Instruction Manual

Tektronix
/

**DAS 92DM927
Am29205 Microprocessor Support**

070-8786-00

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 the Safety Summary prior to
performing service.

**Please check for change information at the rear
of this manual.**

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Instrument Serial Numbers

Each instrument manufactured by Tektronix has a serial number on a panel insert or tag, or stamped on the chassis. The first letter in the serial number designates the country of manufacture. The last five digits of the serial number are assigned sequentially and are unique to each instrument. Those manufactured in the United States have six unique digits. The country of manufacture is identified as follows:

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E200000	Tektronix United Kingdom, Ltd., London
J300000	Sony/Tektronix, Japan
H700000	Tektronix Holland, NV, Heerenveen, The Netherlands

Instruments manufactured for Tektronix by external vendors outside the United States are assigned a two digit alpha code to identify the country of manufacture (e.g., JP for Japan, HK for Hong Kong, IL for Israel, etc.).

Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077

Printed in U.S.A.

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Preface: GUIDE TO DAS 9200 DOCUMENTATION

The Digital Analysis System (DAS) 9200 documentation package provides the information necessary to install, operate, maintain, and service the DAS 9200. The DAS 9200 documentation consists of the following:

- a series of microprocessor-specific **microprocessor support instructions** that describe the various microprocessor support packages.

- a **system user manual** that includes a beginning user's orientation, a discussion of DAS 9200 system-level operation, and reference information such as installation procedures, specifications, error messages, and a complete system glossary.

- a series of **module user manuals** that describe each of the DAS 9200 acquisition, pattern generation, and optional I/O modules.

- an **on-line documentation** package that includes context-sensitive technical notes.

- a **programmatic command language user manual** that describes the set of programmatic commands available for remotely controlling the DAS 9200.

- a series of **application software user manuals** that describe the various application software packages.

- a **technician's reference manual** that helps a qualified technician isolate DAS 9200 problems to the individual module level and determine corrective action (including on-site removal and replacement of modules).

- a **verification and adjustment procedures manual** that allows a qualified technician to make necessary adjustments and verify specifications of the mainframe and modules.

- a series of **workbooks** that teach concepts about the DAS 9200 acquisition modules and pattern generation modules.

GENERAL SAFETY SUMMARY/ MICROPROCESSOR SUPPORT

The general safety information in this summary is for operating and servicing personnel. Specific warnings and cautions can be found throughout the manual where they apply and may not appear in this summary. While using this product you may need to access parts of the mainframe system; if so, read the General Safety Summary in your system user manual for warnings and cautions related to operating the mainframe system.

TERMS IN THIS MANUAL

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

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

TERMS AS MARKED ON EQUIPMENT

CAUTION

CAUTION indicates a hazard to property, including the equipment itself, and could cause minor personal injury.

WARNING

WARNING indicates solely a personal injury hazard not immediately accessible as you read the marking.

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

SYMBOLS AS MARKED ON EQUIPMENT

DANGER
High Voltage

Protective
ground (earth)
terminal

ATTENTION
Refer to
manual

USE CARE WITH COVERS REMOVED

To avoid personal injury, remove jewelry such as rings, watches, and other metallic objects before removing the cover. Do not touch exposed connections and components within the product while the power cord is connected.

REMOVE FROM OPERATION

If you have reason to believe that the instrument has suffered a component failure, do not operate the instrument until the cause of the failure has been determined and corrected.

USE THE PROPER FUSE

To avoid fire hazard, use only a fuse of the correct type, voltage rating, and current rating.

REMOVE LOOSE OBJECTS

During disassembly or installation procedures, screws or other small objects may fall to the bottom of the mainframe. To avoid shorting out the power supply, do not power on the instrument until such objects have been removed.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

Section 1: OVERVIEW

The 92DM900 series of support products are developed by third parties to support buses, microprocessors, microcontrollers, and digital signal processors for specific Tektronix customers. The products are currently being successfully used by these customers. If you need assistance in using this product, contact your local Tektronix Application Engineer.

This section provides basic information on the following:

- the 92DM927 Microprocessor Support product
- software compatibility
- DAS 9200 configuration
- your Am29205 system requirements
- 92DM927 restrictions
- this manual

The 92DM927 Microprocessor Support product displays data from systems that are based on the AMD Am29205 microcontroller. The 92DM927 product runs on a DAS 9200 logic analyzer equipped with at least one 92A96 Acquisition Module.

This product consists of software on a floppy disk, a probe adapter, and this manual. The software includes setup files, a demonstration reference memory, and symbol tables. A complete list of accessories and options is provided at the end of the mechanical parts list in *Appendix D: Replaceable Parts List*.

A demonstration reference memory is provided so you can see an example of state data. You can view the reference memory without connecting the DAS 9200 to your system under test. The reference memory is automatically installed on the DAS 9200 when you install the support software. Directions for viewing this file can be found in *Section 4: Acquiring and Viewing Data*.

To use this product efficiently, you need to have the following:

- knowledge of your DAS 9200 configuration and its operation

- knowledge of your Am29205 system

- this manual

- the *DAS 9200 System User Manual*

- the *92A96 Module User Manual*, Tektronix, Inc. 1992

- a user manual for your Am29205 microcontroller

- LA-LINK (if you want to download symbols from your high-level development system)

DAS 9200 SYSTEM SOFTWARE COMPATIBILITY

The 92DM927 Microprocessor Support Product is compatible with DAS 9200 System Software Release 3, Version 1.3 or higher, DAS 92XTerm System Software Release 3, Version 1.3 or higher, and DAS 9202XT System Software Release 3, Version 1.3 or higher.

DAS 9200 CONFIGURATION

To use the microcontroller support product, your DAS 9200 must be equipped with at least one 92A96 Module and four standard data acquisition probes.

Figure 1-1 shows an overview of a DAS 9200 connected to a typical probe adapter.
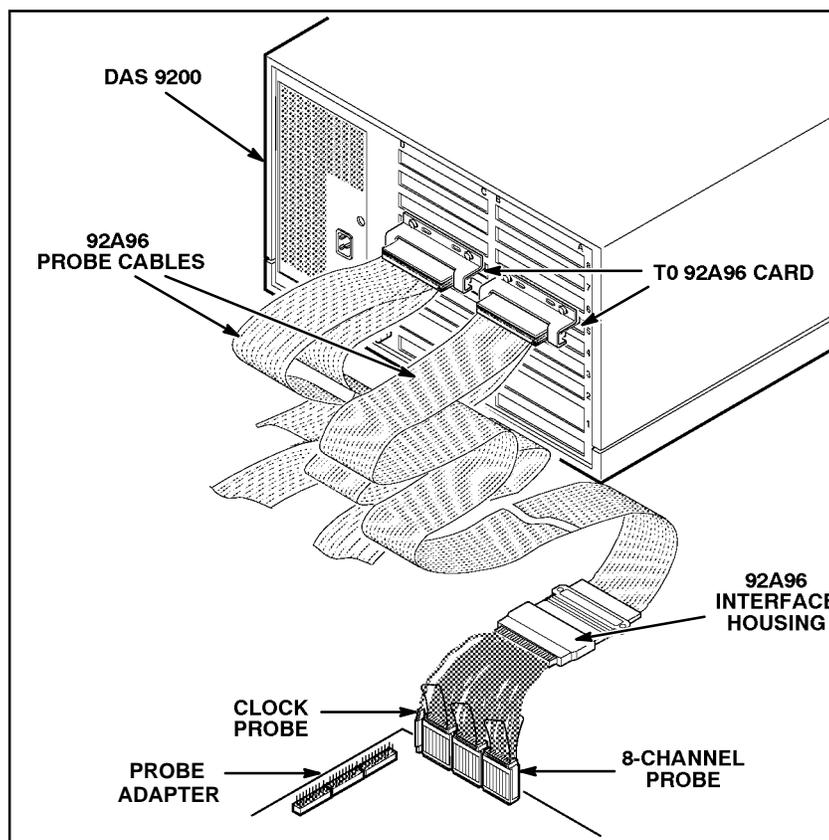
Figure 1-1. DAS 9200 connected to a typical probe adapter.

REQUIREMENTS AND RESTRICTIONS

This section describes requirements and restrictions of the microcontroller support product.

Probe Adapter Clearance. Your Am29205 system must have a minimum amount of clear space surrounding the Am29205 microcontroller to accommodate the probe adapter. Figure C-2 in *Appendix C: Service Information* gives these dimensions.

Probe Adapter Loading. Any electrical connection to your system adds an additional AC and DC load. The probe adapter was carefully designed to add a minimum load to your system. However, this additional load may affect the operation of the Am29205 microcontroller in systems with extremely tight timing margins.

Am29205 System and Probe Adapter Cooling. You must be sure to retain the original level of cooling for your Am29205 system after you install the probe adapter. To maintain the required operating temperature, you may need to provide additional cooling for the probe adapter.

ABOUT THIS MANUAL

This manual is based on the assumption that you are familiar with the operation of the DAS 9200 mainframe and the 92A96 Acquisition Module. Therefore, details about system software and how to move through the menu structure are not provided. An overview of those functions is provided so that you do not need to consult another manual.

This manual provides detailed information on how to do the following:

- install application software
- connect to your system under test
- setup the software and use it
- view acquired data
- maintain the probe adapter

Read *Section 5: General Purpose Analysis* if you are going to acquire and view data using Internal or External clocking.

Manual Conventions

The following conventions are used in this manual:

- The terms application software and support software are used interchangeably in reference to the 92DM927 software that displays the bus cycle data.
- The term SUT (system under test) is used to refer to the microcontroller system from which data is being acquired.
- References to 92A96 Modules include all versions of those modules unless otherwise noted.
- A signal that is active low has an asterisk (*) following its name.

Section 2: INSTALLATION AND CONNECTIONS

This section describes how to do the following:

- install the application software onto the hard disk
- configure the DAS 9200
- configure the probe adapter
- connect the DAS 9200 to the SUT (system under test)

INSTALLING SOFTWARE

Before installing the microcontroller application software, you should be aware that there are three different versions of DAS 9200 system software: the 9201T version, the 92XTerm, and the 9202XT version. The 9201T version allows you to operate the DAS 9200 from a 9201T terminal. The 92XTerm version allows you to operate the DAS 9200 in an X window on a workstation. The 9202XT version allows you to operate the DAS 9200 in an X window from a 9202XT terminal.

NOTE

To use the microcontroller support package, you must install application software that is compatible with your DAS 9200 mainframe configuration and system software.

If you have any two types of DAS 9200 system software (9201T, 92XTerm, 9202XT), and you switch between the two, you must install compatible application software on each system.

If you try to install application software onto an incompatible system or terminal using DAS 9200 System Software Release 3, V1.1 or greater, an error message displays.

If you try to install application software onto an incompatible system or terminal using DAS 9200 System Software Release 3, V1.0 or lower, the system will install the software but it will not operate properly when you try to use it.

Install the application software onto the DAS 9200 as follows:

1. Power on the DAS 9200 mainframe.
2. Insert the appropriate disk into the DAS 9200's floppy drive.
3. Press the Select Menu key, and select the Disk Services menu.
4. Select Install Application in the Operation field of the menu.

5. Press F8: EXECUTE OPERATION, and follow the on-screen prompts.

NOTE

After each install and load operation, a message appears on the screen informing you the operation succeeded or failed. If the message tells you the operation failed, you may need to remove applications or files from the hard disk and try installing or loading again. If the operation fails again, refer to Appendix A: Error Messages and Acquisition Problems.

If there is inadequate disk free space available on the hard disk, you must use the Remove Application or Delete File function of the Disk Services menu to free up enough disk space to install the support software. The approximate space required to install the software is listed on the label of the floppy disk.

CONFIGURING THE DAS 9200

When there are two or three 92A96 Modules in adjacent slots, they are automatically formed into a variable-width module by the system software at power up. If you need to use one 92A96 Module from a variable-width module, you must reconfigure the DAS 9200 prior to selecting software support in the 92A96 Configuration menu. Refer to the discussion of the System Configuration menu in the *DAS 9200 System User Manual* for details on how to reconfigure variable-width modules.

Refer to your module user manual for additional information about connecting probe cables, and positioning and installing 92A96 Modules.

