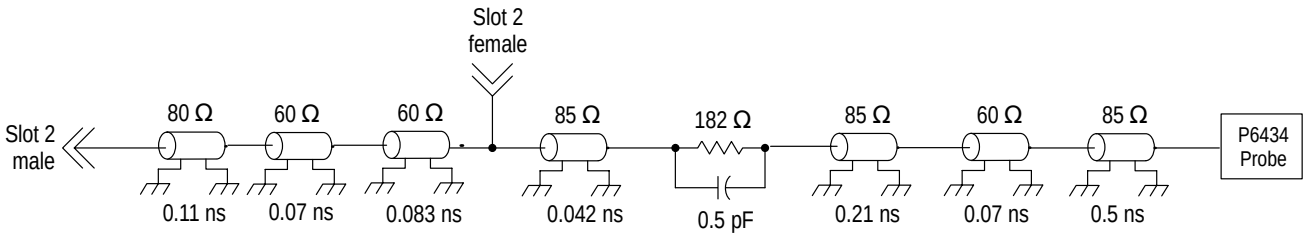


Figure 2–1: SC330 signals without active loads

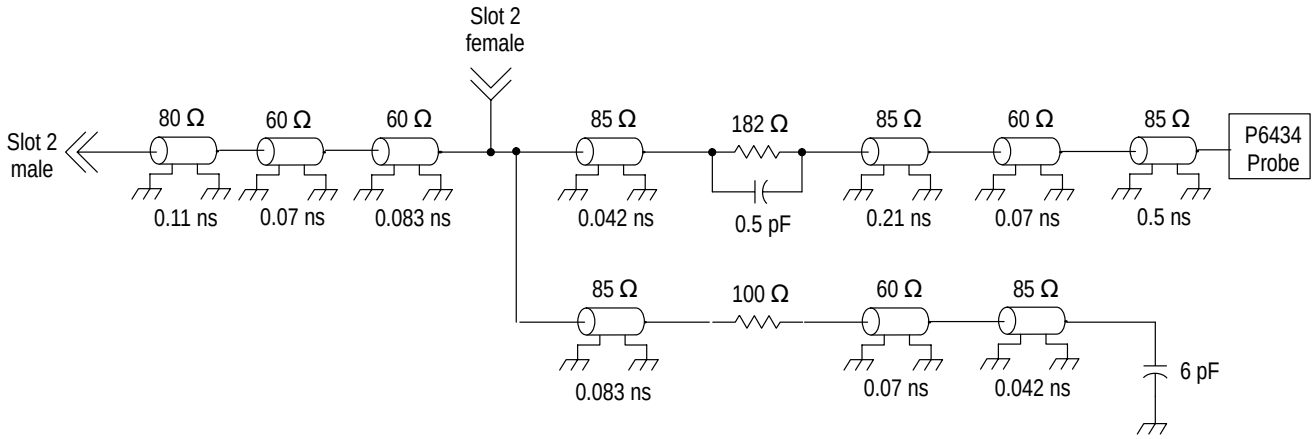


Figure 2–2: SC330 signals with active loads

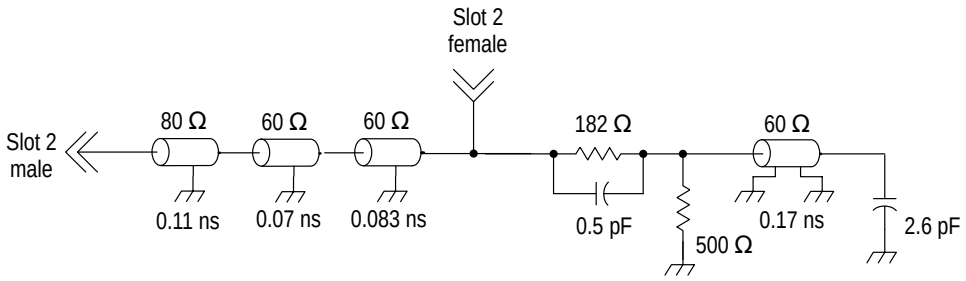


Figure 2–3: SC330 BCLK

Table 2–1 shows the values you can use to calculate characteristics of the Lossy delay lines shown in Figure 2–4, which is the equivalent circuit of the P6434 probe.