In a system with many modules, it is easier to identify which modules are connected to the probe adapter if slot number labels are applied to the 92A96 probe interface housings and DAS 9200 mainframe. Figure 2-1 shows where to apply slot number labels.
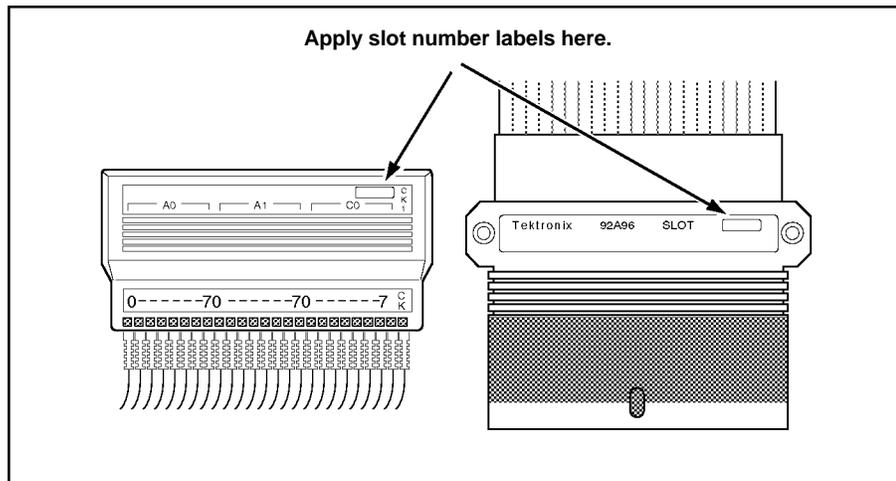
Figure 2-1. Applying slot number labels.

CONFIGURING THE PROBE ADAPTER

The Normal/Timing jumper (J1220) configures the probe adapter for either normal operation or to acquire timing data. It should be placed in the DISASM position to acquire state data, and in the TIMING position to acquire timing data. (When acquiring timing data, the multiplexers on the probe are held in "straight-through" mode; addresses are logged with address bit A0 logged on A0:0, A1 logged on A0:1, A2 on A0:2, and so on, regardless of what type of access is taking place.) Figure 2-2 shows the location of J1220 on the probe adapter.
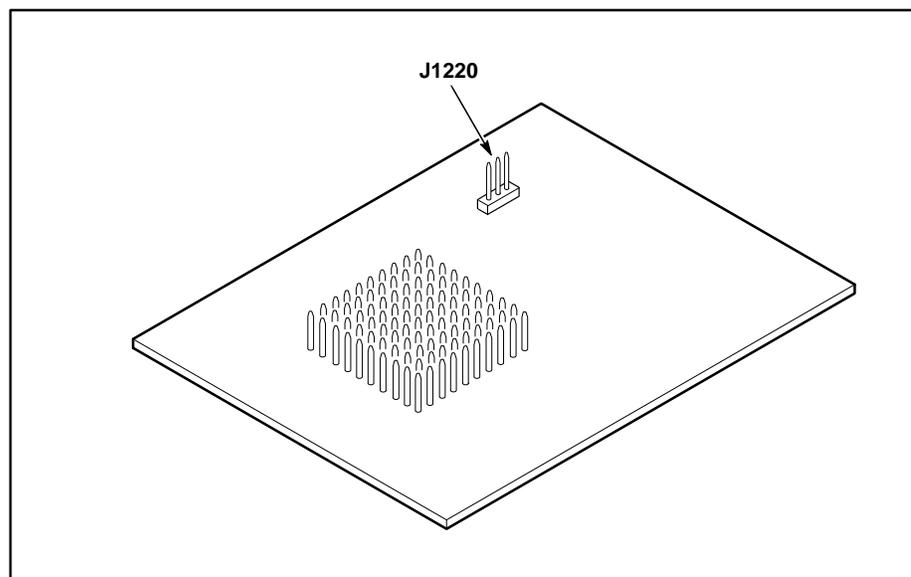
Figure 2-2. Jumper location on the probe adapter.

CONNECTING TO THE SYSTEM UNDER TEST

Before you connect to the SUT, you must connect the standard probes to the 92A96 Module card. Your SUT must also have a minimum amount of clear space surrounding the microcontroller to accommodate the probe adapter. Refer to *Appendix C: Service Information* for the required clearances.

To connect the probe adapter to the SUT, do the following:

1. Turn off power to your SUT. It is not necessary to turn off the DAS 9200.

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CAUTION
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> *Static discharge can damage the microcontroller, probe adapter, podlets, or the 92A96 Module. To prevent static damage, handle all the above only in a static-free environment.*
>
> *Always wear a grounding wrist strap, or a similar device, while handling the microcontroller and probe adapter.*

2. To discharge your stored static electricity, touch the ground jack located on the back of the DAS 9200. Then, touch any of the ground pins of the probe adapter to discharge stored static electricity from the probe adapter.

3. Place the probe adapter onto the antistatic shipping foam to support the probe as shown in Figure 2-3. This prevents the circuit board from flexing.

4. Connect the clock and 8-channel probes to the probe adapter as shown in Figure 2-3. Match the channel groups and numbers on the interface housing to the corresponding pins on the probe adapter.
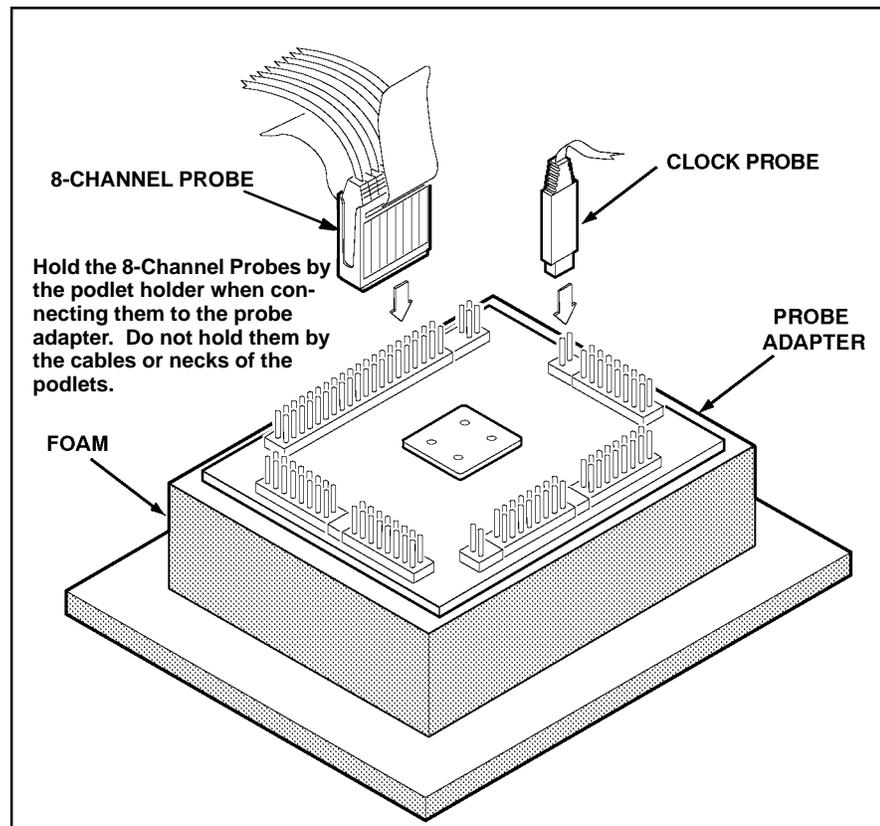
Figure 2-3.   Connecting the podlets to a typical PQFP probe adapter.

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CAUTION
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This JEDEC PQFP (Plastic Quad Flat Pack) probe adapter is equipped with a clip that has been designed for tight tolerances.

The clip supports only Plastic Quad Flat Pack devices that conform to the JEDEC M0-069 October 1990 specification. Attaching the clip to a device that does not conform to this JEDEC standard can easily damage the clip's connection pins and/or the microcontroller, causing the probe adapter to malfunction.

Please contact your IC manufacturer to verify that the microcontroller you are targeting conforms to the JEDEC specification.

For best performance and long probe life, exercise extreme care when connecting the probe to the microcontroller.

5. Remove the probe adapter from the shipping foam and carefully seat the PQFP100 converter clip on it, as shown in Figure 2-4. Refer to the *PQFP100 Converter Clip Instructions* included with the product for more information about the converter clip.
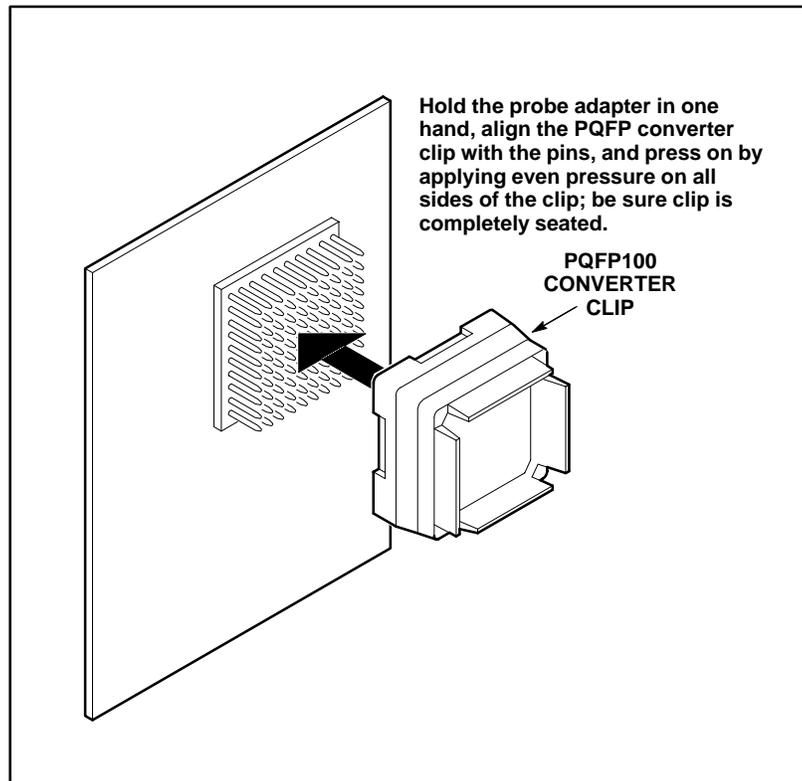
Figure 2-4. Seating the converter clip on the probe adapter.

6. Line up the pin 1 indicator on the target head of the circuit board (a white triangle) with the pin 1 indicator on the microcontroller.

CAUTION

Failure to correctly place the probe adapter onto the microcontroller may permanently damage all electrical components when power is applied.

Center the clip on the microcontroller and apply an equal downward force on all four sides of the clip, slightly rocking the adapter in a clockwise circle.

Do not leverage the probe adapter when installing or removing the probe.

7. Place the probe adapter onto the SUT as shown in Figure 2-5.
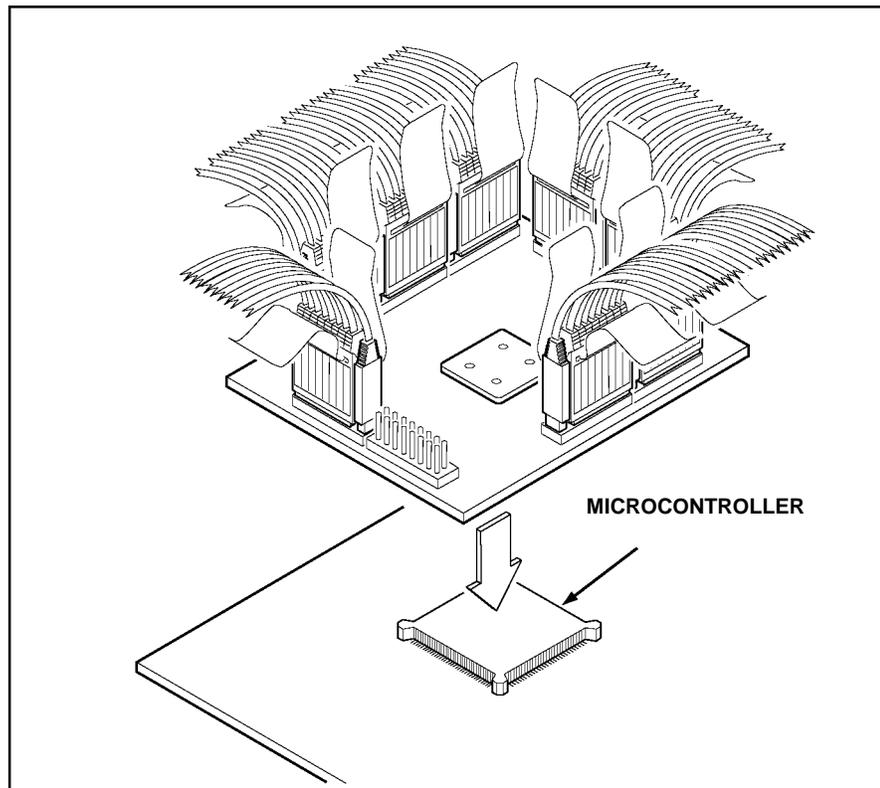
MICROCONTROLLER

Figure 2-5.   Placing a typical PQFP probe adapter onto the SUT.

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CAUTION
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The probe adapter board may slip off or slip to one side of the microcontroller because of the extra weight of the podlets. This can damage the microcontroller and the SUT. To prevent this from occurring, stabilize the probe adapter by placing a nonconductive object (such as foam) between the adapter and the SUT.

Section 3: SETTING UP SUPPORT SOFTWARE

This section provides information on preparing the support software for acquiring data. The section discusses the following:

- load support software
- channel groups and assignments
- changes that affect the data display
- clocking options
- symbols
- triggering

Before you acquire and display data, you need to load support software and specify setups for clocking, triggering, and using symbols. The software provides default values for each of these setup controls, but you can change them as needed.

LOADING SUPPORT SOFTWARE

To load the Am29205 support software, follow these steps:

1. Press the Menu Select key, select the appropriate 92A96 Module, select its Configuration menu, and press Return.
2. Select 29205 in the Software Support field.
3. Press F8: EXECUTE OPERATION.

When you load the support software, the Channel, Clock, and Trigger menus are automatically set up to acquire data from your Am29205 system. You can change the setups in the Clock and Trigger menus as needed. Refer to *Channel Groups and Assignments* for information on what can be changed in the Channel menu.

CHANNEL GROUPS AND ASSIGNMENTS

The support software automatically defines the channel groups for the microcontroller. The channel groups for the Am29205 microcontroller are the following:

 ACCESS   ADDRESS   CONTROL   DATA   INTR   MISC   PRGRMIO

These channel groups cannot be changed nor can the channels be reused in another group; however, you can define and display additional groups. If you want to know which signal is in which group, refer to the channel assignment tables in *Appendix C: Service Information*. Channel assignments are also shown in the 92A96 Channel setup menu.

CHANGES THAT AFFECT THE DATA DISPLAY

You can change part of the default setups for the 92A96 Module. However, keep in mind that if you change the threshold voltage or display polarity, the displayed data will be affected.

CUSTOM CLOCKING

You can use the Clock menu to set clocking choices to control data sampling. The 92DM927 support software offers a customized clocking selection for the Am29205 microcontroller. This clocking choice (Custom) is the default selection whenever you select 29205 Software Support in the Configuration menu.

The 92DM927 support software provides two modes for acquiring Am29205 data: DRAM Refresh Cycles Included or DRAM Refresh Cycles Not Included. The default is DRAM Refresh Cycles Not Included. You can change the clocking mode by changing the DRAM Refresh Cycles option field in the Clock menu.

DRAM Refresh Cycle. A DRAM Refresh Cycle is defined as any RAS signal before a CAS signal (implicit) Refresh that is not in the background of another memory access.

Figure 3-1 shows the Clock menu. A description of how cycles are sampled by the support software, probe adapter, and 92A96 is found in *Appendix B: How Data is Acquired*.

Figure 3-1. Clock menu.

Refer to *Section 5: General Purpose Analysis* for a description of using these other clock selections with this microcontroller support package.

To select the clocking mode, do the following:

1. Press the Select Menu key.

2. Select the Clock menu for the module you want to use.

3. Move the cursor to the DRAM Refresh Cycles field and select one of the following types of clocking:

   • DRAM Refresh Cycles Not Included

   • DRAM Refresh Cycles Included

SYMBOLS

Symbols can be used to represent a specific channel group value or a range of channel group values (defined by upper and lower bounds).

You can use symbol tables to display channel group information symbolically in the State menu and to control triggering. There is a symbol table file (named 29205_CTRL) supplied by the support software that replaces specific Control channel group values.

Table 3-1 shows the name, bit pattern, and meaning for the symbols in the 29205_CTRL file, the Control group symbol table.

Table 3-1
29205_CTRL Symbol Table Definitions

Symbol	Control Group Value			Meaning
	RESET* **R_W*** **POE***	**PWE*** **RSWE*** **ROMOE*** **PIAWE***	**PIAOE*** **CAS2*** **CAS3*** **RAS_D***	
RESET	0 X X	X X X X	X X X X	Reset
READ	1 1 1	1 X X X	X X X X	A ROM, DRAM, PIA, or DMA read
WRITE	1 0 1	1 X X X	X X X X	A ROM, DRAM, PIA, or DMA write
PARPRT_RD	1 X 0	1 1 1 1	1 1 1 1	A parallel port read
PARPRT_WR	1 X 1	0 1 1 1	1 1 1 1	A parallel port write

X represents Don't Care character.

Table 3-2 shows the name, bit pattern, and meaning for the symbols in the 29205_ACCS file, the Access group symbol table.

Table 3-2
29205_ACCS Symbol Table Definitions

Symbol	Access Group Value RAS3* RAS2* RAS1*	Access Group Value RAS0* ROMCS2* ROMCS1* ROMCS0*	Access Group Value PIACS1* PIACS0* DACK1* CAS_L*	Meaning
DMA1	1 1 1	1 1 1 1	X X 0 X	DMA access
DMA1_RFB3	0 1 1	1 1 1 1	X X 0 0	DMA with DRAM bank 3 refresh
DMA1_RFB2	1 0 1	1 1 1 1	X X 0 0	DMA with DRAM bank 2 refresh
DMA1_RFB1	1 1 0	1 1 1 1	X X 0 0	DMA with DRAM bank 1 refresh
DMA1_RFB0	1 1 1	0 1 1 1	X X 0 0	DMA with DRAM bank 0 refresh
PIA0	1 1 1	1 1 1 1	1 0 1 X	PIA bank 0 access
PIA0_RFB3	0 1 1	1 1 1 1	1 0 1 0	PIA bank 0 with DRAM bank 3 refresh
PIA0_RFB2	1 0 1	1 1 1 1	1 0 1 0	PIA bank 0 with DRAM bank 2 refresh
PIA0_RFB1	1 1 0	1 1 1 1	1 0 1 0	PIA bank 0 with DRAM bank 1 refresh
PIA0_RFB0	1 1 1	0 1 1 1	1 0 1 0	PIA bank 0 with DRAM bank 0 refresh
PIA1	1 1 1	1 1 1 1	0 1 1 X	PIA bank 1 access
PIA1_RFB3	0 1 1	1 1 1 1	0 1 1 0	PIA bank 1 with DRAM bank 3 refresh
PIA1_RFB2	1 0 1	1 1 1 1	0 1 1 0	PIA bank 1 with DRAM bank 2 refresh
PIA1_RFB1	1 1 0	1 1 1 1	0 1 1 0	PIA bank 1 with DRAM bank 1 refresh
PIA1_RFB0	1 1 1	0 1 1 1	0 1 1 0	PIA bank 1 with DRAM bank 0 refresh
ROM0	1 1 1	1 1 1 0	1 1 1 X	ROM bank 0 access
ROM0_RFB3	0 1 1	1 1 1 0	1 1 1 0	ROM bank 0 with DRAM bank 3 refresh
ROM0_RFB2	1 0 1	1 1 1 0	1 1 1 0	ROM bank 0 with DRAM bank 2 refresh
ROM0_RFB1	1 1 0	1 1 1 0	1 1 1 0	ROM bank 0 with DRAM bank 1 refresh
ROM0_RFB0	1 1 1	0 1 1 0	1 1 1 0	ROM bank 0 with DRAM bank 0 refresh
ROM1	1 1 1	1 1 0 1	1 1 1 X	ROM bank 1 access
ROM1_RFB3	0 1 1	1 1 0 1	1 1 1 0	ROM bank 1 with DRAM bank 3 refresh
ROM1_RFB2	1 0 1	1 1 0 1	1 1 1 0	ROM bank 1 with DRAM bank 2 refresh
ROM1_RFB1	1 1 0	1 1 0 1	1 1 1 0	ROM bank 1 with DRAM bank 1 refresh
ROM1_RFB0	1 1 1	0 1 0 1	1 1 1 0	ROM bank 1 with DRAM bank 0 refresh

X represents Don't Care character.

Table 3-2 (continued)
29205_ACCS Symbol Table Definitions

Symbol	Access Group Value RAS3* RAS2* RAS1*	RAS0* ROMCS2* ROMCS1* ROMCS0*	PIACS1* PIACS0* DACK1* CAS_L*	Meaning
ROM2	1 1 1	1 0 1 1	1 1 1 X	ROM bank 2 access
ROM2_RFB3	0 1 1	1 0 1 1	1 1 1 0	ROM bank 2 with DRAM bank 3 refresh
ROM2_RFB2	1 0 1	1 0 1 1	1 1 1 0	ROM bank 2 with DRAM bank 2 refresh
ROM2_RFB1	1 1 0	1 0 1 1	1 1 1 0	ROM bank 2 with DRAM bank 1 refresh
ROM2_RFB0	1 1 1	0 0 1 1	1 1 1 0	ROM bank 2 with DRAM bank 0 refresh
DRAM_BNK3	0 1 1	1 1 1 1	1 1 1 1	DRAM bank 3 access
DRAM_BNK2	1 0 1	1 1 1 1	1 1 1 1	DRAM bank 2 access
DRAM_BNK1	1 1 0	1 1 1 1	1 1 1 1	DRAM bank 1 access
DRAM_BNK0	1 1 1	0 1 1 1	1 1 1 1	DRAM bank 0 access
REFRESH_3	0 1 1	1 1 1 1	1 1 1 0	DRAM bank 3 refresh
REFRESH_2	1 0 1	1 1 1 1	1 1 1 0	DRAM bank 2 refresh
REFRESH_1	1 1 0	1 1 1 1	1 1 1 0	DRAM bank 1 refresh
REFRESH_0	1 1 1	0 1 1 1	1 1 1 0	DRAM bank 0 refresh
IDLE_ADDR	1 1 1	1 1 1 1	1 1 1 X	No access to ROM, DRAM, DMA, or PIA address space during this cycle

X represents Don't Care character.

Refer to *Triggering* in this section and *Displaying Channel Groups Symbolically* in Section 4 for more information on using and displaying symbolic values. Refer also to *Searching Through Data* in Section 4 for information on how to use symbol table values for data searches.

Copying and Editing the Predefined Symbol Tables. You cannot directly edit any symbol tables supplied by microcontroller support. But you can make a copy of a predefined symbol table and then edit the copy for your specific use.

To create a new symbol table, follow these steps:

1. Select the Symbol Editor menu from the Menu Selection overlay.
2. Press F2: FILE FUNCTIONS.
3. Select Open File in the Function field, and press Return.
4. Select New File in the Edit Status field, and press Return.
5. Enter a new symbol table file name in the New File Name field.
6. Select Pattern or Range in the Table Type field to match the symbol table you are copying, and press Return.
7. Press F5: EXECUTE FUNCTION.
8. Select Merge Files in the Function field, and press Return.
9. Select the file to base your new symbol table on, such as the 29205_CTRL file.
10. Press F5: EXECUTE FUNCTION.
11. Press F8: EXIT & SAVE.
12. Edit the file as desired keeping the following in mind:
    - If the new symbol has fewer don't cares than an existing symbol, it must be placed ahead of the existing symbol.
    - If the new symbol has more don't cares than an existing symbol, it must be placed after the existing symbol.
    - Do not duplicate symbol names.

    Also refer to your *DAS 9200 System User Manual* for more information on editing the symbol table.

13. Select the Channel menu from the Menu Selection overlay.
14. Change the file name of the symbol table for the Control group (or whichever group's symbol table you are replacing) to the one that you specified in step 5.

TRIGGERING

All the Trigger menu selections available for use with your 92A96 Module are also available for use with state data analysis. Refer to your module user manual for a list and description of these selections.

You can use the Home key to quickly clear the word recognizer field of any channel group with a symbolic radix. To clear a word recognizer, open the field, press the Home key, and close the field. The first entry on the list is blank.

The DAS 9200 makes it possible to cross-trigger with other modules or to an external instrument. You may want to consider sending or receiving a signal to or from another module, or to the Sync Out SMB connector on the module. You should refer to your *DAS 9200 System User Manual* for an in-depth description of defining and using signals, and to specific module user manuals for a description of using the Sync Out SMB connector.

Section 4:   ACQUIRING AND VIEWING DATA

This section describes how to acquire data and view it in the State display. This section explains:

- acquiring data

- viewing data

- displaying groups symbolically

- searching through data

- printing data

- viewing the demonstration reference memory

ACQUIRING DATA

Once you load the Am29205 support, choose a clocking mode and specify the trigger, you are ready to acquire data. Press the F1: START acquisition key to begin the acquisition. You can press the F1: STOP key at any time to stop acquisition.