Table 2–1: Lossy delay line values

Characteristic	Value
C (capacitance)	1.58 pF per inch
L (inductance)	8.9 nH per inch
R (resistance)	.067 Ω per inch
Z_0 (impedance)	75 Ω

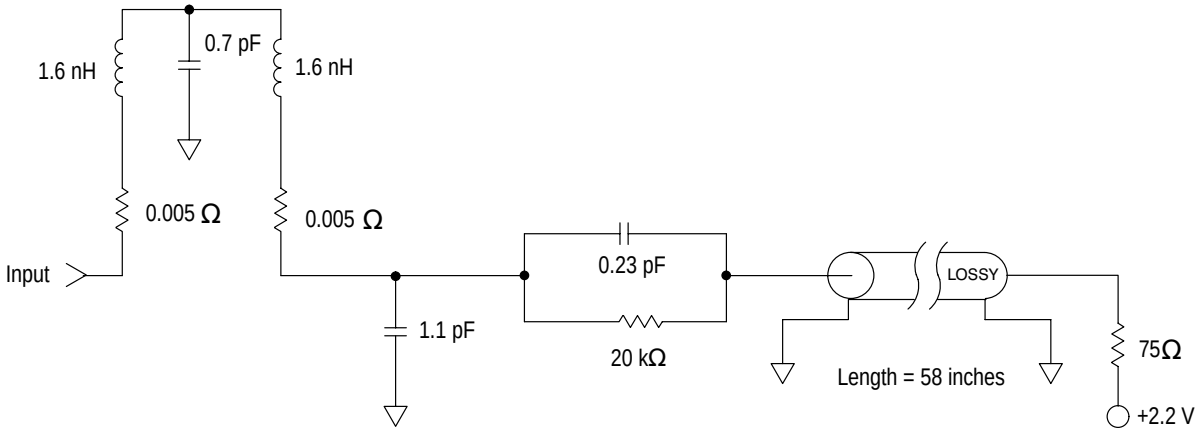


Figure 2–4: Equivalent circuit for the P6434 probe

Specification Tables

These specifications are for a probe adapter connected between a compatible Tektronix logic analyzer and a system under test. The signal voltage swing in your system under test must be at least 200 mV around the GTL+ reference voltage.

Table 2–2 lists the electrical requirements of the system under test, the AC adapter, and the power supply that provides power to the SC330 probe adapter. Table 2–3 lists the environmental specifications. Table 2–4 lists the BCLK timing restrictions and electrical specifications.

Table 2–2: Electrical specifications

Characteristics	Requirements	
Probe adapter: DC power requirements		
Voltage, VCC	4.75 – 5.25 VDC	
Current, VCC	I maximum 490 mA, I typical 210 mA	
AC adapter		
Input Voltage rating	90 – 265 V CAT II	
Input Frequency Rating	47 – 63 Hz	
Output Voltage Rating	5 V	
Output Current Rating	5 V	
Output Power Rating	25 W	
System under test: DC power requirements		
Voltage, VCC 1.5V	1.5 V ± 9%	
Current, VCC 1.5V	I maximum 15.1 mA, I typical 5.0 mA	
System under test: clock rate	Maximum 133 MHz	
System under test: tested clock rate	Maximum 100 MHz	
Minimum setup time required, all signals at edge fingers	2.25 ns	
Minimum hold time required, all signals at edge fingers	1.77 ns	
	Specification	
Measured typical system under test signal loading	**AC load**	**DC load**
All latched signals: INIT#, BREQ0#, BREQ1#, BREQ2#, BREQ3#, BINIT#, REQ4#, RESET#, ADS#, RS0#, RS1#, RS2#, HIT#, HITM#, DRDY#, BNR#, AERR#, A3#, A8# – A15#,	8 pF	74GTL16622 in parallel with 20 kΩ

Table 2–2: Electrical specifications (cont.)

Characteristics	Requirements	
BCLK	2.6 pF	AD8009
All other signals	2.5 pF	20 kΩ

Table 2–3: Environmental specifications[1]

Characteristic	Description
Temperature	
Maximum operating	+50° C (+122° F)[2]
Minimum operating	0° C (+32° F)
Nonoperating	–55° C to +75° C (–67° to +167° F)
Humidity	10 to 95% relative humidity
Altitude	
Operating	4.5 km (15,000 ft) maximum
Nonoperating	15 km (50,000 ft) maximum
Electrostatic immunity	The probe adapter is static sensitive

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

2 **Not to exceed microprocessor thermal considerations. Forced air cooling might be required across the CPU.**

Table 2–4: BCLK timing and electrical specifications

Characteristics	Minimum	Maximum	Units	Notes
V_{in} (lo)		0.5	V	
V_{in} (hi)	2.0		V	
Duty Cycle	25	75	%	
t_{lh}		1.25	ns	Monotonically increasing
t_{hl}		1.25	ns	Monotonically decreasing

Dimensions Figure 2–5 shows the dimensions of the SC330 probe adapter.

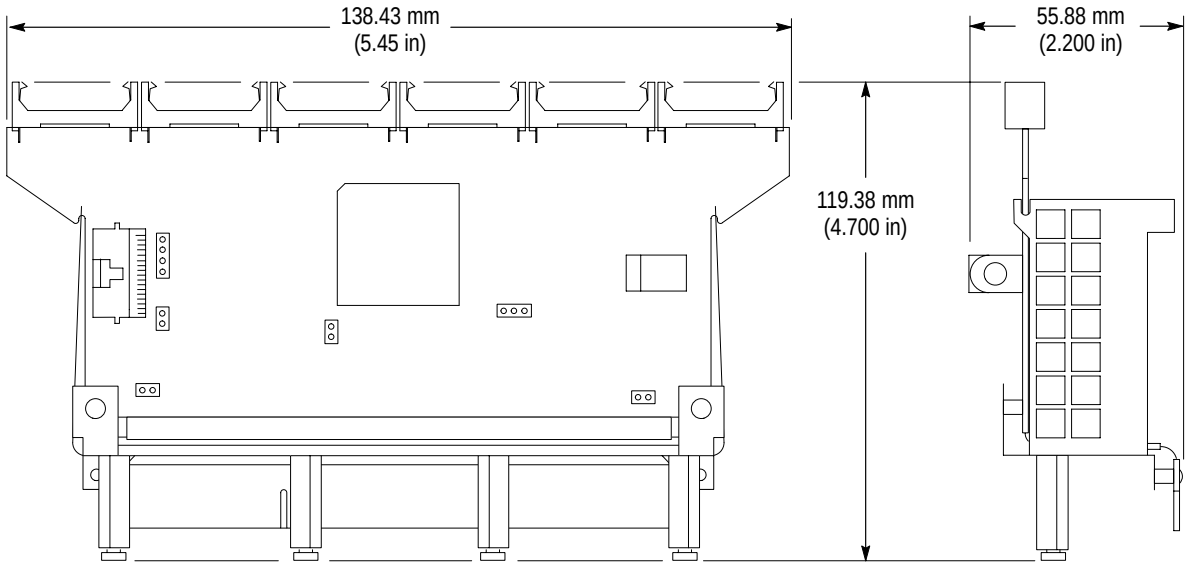


Figure 2–5: Dimensions of the SC330 probe adapter

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 information on replacing the SC330 probe adapter fuse.

Replacing the Fuse

If the fuse on the probe adapter opens (burns out), you can replace it with a 5 A, 125 V fuse. Figure 3–1 shows the location of the fuse on the SC330 probe adapter. See the *Replaceable Parts List* chapter for part descriptions.