If you have any problems acquiring data, refer to *Appendix A: Error Messages and Acquisition Problems*.

VIEWING STATE DATA

The 92A96 Module displays state data in the State display. This display shows the bus cycles with addresses, data, and other channel group values if selected. Figure 4-1 shows an example of Am29205 data.

Figure 4-1. Am29205 data in the State display using Custom clocking.

You can select a display format and tailor it for your application using the State Format Definition overlay. Refer to your *92A96 Module User Manual* for a detailed description of the selections available in this overlay, such as adding the Timestamp group.

Displaying Channel Groups Symbolically

Any channel group can be displayed as symbolic values in the State menu similar to the way the Control group can be displayed as symbolic values in the State menu. You can use the Symbol Editor menu to create symbol tables in which symbols are assigned to various channel group values (ranges or patterns). You can then change the radix of the channel group in the State menu using the State Format Definition overlay, and select the symbol table you created to use for display or triggering purposes.

Searching Through Data

You can define data patterns you want to search for in the State display by using the State Search Definition overlay. To access this overlay, press F6: DEFINE SEARCH from the State menu.

To define and execute a search, follow these steps:

1. Press F6: DEFINE SEARCH from the State display menu to access the State Search Definition overlay.

2. Define the type of search and values on which to search.

3. Press F8: EXIT & SAVE.

4. Press either F8: SEARCH FORWARD or F7: SEARCH BACKWARD to start the search.

5. To abort a search, press the Break key.

Figure 4-2 shows the State Search Definition overlay.
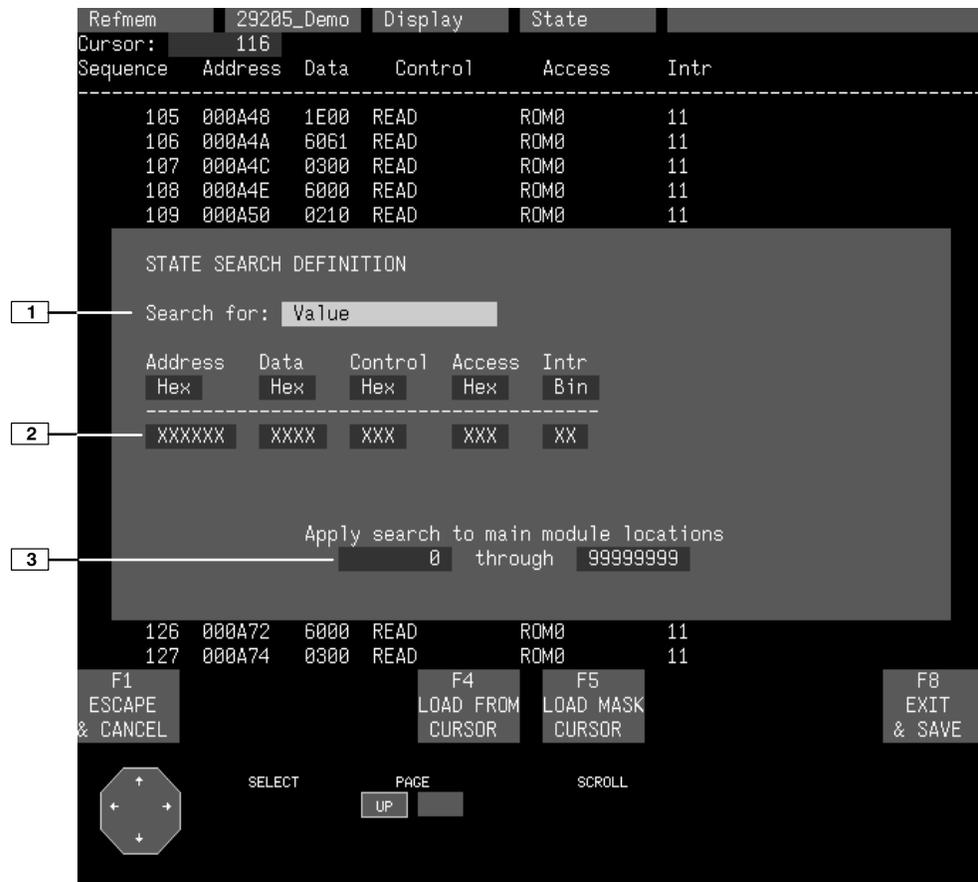
Figure 4-2. State Search Definition overlay.

[1] **Search Type.** Selects the type of search you want to perform; to search for data values, use the Value selection.

[2] **Search Value.** Specifies the value for which you want to search. You cannot search by symbol names for any group with a symbol table. For the Control group, you should search on binary values. Refer to the Control group symbol table in Section 3 to see the symbols for the Control group and their binary values.

[3] **Search Range.** Specifies the lower- and upper-bound sequences of the range you want to search. The default value is the entire acquisition memory.

Function Keys

F1: ESCAPE & CANCEL. Closes the overlay and discards any changes you have made since entering it.

F4: LOAD FROM CURSOR. Loads the data values from the sequence the cursor is on (corresponding to the main module) to the search value fields for the channel groups. Don't care (Xs) mask entries *are not* retained.

F5: LOAD MASK CURSOR. Loads the data values (including mask entries) from the sequence the cursor is on (corresponding to the main module) to the search value fields for the channel groups. Don't care (Xs) mask entries *are* retained.

F8: EXIT & SAVE. Exits the overlay and executes or saves any changes made.

PRINTING DATA

To print state data, use the State Table Print overlay. To access this overlay, press the Shift and Print keys at the same time from the State menu. Refer to your *DAS 9200 System User Manual* for a detailed description of the selections available in this overlay.

REFERENCE MEMORY

A demonstration reference memory file is provided so you can see an example of how your Am29205 microcontroller instruction mnemonics look when they are displayed. A symbol table for the Address group of the demonstration reference memory is also provided so you can see an example of range symbols. Viewing the reference memory is not a requirement for preparing the 92A96 Module for use. You can view the reference memory file without connecting the DAS 9200 to your SUT.

To view the 29205_Demo Refmem, follow these steps:

1. Press the Select Menu key and select the 29205_Demo file from the Refmem column.
2. Select the State menu, and press Return.

Section 5: GENERAL PURPOSE ANALYSIS

You may need to perform general purpose (timing) analysis on your Am29205 system prior to, during, and after attempting to integrate your software with the Am29205 system hardware. When performing hardware analysis, you will want to use the data acquisition module to acquire data with a finer resolution. When more data samples are taken in a given period of time, the resolution in the Timing display increases, letting you see signal activity that would otherwise go undetected.

This section provides information on the following:

- clocking

- triggering

- displaying data

- supplied Timing Format Definition file

To acquire and display timing data, you need to change the clocking selection and trigger program, acquire data, and view it in the Timing menu. A predefined Timing Format Definition overlay file called 29205_96 can be used to view Am29205 timing data. A description of these files and how to use them can be found later in this section.

There often is a need to view data in a split screen display with state data in one half and timing data in the other. Do not disconnect any of the 92A96 probe cables or interface housings if you are analyzing data in this manner. Instead, use the extra channels available from the 92A96 Module to make other Am29205 system connections.

CLOCKING

To change the data sampling rate, use the Clock menu.

The Normal/Timing jumper, J1220, on the probe adapter should be set in the Timing position to acquire timing data. For more information on the Normal/Timing jumper, refer to Section 2.

When using the 92A96 Module for timing analysis, you will want to use the Internal or External clocking modes. The Internal clock selection can sample data up to 100 MHz, which has a 10 ns resolution between samples. The External clock selection samples data on every active clock edge on the 92A96 clock inputs up to 100 MHz.

The Clock menu is shown in Figure 3-1. The default clocking mode is Custom when microcontroller support is used; you will need to change it to either Internal or External. Your *92A96 Module User Manual* contains an in-depth description of Internal and External clocking.

Custom Clocking

Custom clocking only stores one data sample for each bus transaction, which can take one or more clock cycles. Custom clocking also time-aligns certain signals that otherwise would be skewed relative to the current bus transaction. This clocking selection is generally unproductive for timing analysis. Refer to Appendix B for a more in-depth description of how Custom clocking is used with the probe adapter to acquire data.

Internal Clocking

When you select Internal as the clocking mode, the 92A96 Module stores one data sample as often as every 10 ns (100 MHz). This clocking selection is commonly referred to as asynchronous.

Two typical uses of Internal clocking might be to verify that all the Am29205 signals are transitioning as expected or to measure timing relationship between signal transitions.

It is possible to acquire asynchronous data at rates of 200 MHz and 400 MHz. The faster the 92A96 Module acquires data, the fewer channels it can acquire data on. A single 92A96 Module can acquire data on 24 channels at 400 MHz or 2.5 ns resolution. Refer to your *92A96 Module User Manual* for information on sampling data at speeds faster than 100 MHz.

External Clocking

When you select External as the clocking mode, the 92A96 Module acquires and stores data based on the clock channel up to 100 MHz. This clocking selection is commonly referred to as synchronous.

By selecting the rising edge of CLK: 3 on the acquisition module as the clock channel, and turning off the remaining three clocks, the module will sample data on every rising edge of the clock. No data is acquired on the falling clock edge unless you select both edges.

You can also use the other three clock channels as qualifiers or clocks to further modify the clocking in of information from your Am29205 system.

TRIGGERING

All the Trigger menu selections available for use with the 92A96 Module are still available for use with timing analysis. Refer to your module user manual for a list and description of the selections.

ACQUIRING DATA

You can acquire data as described in the *Acquiring Data* description in Section 4. The Normal/Timing jumper, J1220, on the probe adapter should be set in the Timing position to acquire timing data. For more information on the Normal/Timing jumper, refer to Section 2.

DISPLAYING DATA

General purpose analysis requires that you view data in either the State or Timing menus. The following discussion describes these menus.

Timing Menu

In the Timing menu, every channel is shown as a waveform, and groups of channels are shown as bus forms.

A predefined Timing Format Definition overlay file, part of the Am29205 microcontroller support, is available for you to use when displaying data in the Timing format. The 29205_96 file is installed on the DAS 9200 with the support software.

The 29205_96 Timing Format file places the Am29205 system clock first followed by the Address and Data groups displayed as bus forms containing bus values instead of as individual timing waveforms. These groups are followed by other important control signals. Figure 5-1 shows data displayed using the 29205_96 file.

To select the supplied Timing Format Definition file, follow these steps:

1. Select the Timing menu and press F5: DEFINE FORMAT.

2. Press F5: RESTORE FORMAT.

3. Select 29205_96, and press the Return key. A message tells you the format file is selected.

4. Press F8: EXIT & SAVE to return to the Timing menu.

Refer to the channel assignment tables in Appendix C for the lists of individual channels and their Am29205 signal names.
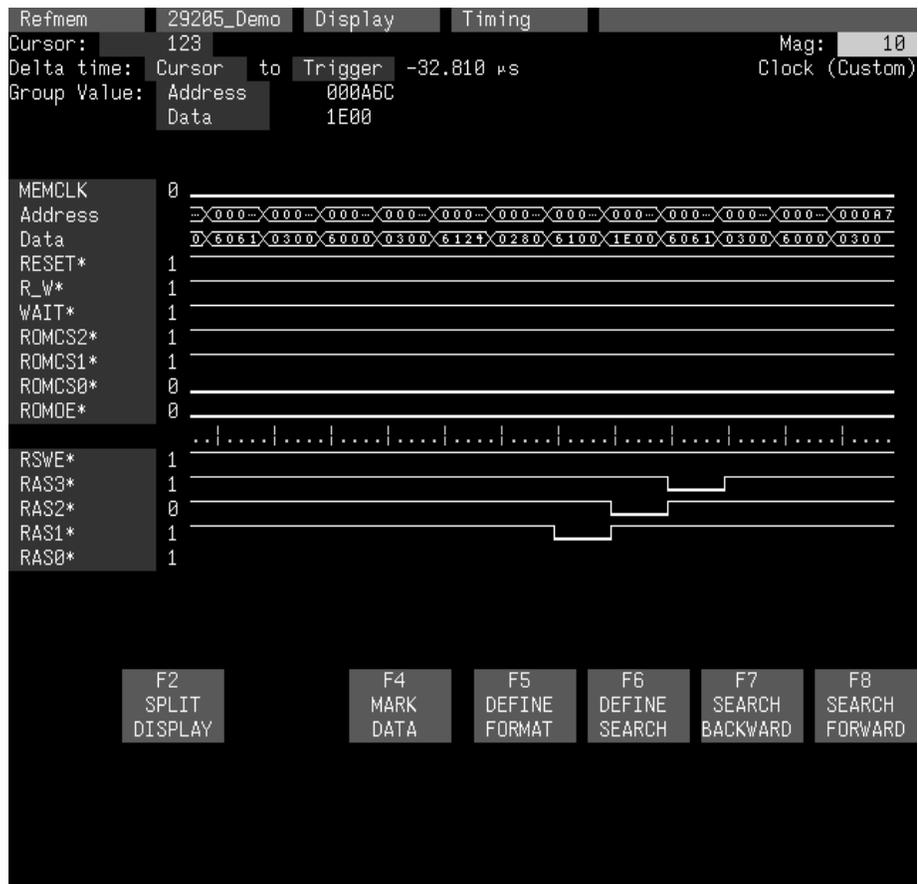
Figure 5-1. Timing data using the 29205_96 Timing Format file.