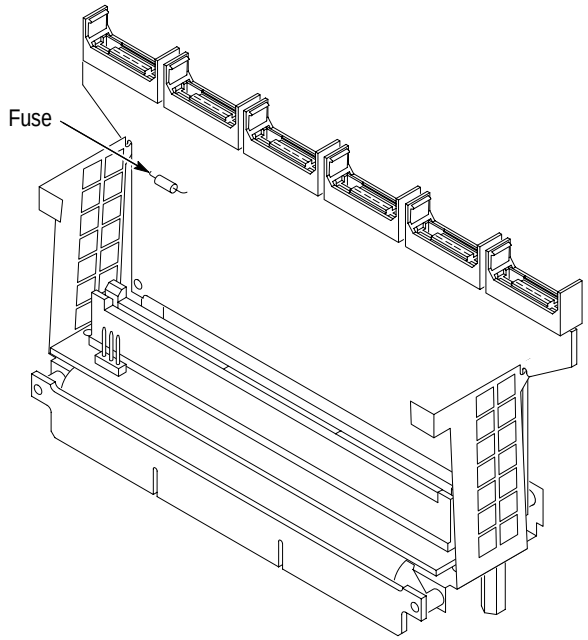


Figure 3–1: Fuse location on the SC330 probe adapter

Replaceable Parts List

Replaceable Parts List

This chapter contains a list of the replaceable components for the TMS S2A SC330 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.

Using the Replaceable Parts List

The tabular information in the Replaceable Parts List is arranged for quick retrieval. Understanding the structure and features of the list will help you find all of the information you need for ordering replacement parts. The following table describes the content of 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 entries 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.

Chassis Parts

Chassis-mounted parts and cable assemblies are located at the end of the Replaceable Electrical Parts List.

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
00779	AMP INC.	CUSTOMER SERVICE DEPT PO BOX 3608	HARRISBURG, PA 17105–3608
14310	AULT INC	7300 BOONE AVE NORTH BROOKLINE PARK	MINNEAPOLIS, MN 55428
1AW87	LEWIS SCREW CO.	4300 SOUTH RACINE AVENUE	CHICAGO, IL 60609
26742	METHODE ELECTRONICS INC	BACKPLAIN DIVISION 7444 WEST WILSON AVE	CHICAGO, IL 60656–4548
60381	PRECISION INTERCONNECT CORP.	16640 SW 72ND AVE	PORTLAND, OR 97224
61857	SAN–O INDUSTRIAL CORP	91–3 COLIN DRIVE	HOLBROOK, NY 11741
63058	BERG ELECTRONICS INC.	MCKENZIE SOCKET DIV 910 PAGE AVE	FREMONT, CA 94538–7340
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077–0001
82389	SWITCHCRAFT	DIV OF RAYTHEON 5555 N. ELSTON AVENUE	CHICAGO, IL 60630–1314
S3109	FELLER U.S. CORPORATION	72 VERONICA AVE UNIT #4	SOMERSET, NJ 08873
TK1373	PATELEC–CEM	10156 TORINO VAICENTALLO 62/456	ITALY,
TK2541	AMERICOR ELECTRONICS LTD	UNIT–H 2682 W COYLE AVE	ELK GROVE VILLAGE, IL 60007
362650	THERMACORE, INC.	780 EDEN RD	LANCASTER, PA. 17601
TK2548	XEROX CORPORATION	14181 SW MILLIKAN WAY	BEAVERTON, OR 97005

Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
4–1–0	010–0633–00			1	PROBE ADAPTER RIGID FLEX, 330–PIN,INTERPOSER,SLOT2;TMSS2A	80009	010-0633-00
–1	671–4803–00			1	CIRCUIT BD ASSY:INTERPOSER,FOR SLOT 2, TMSS2A	80009	671–4803–00
–2	105–1088–00			6	LATCH HOUSING:LATCH HOUSING ASSY,EDGE MOUNT,1/PKG,0.480 H X 1.24 L,W/PCB CLIP,TMSS2A	60381	105–1088–00
–3	131–6520–00			6	CONN,RCPT:EDGE MOUNT,MICTOR,FEMALE,RTANG,38 POS,0.025 CTR,PD NI,MATCHED IMPEDANCE	TK0AT	767044–1
–4	131–6610–00			1	JACK,POWER DC:PCB,MALE,RTANG,2MM PIN DIA,BRASS,SILVER PLATE,5A	82389	RAPC722TB
–5	131–4530–00			1	CONN,HDR:PCB,MALE,STR,1 X 3,0.1 CTR,0.230 MLG X 0.120 TAIL,30 GOLD,BD RETENTION	00779	104344–1
–6	131–4917–00			1	CONN,HDR:PCB,MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.110 TAIL,30 GOLD,TUBE,HIGH TEMP	00779	104350–1
–7	131–4356–00			1	CONN,SHUNT:SHUNT/SHORTING,FEMALE,1 X 2,0.1 CTR,0.63 H,BLK,W/HANDLE,JUMPER,30 GOLD,	26742	9618–302–50
–8	131–1857–00			1	CONN,HDR:PCB,MALE,STR,1 X 36,0.1 CTR,0.230 MLG X 0.100 TAIL,GOLD	22526	65507–136
–9	131–4850–00			1	CONN,HDR:PCB,MALE,RTANG,2 X 15,0.05 X 0.1 CTR,0.35 H X 0.10 TAIL,CTR PLZ,LATCHING,30 GOL	00779	104069–5
–10	407–4720–00			1	BRACKET,CKT BD:BOARD MOUNT,5.90 X 1.473	5Y400	407–4720–00
–11	211–0213–00			4	SCREW,MACHINE:4–40 X 0.312,PNH,NYL SLOT	0KB01	ORDER BY DESCRIPTION
–12	129–1522–00			4	SPACER,POST:STANDOFF,HEX,0.188 X 0.875,NYLON	0KB01	NY
–13	211–0325–00			6	SCR,ASSEM WSHR:4–40 X 0.250,PNH,STL,CDPL,T–9 TORX DR,MACHINE	93907	ORDER BY DESCRIPTION
–14	131–6292–00			1	CONN BOX:PCB,HI–SPEC SLOT 2,FEMALE,STR,330 POS,3 BAY,0.759 H X 0.090 TAIL,W/MTG POSTS,STA	27264	71109–2330
–15	159–0059–00			1	FUSE,WIRE LEAD:5A,125V	61857	SPI–5A
–16	214–4927–00			1	HEAT SINK,SEMIC:IC,HEAT PIPE,FOR INTEL PENTIUM III XEON SC330(SLOT 2),0.45 DEGC/W PLATE TO AIR,4	362650	214–4927–00
					STANDARD ACCESSORIES		
	071–0477–01			1	MANUAL,TECH INSTRUCTION,SC330 HARDWARE SUPPORT;TMSS2A	TK2548	071–0477–01
	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	S3109	ORDER BY DESCRIPTION
	119–5061–01			1	POWER SUPPLY:25W,5V 5A,CONCENTRIC 2MM,90–265V,47–63 HZ IEC,15X8.6X5 CM, UL,CSA, TUV,IEC,SELF	14310	SW108KA0002F01
					OPTIONAL ACCESSORIES		
	————————*			6	P6434 MASS TERMINATION PROBE, Opt 21 *	80009	P6434
	161–0104–05			1	CA ASSY,PWR:3,1.0MM SQ,250V/10A,2.5 METER,RTANG,IEC320,RCPT,AUSTRALIA,SAFTEY CONTROLLED	TK1373	161–0104–05

Replaceable parts list (cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
	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)	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