State Menu

In the State menu, all channel group values are shown based on the selected radix in the Channel menu or the State Format Definition overlay. This menu shows the bus cycles with addresses, data, and other group values if selected.

If you want to display other channel groups (such as Misc), access the State Format Definition overlay and change the radix for the group from Off to Hex, Bin, or Oct. This overlay also allows you to add the Timestamp group (and change the radix) to the data display.

SEARCHING THROUGH DATA

To search through data, you can use either the Timing Search Definition overlay or the State Search Definition overlay. You can use these overlays and search through data as described in your *92A96 Module User Manual*.

Before performing a search in the Timing menu, be sure to check the State Format Definition overlay and make sure the channels on which you want to conduct the search will be displayed (radix is not Off). Channels in the TIming menu cannot be searched on unless they can also be displayed in the State menu.

PRINTING DATA

To print state data, you can use the State Table Print overlay. To access this overlay, press the Shift and Print keys at the same time from the State menu.

To print timing data, you can use the Timing Print overlay. To access this overlay, press the Shift and Print keys at the same time from the Timing menu.

For detailed information on the State Table Print overlay or the Timing Print overlay, refer to your *92A96 Module User Manual*.

Appendix A: ERROR MESSAGES AND ACQUISITION PROBLEMS

This appendix describes error messages and problems that you may encounter while acquiring data.

MODULE ERROR MESSAGES

These error messages will appear in the Module Monitor menu when there are problems with acquiring data or satisfying the trigger program. The error messages are listed in alphabetical order; a description of the error message and the recommended solution follow the error message.

Slow Clock. This message appears when the active clock channel (or channels) is not changing, is typically changing at 1 ms or slower intervals, or one of the clock qualifiers is held in the wrong state. Check for the following:

1. The Am29205 system is powered on and running. Be sure the system is not halted.

2. 29205 Support is selected in the appropriate 92A96 Configuration menu.

3. Custom is selected in the Clock menu.

4. The connections between the 92A96 Module and the probe adapter are correct.

   - The clock and 8-channel probe connections between the interface housings and probe adapter are correct (module name, clock, section names, and channel numbers match), are properly oriented (GND connects to ground), and are fully engaged.

   - The connections between the interface housings and 92A96 probe cables have matched color labels, matched slot numbers, and are properly keyed.

   - The connections between the 92A96 probe cables and probe connectors have matched color labels, matched slot numbers, and are properly keyed.

5. The orientation of pin 1 on the microcontroller, the probe adapter, and SUT are correct

6. No bent or missing pins on the Am29205 microcontroller or on either of the probe adapter sockets.

7. The Normal/Timing jumper is in the DISASM position.

Waiting for Stop. This message appears when the trigger condition is satisfied and memory is full but the Manual Stop mode is selected in the Cluster Setup menu. The solution is to manually stop the DAS 9200 by pressing F1: STOP.

This message can also appear when other modules in the cluster have not filled their memories. Wait for the other modules to fill their memories. If the message does not disappear in a short time, press F1: STOP.

Waiting for Stop-Store. This message appears when the trigger condition is satisfied but the amount of post-fill memory specified in the trigger position field is not yet filled. Press F1: STOP to view the acquired data, then check for the following:

1. The trigger program in the Trigger menu is correct.

2. The storage qualification in the Trigger menu is correct.

3. The system or the module does not have an exception or fault. The Am29205 system or acquisition module might have experienced a hardware or software exception or fault after the trigger condition was satisfied.

Waiting for Trigger. This message appears when the trigger condition does not occur. Check for the following:

1. The Am29205 system is powered on and running. Be sure the system is not halted.

2. The trigger conditions are not being satisfied. The Module Monitor menu shows which state events are not occurring. Press F1: STOP, access the Trigger menu, and redefine the conditions for that state. Also refer to the description on *Triggering* in Section 3.

ACQUISITION PROBLEMS

There may be problems for which no error messages are displayed. Some of these problems and their recommended solutions follow.

Incorrect Data. If the data acquired is obviously incorrect, check the following:

1. 29205 Support is selected in the 92A96 Configuration menu.

2. Custom is selected in the Clock menu.

3. The Normal/Timing jumper is in the DISASM position.

4. The connections between the 92A96 Module and the probe adapter are correct.

- The clock and 8-channel probe connections between the interface housings and probe adapter are correct (module name, clock, section names, and channel numbers match), are properly oriented (GND connects to ground), and are fully engaged.

- The connections between the interface housings and 92A96 probe cables have matched color labels, matched slot numbers, and are properly keyed.

- The connections between the 92A96 probe cables and probe connectors have matched color labels, matched slot numbers, and are properly keyed.

5. The orientation of pin 1 on the microcontroller, the probe adapter, and SUT are correct.

6. No bent or missing pins on the Am29205 microcontroller or on either of the probe adapter sockets.

Other Suggestions. If the previous suggestions do not fix the problem with acquiring data, try the following:

1. Reload the module setup; select 29205 Support in the 92A96 Configuration menu to restore the DAS 9200 to a known state.

2. Possible AC and DC loading problems may be remedied by removing one or both of the protective sockets from the probe adapter. These sockets may add enough additional inductance to your Am29205 system to affect it. Refer to Appendix C for a description to remove sockets from the probe adapter.

If the DAS 9200 still is not acquiring data after trying these solutions, there may be a problem with your Am29205 system. Try performing hardware analysis with your DAS 9200 system to ensure that the Am29205 signals are valid at the time the probe adapter samples them.

Refer to *Section 5: General Purpose Analysis* for information on data sampling rates using either the Internal or External clocking selections in the Clock menu. Also refer to *Appendix B: How Data is Acquired* to see when the support software, probe adapter, and 92A96 Module sample the various Am29205 system signals.

Appendix B: HOW DATA IS ACQUIRED

This appendix explains how the 92A96 Module acquires Am29205 signals using the 92DM927 probe adapter and software. This appendix also provides additional information on microcontroller signals accessible on or not accessible on the probe adapter, and on extra 92A96 channels available for you to use for additional connections.

92A96 CUSTOM CLOCKING

A special clocking program (called Custom) is loaded to the 92A96 Module every time the Am29205 Software Support is selected in the Configuration menu. With Custom clocking, the module logs in signals from multiple groups of channels at different times when they are valid on the Am29205 bus. The module then sends all the logged-in signals to the trigger machine and to the acquisition memory of the module for storage.

In Custom clocking, the module's clocking state machine (CSM) generates one master sample for each Am29205 bus cycle, no matter how many clock cycles are contained in that cycle.

ROM, PIA, or DMA Access

ROM, PIA, and DMA accesses can be extended by the WAIT* signal and can be of different lengths depending on the WSx, IOWAITx, and DMAWAITx bits in the internal registers. Because of this, the CSM waits until the control signal disappears to identify the end of the cycle. Figure B-1 shows the strobe points and the master sample for ROM, PIA, and DMA accesses.
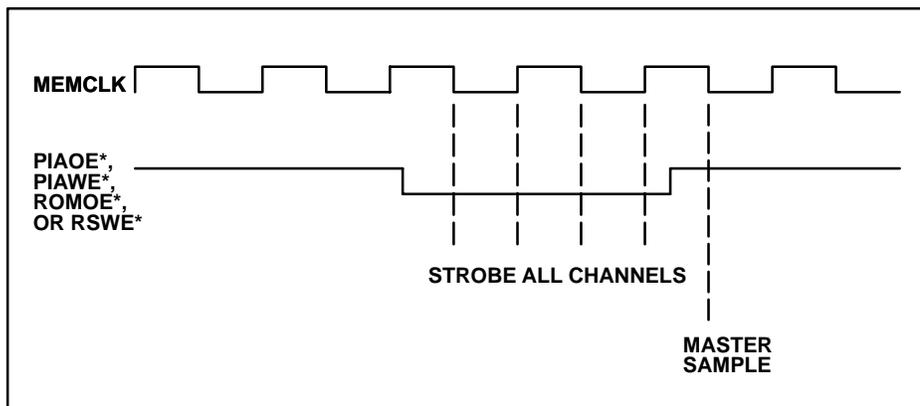
Figure B-1. Am29205 bus timing (ROM, PIA, and DMA accesses).

Parallel Port Access

The CSM creates a master strobe after the first rising edge of MEMCLK after POE* or PWE* are asserted. Figure B-2 shows the master sample for parallel port accesses.

```
MEMCLK

                                              FIRST RISING EDGE

POE*
OR PWE*

                                  STROBE ALL CHANNELS
                                  AND MASTER SAMPLE
```
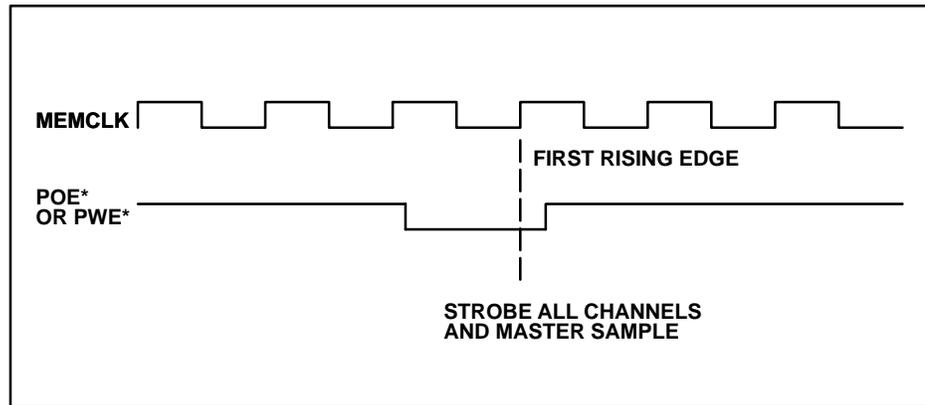
Figure B-2. Am29205 bus timing (parallel port accesses).

DRAM Access

Because DRAM accesses are fixed at four cycles, the CSM creates a master strobe after the third rising edge of MEMCLK while a RASx* signal is asserted. Figure B-3 shows the master sample for DRAM accesses.

```
MEMCLK

                                              THIRD RISING EDGE

RAS3*,
RAS2*,
RAS1*,
OR RAS0*

                                  STROBE ALL CHANNELS
                                  AND MASTER SAMPLE
```
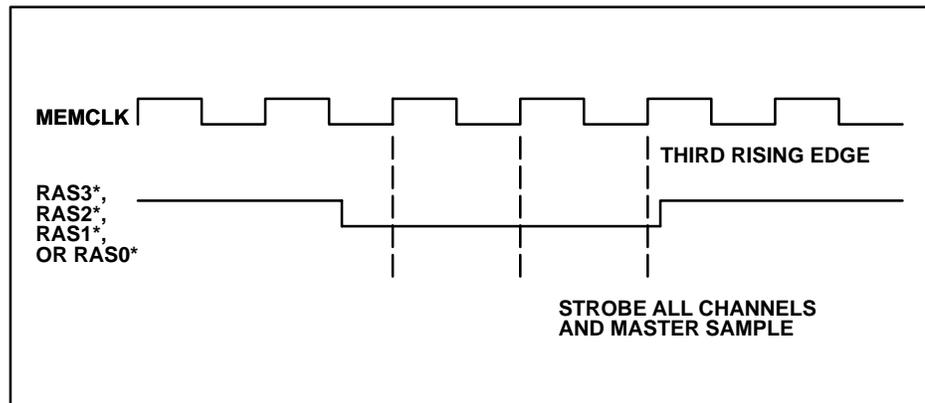
Figure B-3. Am29205 bus timing (DRAM accesses).

CLOCKING OPTIONS

The 92A96 clocking algorithm for the Am29205 microcontroller has two variations: DRAM Refresh Cycles Excluded, and DRAM Refresh Cycles Included.

DRAM Refresh Cycles Excluded

DRAM Refresh cycles are not acquired or displayed.

DRAM Refresh Cycles Included

All bus cycles, including DRAM refresh cycles, are logged in.

ALTERNATE MICROCONTROLLER CONNECTIONS

You can connect to microcontroller signals that are not required by the support software so you can do more advanced timing analysis. These signals may or may not be accessible on the probe adapter board. The following paragraphs and tables list signals that are accessible on or are not accessible on the probe adapter board.

For a list of signals required or not required by the support software, refer to the channel assignment tables in Appendix C.

Signals On the Probe Adapter

The probe adapter board contains pins for microcontroller signals that are not acquired by the 92DM927 software. You can connect extra podlets to these pins, because they can be useful for general purpose analysis. However, these signals are not defined in the Channel setup menu; you must enter the Channel setup menu and assign those signals to a new channel group.

Table B-1 shows the microcontroller signals available on the probe adapter's square pin grid; the rest of the microcontroller signals on the grid are connected to the probe adapter. Refer to the *PQFP100 Converter Chip Instructions* included with this product for a pin number locator diagram.

Table B-1
Am29205 Signals On Square Pin Grid

Pin No.	Signal Name
4	INCLK
76	PAUTOFD
93	PSYNC
92	VDAT
99	VCLK
100	LSYNC
26	RXD
28	TXD
27	UCLK

Figure B-4 shows the square pin grid on the probe adapter.
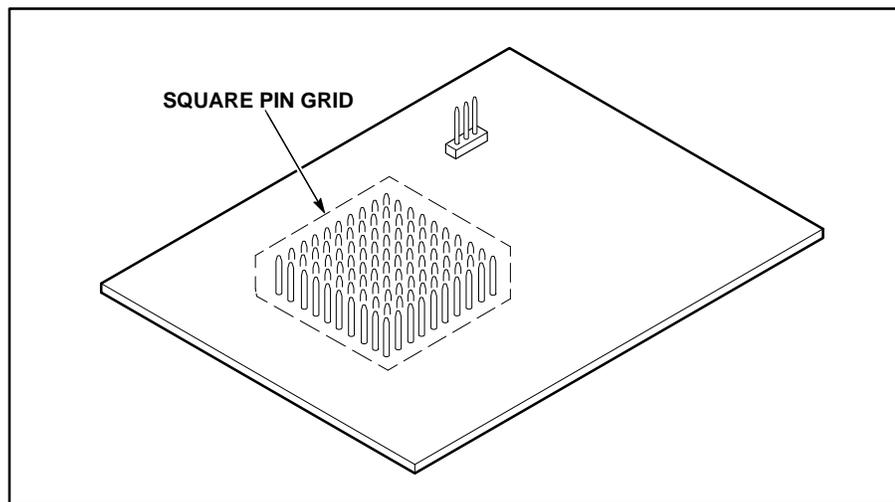
Figure B-4. Square pin grid location on the probe adapter.

Signals Not On the Probe Adapter

All Am29205 microcontroller signals are accessible on the probe
adapter.

Extra 92A96 Channels

After connecting the 92A96 probes to the probe adapter, there are no
extra 92A96 channels available for you to use to make alternate SUT
connections. However, you can disconnect channels not required by the
support software to make alternate connections. The channel
assignment tables in Appendix C indicate channels not required by the
support software.

WARNING

The following servicing instructions are for use only by qualified personnel. To avoid personal injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer to the General Safety Summary and the Servicing Safety Summary prior to performing any service.

Appendix C: SERVICE INFORMATION

This appendix contains the following information:

- safety summary
- brief description of the probe adapter and how it works
- care and maintenance procedures
- channel assignment tables
- dimensions of the probe adapter
- removing and replacing individual signal leads
- removing and replacing sockets

SERVICING SAFETY INFORMATION

The following servicing safety information is for service technicians. Follow these safety precautions, along with the general precautions outlined in your *DAS 9200 System User Manual*, while installing or servicing this product.

Do Not Service Alone. Do not perform internal service or adjustment on this product unless another person is present and able to give first aid and resuscitation.

Use Care When Servicing With Power On. To avoid personal injury from dangerous voltages, remove jewelry such as rings, watches, and other metallic objects before servicing. Do not touch the product's exposed connections and components while power is on.

PROBE ADAPTER DESCRIPTION

The probe adapter is a nonintrusive piece of hardware that allows the 92A96 to acquire data from an Am29205 microcontroller in its own operating environment with little affect, if any, on that system. Refer to Figure C-1 while reading the following discussion.
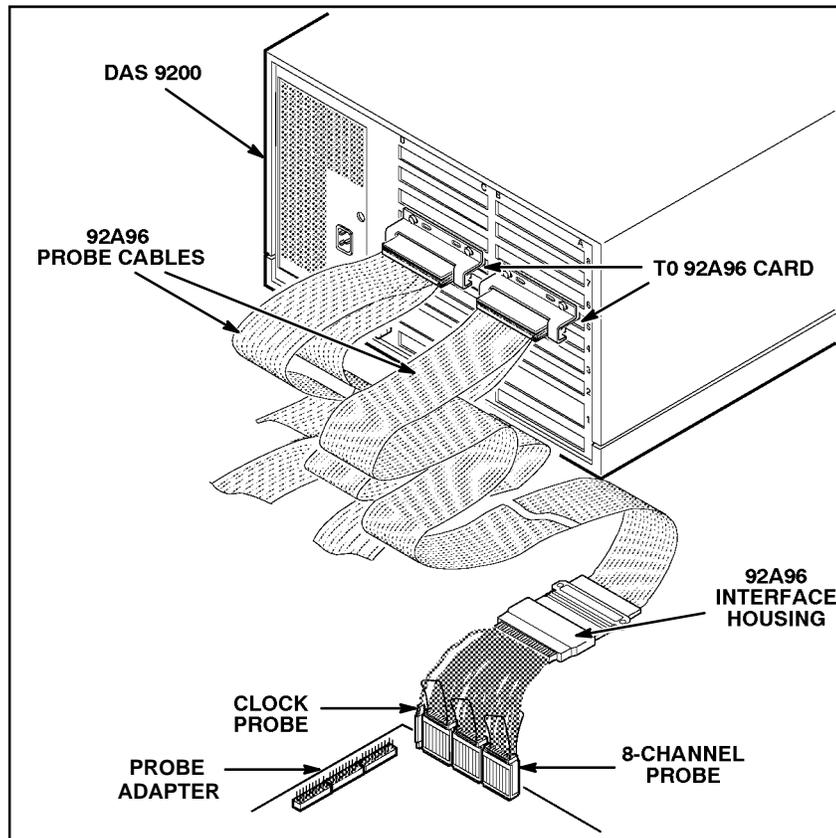
Figure C-1. Overview of the standard probe and probe adapter.

The probe adapter consists of a circuit board and a socket for the Am29205 microcontroller. The probe adapter connects to the SUT. Signals from the Am29205 system flow from the probe adapter to the podlet groups. The signals flow through the probe signal leads to the 92A96 Module.

All circuitry on the probe adapter is powered from the SUT (system under test).

The probe adapter accommodates the AMD Am29205 microcontroller in a 100-pin PQFP package.

Configuring the Probe Adapter

The Normal/Timing jumper (J1220) should be placed in the DISASM position to acquire state data, and in the TIMING position to acquire timing data. (When acquiring timing data, the multiplexers on the probe are held in "straight-through" mode; addresses are logged with address bit A0 logged on A0:0, A1 logged on A0:1, A2 on A0:2, and so on, regardless of what type of access is taking place.)

Probe Adapter Circuit Description

The probe adapter uses a 74F373 to latch 8 bits of the RAS address during a DRAM access, and three 74F157As to demultiplex the DRAM (RAS and CAS) address onto the 92A96 address podlets. During any other access, the multiplexers are set to pass the signals straight through.

Two 16L8s funnel the control signals down into 8 Clocks/Quals and generate the latch enable signal (RAS_D*). They also latch the 19th and 21st bits of the RAS address, demultiplex the 23rd bit of the RAS address, generate the mux-select signal, and distinguish a refresh from a real access by latching the logical value of (CAS2* or CAS3*) when RASx goes low.

The probe adapter supports both page-mode and static-column DRAM access by latching the upper address (RAS) in hardware and logging these cycles with their proper addresses. The acquired data's timestamp is the only indication, in a static column or page block mode, that the read was a single read or a group of reads.

Jumper J1220 on the probe adapter holds the multiplexer chips in "straight through" mode. This allows asynchronous clocking to capture the actual address regardless of the type of access.

The PDT jumper provides support for the PDT reset line; pin 1 is ground and pin 2 is the RESET* signal.

CARE AND MAINTENANCE

The probe adapter does not require scheduled or periodic maintenance. To maintain good electrical contact, keep the probe adapter free of dirt, dust, and contaminants. Also, ensure that any electrically conductive contaminants are removed.

Dirt and dust can usually be removed with a soft brush. For more extensive cleaning, use only a damp cloth. Abrasive cleaners and organic solvents should never be used.

~~~~~~~~~~~~~~~~
CAUTION
~~~~~~~~~~~~~~~~

The semiconductor devices contained on the probe adapter are susceptible to static-discharge damage. To prevent damage, service the probe adapter only in a static-free environment.

If the probe adapter is connected to your system, grasp the ground lug on the back of the DAS 9200 mainframe to discharge your stored static electricity. If the probe adapter is not connected, touch any of the ground pins (row of square pins closest to the edge of the probe adapter circuit board labeled GND) to discharge stored static electricity from the probe adapter.

Always wear a grounding wrist strap, or similar device, while servicing the instrument.

Exercise care when soldering on a multilayer circuit board. Excessive heat can damage the through-hole plating or lift a run or pad and damage the board beyond repair. Do not apply heat for longer than three seconds. Do not apply heat consecutively to adjacent leads. Allow a moment for the board to cool between each operation.

If you must replace an electrical component on a circuit board, exercise extreme caution while desoldering or soldering the new component. Use a pencil-type soldering iron of less than 18 watts and an approved desoldering tool. Ensure that the replacement is an equivalent part by comparing the description as listed in the replaceable parts list.

SPECIFICATIONS

These specifications are for a probe adapter connected to a 92A96 Acquisition Module and the system under test (SUT). Figure C-2 shows the dimensions of the probe adapter with the podlet holders attached.
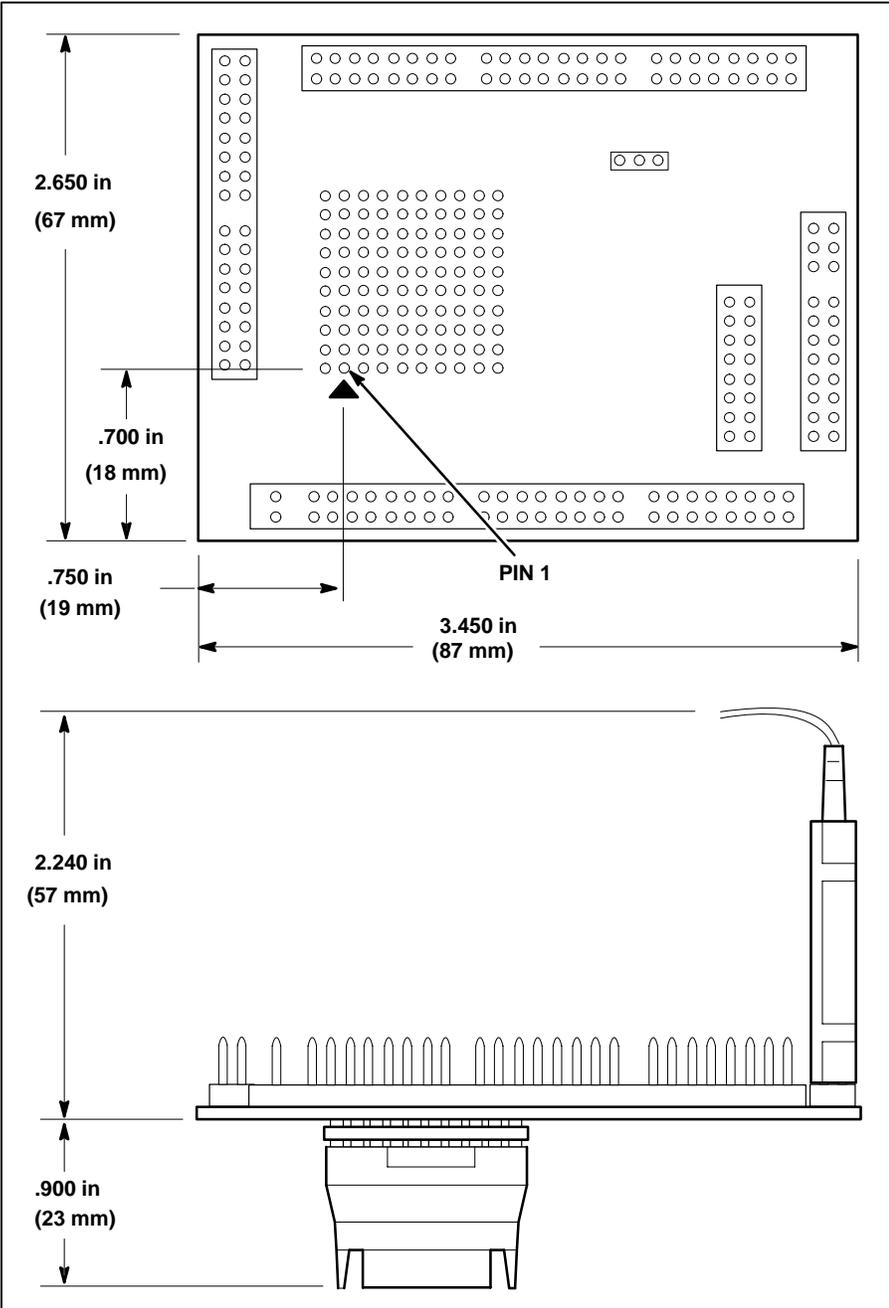
Figure C-2. Minimum clearance of the probe adapter with castle extension.