*** Check the P6434 manual for detailed replaceable part number information.**

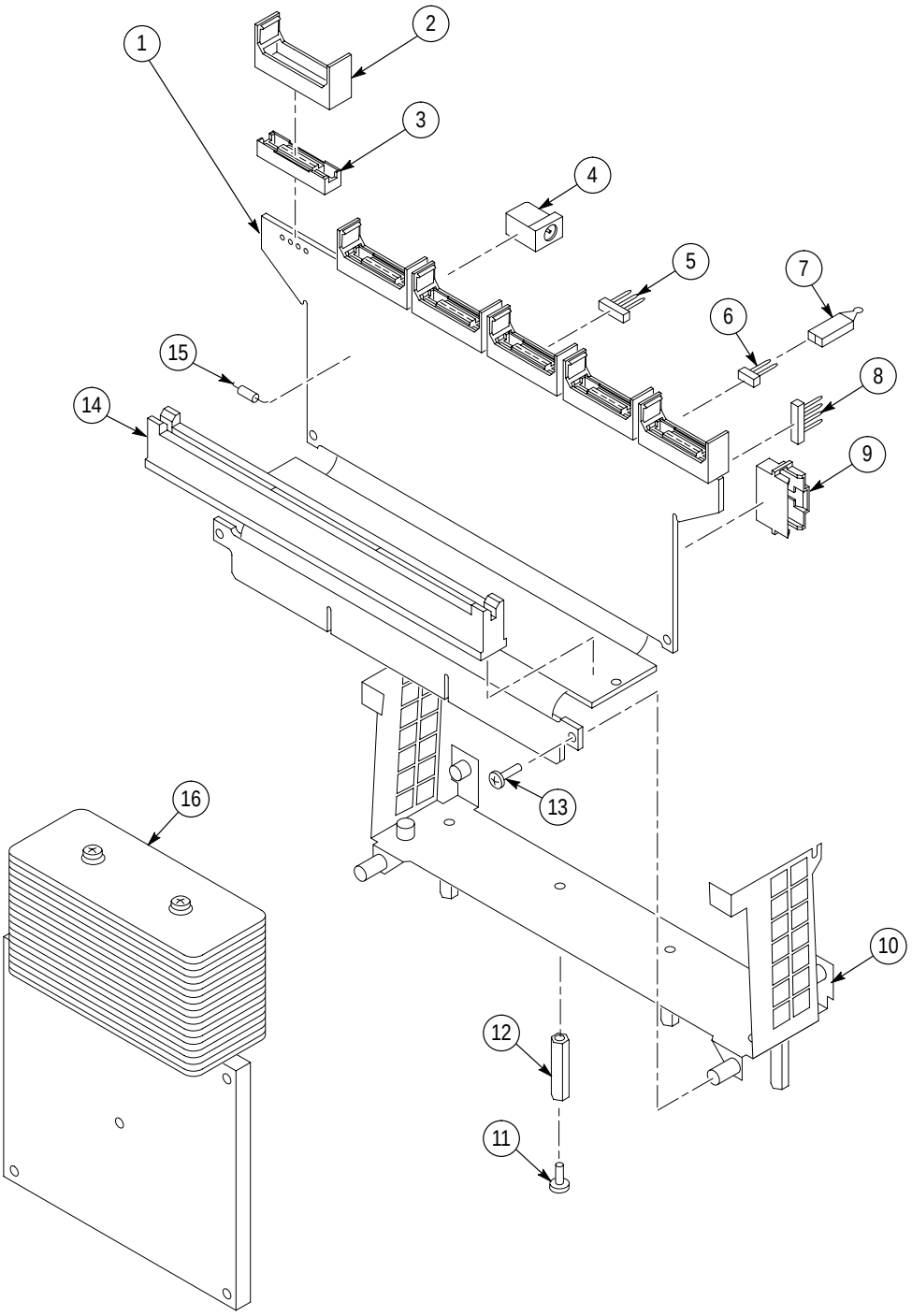


Figure 4–1: TMS S2A SC330 probe adapter exploded view

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