Channel Assignments

Channel assignments shown in Table C-1 to Table C-8 use the following conventions:

- all signals are required by the support software unless indicated otherwise

- an asterisk (*) following a signal name indicates an active low signal

- a _D following a signal name indicates a derived signal (not a microcontroller output)

- a _L following a signal name indicates a latched signal (not a microcontroller output)

- an = (equal sign) following a signal name indicates that it is double probed

Table C-1 shows the 92A96 section and channel assignments for the Address group and the microcontroller signal to which each channel connects. The channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB). The default radix is HEX.

Table C-1
92DM927 Address Group Channel Assignments

Bit Order	92A96 Channel	Am29205 Signal Name
MSB	A2:7	A23_M†
	A2:6	A22_M†
	A2:5	A21_M‡
	A2:4	A20_M‡
	A2:3	A19_M‡
	A2:2	A18_M‡
	A2:1	A17_M‡
	A2:0	A16_M‡
	A1:7	A15_M‡
	A1:6	A14_M‡
	A1:5	A13_M‡
	A1:4	A12_M‡
	A1:3	A11_M‡
	A1:2	A10_M‡
	A1:1	A9
	A1:0	A8
	A0:7	A7
	A0:6	A6
	A0:5	A5
	A0:4	A4
	A0:3	A3
	A0:2	A2
	A0:1	A1
LSB	A0:0	A0

† Signal valid only when Normal/Timing jumper is in DISASM position and DRAM access is taking place.

‡ Signal demultiplexed only when Normal/Timing jumper is in DISASM position and DRAM access is taking place.

Table C-2 shows the 92A96 section and channel assignments for the Data group and the microcontroller signal to which each channel connects. The channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB). The default radix is HEX.

Table C-2
92DM927 Data Group Channel Assignments

Bit Order	92A96 Channel	Am29205 Signal Name
MSB	D1:7	ID31
	D1:6	ID30
	D1:5	ID29
	D1:4	ID28
	D1:3	ID27
	D1:2	ID26
	D1:1	ID25
	D1:0	ID24
	D0:7	ID23
	D0:6	ID22
	D0:5	ID21
	D0:4	ID20
	D0:3	ID19
	D0:2	ID18
	D0:1	ID17
LSB	D0:0	ID16

Table C-3 shows the 92A96 section and channel assignments for the Control group and the microcontroller signal to which each channel connects. The channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB). The default radix is SYM.

Table C-3
92DM927 Control Group Channel Assignments

Bit Order	92A96 Channel	Am29205 Signal Name
MSB	C2:4	CAS3*
	C3:4	CAS2*
	C2:2	PIAOE*
	A3:4	PIAWE*
	C2:1	ROMOE*
	A3:3	RSWE*
	A3:2	PWE*
	A3:1	POE*
	C3:6	R_W*
	C2:0	RESET*
LSB	C2:3	RAS_D*

Table C-4 shows the 92A96 section and channel assignments for the Access group and the microcontroller signal to which each channel connects. The channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB). The default radix is SYM.

Table C-4
92DM927 Access Group Channel Assignments

Bit Order	92A96 Channel	Am29205 Signal Name
MSB	C3:7	CAS_L*
	C2:7	DACK1*
	C2:6	PIACSO*
	C3:5	PIACS1*
	A3:7	ROMCSO*
	A3:6	ROMCS1*
	A3:5	ROMCS2*
	C3:3	RAS0*
	C3:2	RAS1*
LSB	C3:1	RAS2*

Table C-5 shows the 92A96 section and channel assignments for the Intr group and the microcontroller signal to which each channel connects. The channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB). The default radix is BIN.

Table C-5
92DM927 Intr Group Channel Assignments

Bit Order	92A96 Channel	Am29205 Signal Name†
MSB	D2:5	INTR3*
LSB	D2:3	INTR2*

† These signals are not required by support software.

Table C-6 shows the 92A96 section and channel assignments for the PrgrmIO group and the microcontroller signal to which each channel connects. The channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB). The default radix is OFF.

Table C-6
92DM927 PrgrmIO Group Channel Assignments

Bit Order	92A96 Channel	Am29205 Signal Name†
MSB	D2:2	PIO8
	D2:1	PIO9
	D2:0	PIO10
	D3:7	PIO11
	D3:6	PIO12
	D3:5	PIO13
	D3:4	PIO14
LSB	D3:3	PIO15

† These signals are not required by support software.

Table C-7 shows the 92A96 section and channel assignments for the Misc group and the microcontroller signal to which each channel connects. The channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB). The default radix is OFF.

Table C-7
92DM927 Misc Group Channel Assignments

Bit Order	92A96 Channel	Am29205 Signal Name†
MSB	D2:7	MEMCLK
	D2:6	WAIT*
	D2:4	DREQ1*
	D3:2	PBUSY*
	D3:1	PACK
	D3:0	PSTROBE
LSB	C2:5	WE*

† These signals are not required by support software.

Table C-8 shows the 92A96 section and channel assignments for the clock channels (not part of any group) and the microcontroller signal to which each channel connects. These channels are used only to clock in data; they are not acquired or displayed.

Table C-8
92DM927 Clock Channel Assignments

92A96 Channel	Am29205 Signal Name
CK:0	WE_D*
CK:1	PARPORT_D*
CK:2	CAS_L*=
CK:3	MEMCLK=

= This channel is double probed.

DISCONNECTING PROBES

You may need to disconnect the clock and 8-channel probes from the probe adapter to use them on another application, to connect individual podlets to other signals in your Am29205 system, or to replace defective clock or probe channels (podlets). Refer to Figure C-3 and the following procedure to disconnect the clock and 8-channel probes from the probe adapter. Use the antistatic shipping material to support the probe adapter while disconnecting the clock and 8-channel probes.

Squeeze the pull tabs together, being careful not to pinch any podlet cables between them, and pull.

Grasp the body of the clock probe and pull to remove. Do not pull on the cable or top of the probe body.
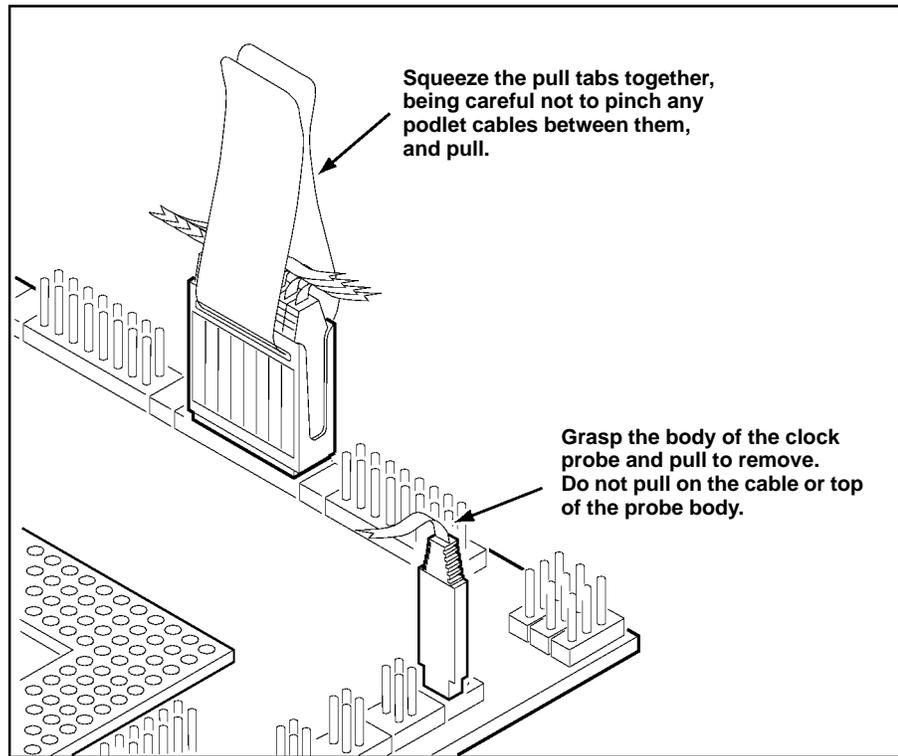
Figure C-3. Disconnecting clock and 8-channel probes.

1. Power off the SUT. It is not necessary to power off the DAS 9200.

$$\text{CAUTION}$$

Pulling on the cables, or on the neck of the clock probe, or pinching the cables between the pull tabs can damage the probes. Always handle the probes by their bodies.

2. Firmly grasp the body of a clock probe and gently pull it off of the square pins.

3. Squeeze the pull tabs on the podlet holder together; be careful not to pinch any podlet cables between them.

4. Gently pull the 8-channel probe off of the square pins.

REMOVING AND REPLACING PROBE PODLETS

Each 8-channel probe consists of 8 single-channel podlets ganged together in a podlet holder. You may need to remove these podlets from the 8-channel probe to use for alternate connections to Am29205 system signals.

Refer to the discussions on *Alternate Microcontroller Connections* in Appendix B and *Channel Assignments* in this appendix for information about which channels you can use to make alternate connections between the DAS 9200 and system under test without disturbing the channel connections required by support software.

You can also use these procedures to replace a defective clock probe or a defective podlet from an 8-channel probe.

Removing Probe Podlets from the Interface Housing

Refer to Figure C-4 and the following procedure to remove a clock probe or an 8-channel probe podlet from the interface housing.

1. Power off the SUT. It is not necessary to power off the DAS 9200.

2. Use a small pointed tool such as a ballpoint pen, pencil, or straightened paper clip to press down on the latch detent of the podlet through an opening on the interface housing.

3. Gently pull the podlet connector out of the housing with one hand while pressing down on the latch detent with the pointed tool.
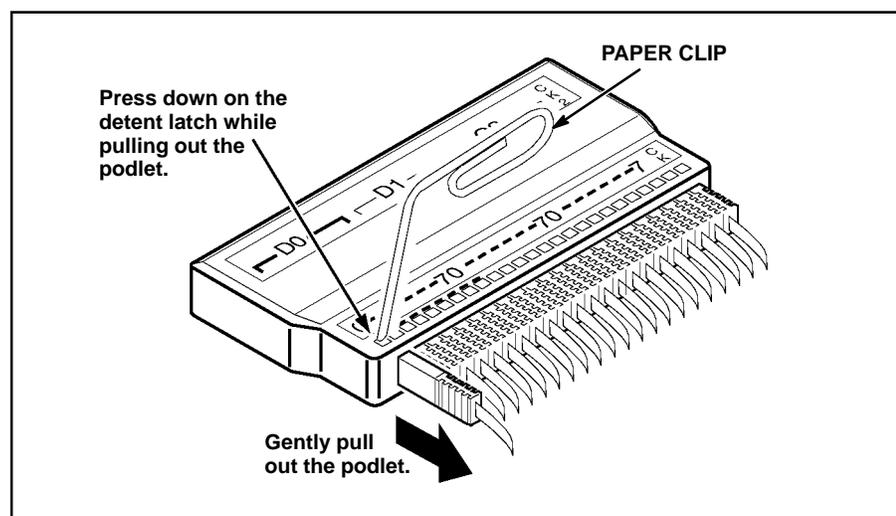

Figure C-4. Removing a clock or probe podlet from the interface housing.

Replacing a Clock Probe

To replace a clock probe, insert a new clock probe into the same clock channel position on the interface housing. Insert the clock probe into the interface housing with the detent latch oriented to the label side of the housing. Refer to Figure C-4.

Removing Probe Podlets from the Podlet Holder

Refer to Figure C-5 and the following procedure to remove the 8-channel probe podlets from the podlet holder.

CAUTION

Excessive pulling on the sides of the holder can damage the podlet holder. Spread the holder open wide enough to clear and remove the podlets.

1. To remove podlets from the podlet holder, grasp the plastic pull tab on each side of the podlet holder and gently spread the sides of the holder open just enough to clear a podlet.

2. Remove the middle two podlets from the podlet holder by pushing up on the metal pin receptacles.

3. Release the tabs on the podlet holder.

4. Remove the remaining podlets by turning and extracting each one at a time.
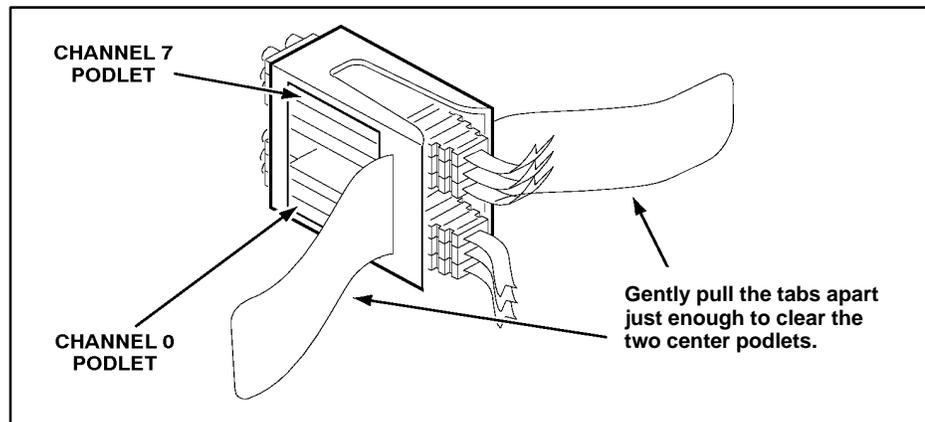
Figure C-5. Ganging together the 8-channel probe podlets.

Replacing 8-Channel Probe Podlets

The channel podlets must retain the same channel order on both the interface housing and in the podlet holder. Be sure to replace the old podlet with a podlet of the same color. Table C-9 shows the color code and channel number of each podlet for an 8-channel probe.

Table C-9
Podlet-to-Channel Color Code

Podlet Color	Channel
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7

Refer to Figure C-5 and the following procedure to replace an 8-channel probe podlet.

1. Insert the appropriately colored podlet into the interface housing with the detent latch oriented to the label side of the housing.

2. If you are replacing a single podlet, orient the podlet connector marked GND towards the side of the podlet holder labeled GROUND.

3. Grasp the plastic pull tab on each side of the holder and gently spread the sides of the holder open just enough to clear the podlet.

4. Hold the podlet body with the other hand and place it in the holder in the correct channel order. Do not grasp and turn the podlet cable.

5. If you are reganging all the podlets of an 8-channel probe, begin ganging the podlets together starting with either channel 0 or channel 7. Orient the podlet channel marked GND towards the side of the podlet holder labeled GROUND.

~~~~~~~~~~~~
CAUTION
~~~~~~~~~~~~

*Avoid twisting the podlet cables between the interface
housing and the podlet holder. To prevent damage to the
podlets, keep the podlet cables parallel to each other when
ganging them into the holder.*

6. Hold the podlet body, turn the podlet body parallel to the sides of
   the holder, move it into the holder, and use your fingers to press
   it into place perpendicular to the sides of the holder. Be sure to
   gang the podlets in the correct channel order according to the
   channel label on the podlet holder and podlet color code, with all
   ground channels toward the Ground side of the holder. Do not
   place the podlet into the holder by grasping the podlet cable.

7. Continue placing the next two podlets, one at a time, in channel
   order, in the podlet holder. Orient all ground channels toward the
   Ground side of the holder.

8. The fourth podlet should be either channel 0 or 7, whichever one
   is not already placed in the holder. Place this podlet in the other
   end of the podlet holder and orient the ground channel correctly.

9. Continue placing the next two podlets, one at a time, in channel
   order, in the podlet holder. Continue orienting the ground
   channels correctly.

~~~~~~~~~~~~
CAUTION
~~~~~~~~~~~~

*Excessive pulling on the sides can break the podlet holder.
Spread the holder open only wide enough to clear the
podlet.*

10. Grasp the plastic pull tab on each side of the holder and gently
    spread the sides of the holder open just enough to clear a podlet.

11. Place the last pair of podlets (channels 3 and 4) in the podlet
    holder in proper channel order, orienting the ground channels to
    the Ground side of the holder.

REMOVING AND REPLACING SOCKETS

The probe adapter board contains sockets designed to protect the probe
adapter and to make it easy to insert and remove the microcontroller.
The socket on top of the probe adapter board is soldered and cannot be
removed. The protective socket on the bottom of the probe adapter
board can be removed.

Appendix D: Replaceable Parts List

Parts Ordering Information

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, include the following information in your order: part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

List of Assemblies

A list of assemblies can be found at the beginning of the electrical parts list. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

Cross Index-Mfr. Code Number to Manufacturer

The Mfg. Code Number to Manufacturer Cross Index for the electrical parts list is located immediately after this page. The cross index provides codes, names, and addresses of manufacturers of components listed in the electrical parts list.

Abbreviations

Abbreviations conform to American National Standard Y1.1.

Component Number

(column 1 of the parts list)

Example a.   component number

A23R1234   A23   R1234

Assembly number   Circuit number

Read: Resistor 1234 of Assembly 23

Example b.   component number

A23A2R1234   A23   A2   R1234

Assembly number   Subassembly number   Circuit number

Read: Resistor 1234 of Subassembly 2 of Assembly 23
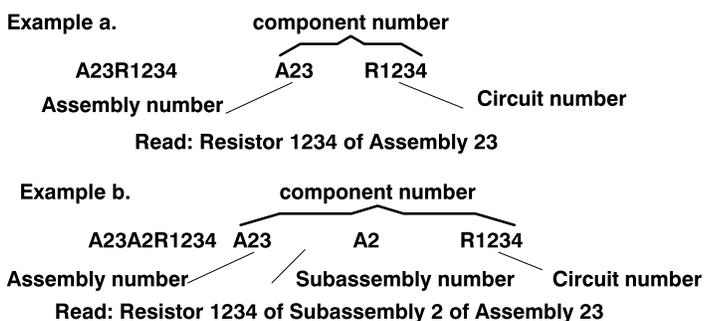
The circuit component's number appears on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the mechanical parts list. The component number is obtained by adding the assembly number prefix to the circuit number.

The electrical parts list is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the electrical parts list.

Tektronix Part No.
(column 2 of the parts list)

Indicates part number to be used when ordering replacement part from Tektronix.

Serial No.
(columns 3 & 4 of the parts list)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

Name & Description
(column five of the parts list)

In the parts list, an item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. For further item name identification, the U.S. Federal Catalog handbook H6-1 can be utilized where possible.

Mfr. Code
(column 6 of the parts list)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

Mfr. Part No.
(column 7 of the parts list)

Indicates actual manufacturer's part number.

CROSS INDEX − MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
26742	METHODE ELECTRONICS INC	7447 W WILSON AVE	CHICAGO IL 60656−4548
63058	MCKENZIE TECHNOLOGY	44370 OLD WARMS SPRINGS BLVD	FREMONT CA 94538
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077−0001

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1−0	010−0566−00			1	PROBE ADAPTER:29205,PQFP100,SOLDERED; 32/92DM927	80009	010056600
−1	671−2858−00			1	CIRCUIT BD ASSY:29205,PROBE ADAPTER, PQFP100,SOLDERED;	80009	671285800
−2	131−5267−00			3	CONN,HDR:PCB,;MALE,STR,2 X 40,0.1 CTR,0.235 MLG X 0.110 TAIL,30GOLD (J1110,J1130,J1230,J1530,J1540)	80009	131526700
−3	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 (J1220)	00779	104344−1
−4	131−4356−00			1	CONN,BOX:SHUNT/SHORTING,;FEMALE,1 X 2,0.1 CTR,0.630 H,BLK,W/HANDLE,JUMPER (P1220)	26742	9618−302−50
−5	136−0940−00			1	SOCKET,PGA:PCB,;132 OIA, 14 X 14,0.1 CTR,0.170 H X 0.170 TAIL, OPEN CTR, SYMMETRICAL, PAT 1415 DISKETTE,32DM927	63058	132H101B1−1414F

STANDARD ACCESSORIES

	Tektronix Part No.			Qty	Name & Description	Mfr. Code	Mfr. Part No.
	070−8786−00			1	MANUAL,TECH:92DM927,INSTRUCTION,29205,	80009	070−8786−00
	063−1541−00			1	SOFTWARE PKG:29205,SUPPORT,3.5	80009	063−1541−00
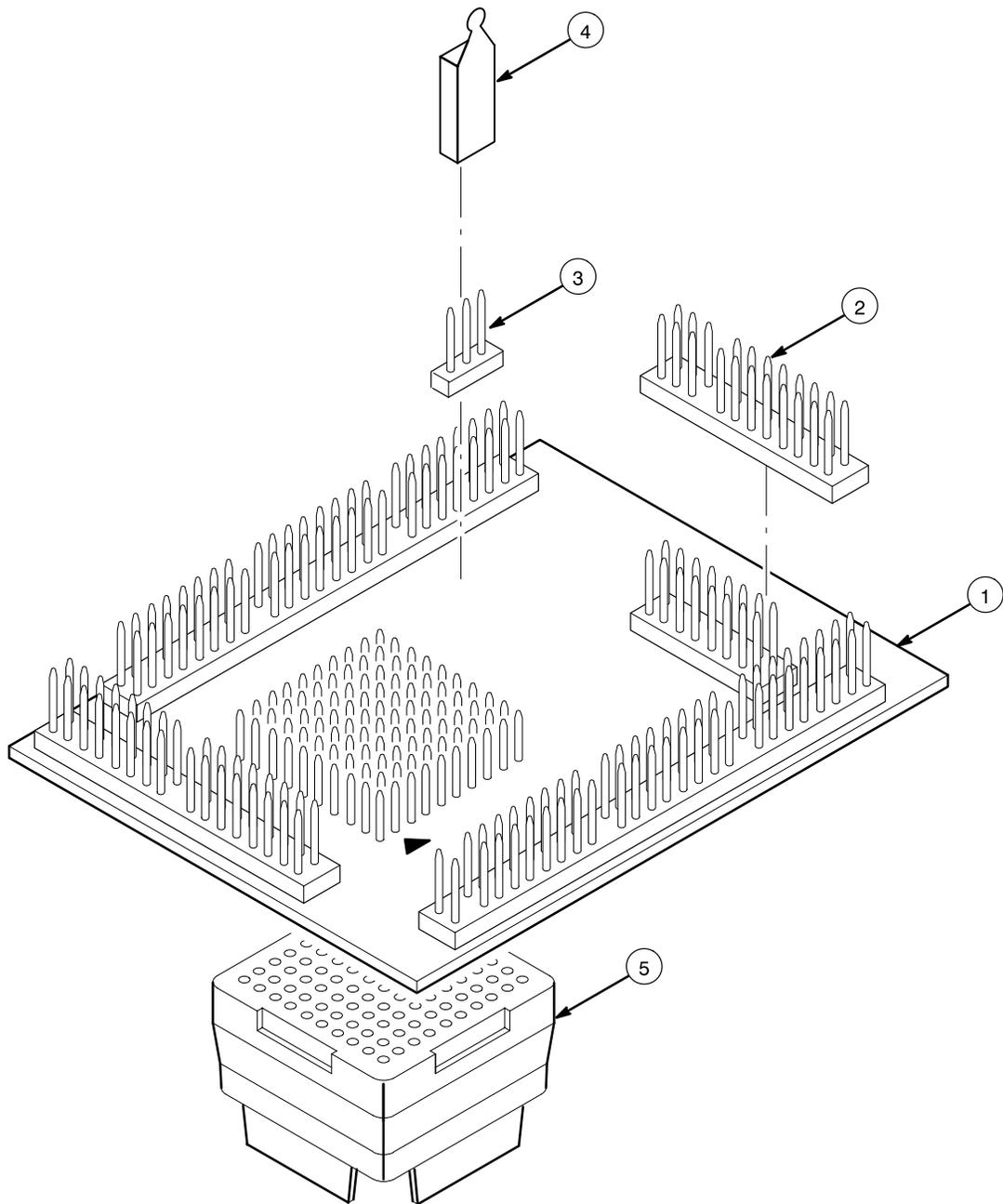
Figure 1. Exploded view.

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