

# Instruction Manual



## DAS<sup>®</sup>/TLA LADM935 SBus Bus Support

**070-9609-00**

There are no current European directives that apply to this product. This product provides cable and test lead connections to a test object of electronic measuring and test equipment.

### **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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# General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

*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.

## Injury Precautions

**Avoid Electric Overload.** To avoid electric shock or fire hazard, do not apply a voltage to a terminal that is outside the range specified for that terminal.

**Avoid Electric Shock.** To avoid injury or loss of life, do not connect or disconnect probes or test leads while they are connected to a voltage source.

**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.

**Do Not Operate in Wet/Damp Conditions.** To avoid electric shock, do not operate this product in wet or damp conditions.

**Do Not Operate in an Explosive Atmosphere.** To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

**Avoid Exposed Circuitry.** To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.

## Product Damage Precautions

**Use Proper Power Source.** Do not operate this product from a power source that applies more than the voltage specified.

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

**Symbols and Terms**

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



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

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**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:



DANGER  
High Voltage



Protective Ground  
(Earth) Terminal



ATTENTION  
Refer to Manual



Double  
Insulated

# 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, disconnect the main power by means of the power cord or, if provided, the power switch.

**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: Microprocessor Support Product Documentation

This instruction manual is part of a two-manual set for operating bus support products on compatible Tektronix logic analyzers and contains specific information about the SBus support product. If you are familiar with operating support products on the logic analyzer for which this product was purchased, you probably only need to use this instruction manual to successfully operate the product.

One or more basic operations user manuals are included with bus support products. Each logic analyzer has its own basic operations manual that describes how to perform tasks common to bus support products on that platform. You should place the appropriate basic operations user manual in the notebook behind this instruction manual.

If you are not familiar with operating bus support products on a Tektronix logic analyzer, you will need to use the basic operations user manual with this instruction manual to operate the SBus support product.

This manual provides detailed information on the following topics:

- Connecting the logic analyzer to the system under test
- Setting up the logic analyzer to acquire data from the system under test
- Acquiring and viewing disassembled data
- The LADM935 probe adapter

## Manual Conventions

This manual uses the following conventions:

- The term disassembler refers to the application software that disassembles bus cycles into instruction mnemonics and cycle types.
- The term SUT (system under test) refers to the bus-based system from which data is being acquired.
- The term logic analyzer refers to the Tektronix logic analyzer for which this product was purchased.
- The term acquisition module refers to the 92A96 data acquisition modules.
- The term 92A96 refers to all versions of the 92A96, 92C96, and subsequent DAS/TLA acquisition modules unless otherwise noted.

- The term XXX or P54C used in field selections and file names in the basic operations user manual can be replaced with SBus. This is the name of the bus in field selections and file names you must use to operate the support product.
- A tilde (~) following a signal name indicates an active low signal.

Also refer to the *Glossary* in the basic operations user manual for definitions of logic analyzer, acquisition module, and disassembler terms.

## Logic Analyzer Documentation

A description of other documentation available for each type of Tektronix logic analyzer is located in each basic operations user manual. The documentation provides the information necessary to install, operate, maintain, and service the logic analyzer and associated products.

# Getting Started

The DAS/TLA LADM900 series of support products are developed by third parties to support buses, microprocessors, microcontrollers, and digital signal processors for specific Tektronix customers. These support products are currently being successfully used by these customers. If you need assistance in using this product, contact your local Tektronix Technical Support Specialist.

This chapter provides information on the following topics:

- The LADM935 SBus support product
- Logic analyzer system software compatibility
- Your SBus system requirements
- SBus support product restrictions
- How to connect to your SUT (system under test)

## Product Description

The SBus Bus Support product disassembles data from systems based on SUN SPARC Technology microSPARC-II microprocessors (manufactured by Fujitsu) using SBus protocol. The instruction mnemonics are based on the SPARC Version 8 instruction set. The LADM935 product runs on a DAS/TLA logic analyzer equipped with at least one 92A96 Data Acquisition Module.

A complete list of accessories and options is provided at the end of the parts list in the *Replaceable Parts* chapter.

To use this product efficiently, you need to have the items listed in the basic operations user manual as well as the *IEEE Standard for a Chip and Module Interconnect Bus (IEEE Std 1496-1993)*, IEEE, 1993.

## Logic Analyzer System Software Compatibility

The label on the application floppy disk states which version of logic analyzer system software the application is compatible with.

## Logic Analyzer Configuration

To use the SBus support product, the logic analyzer must be equipped with at least one 92A96 module and four standard data acquisition probes.

The basic operations user manual contains information on how to configure the DAS/TLA under *Configuring the Logic Analyzer* in the *Getting Started* chapter.

## Requirements and Restrictions

You should review the general requirements and restrictions of bus support products in the *Getting Started* chapter in the basic operations user manual as they pertain to your SUT:

You should also review the mechanical specifications in the *Specifications* chapter in this manual as they pertain to your system under test, as well as the following description of other SBus support product requirements and restrictions.

**9201T DAS System.** If you have a 9201T version of the DAS/TLA system, you must change the system to the 92XTerm or 9202XT version.

**Burst Reads and Burst Writes.** For Burst Reads and Burst Writes, the calculated address following the rules of Sub-Block Ordering are not supported.

**64-Bit Extended Transfers.** The 64-bit extended transfers are not supported.

**Disabling the Instruction and Data Caches.** To disassemble acquired data, you must disable the internal instruction and data caches on the microSPARC-II microprocessor. Disabling the cache makes all instruction prefetches visible on the SBus bus so they can be acquired and disassembled.

## Configuring the Probe Adapter

The probe adapter does not require any configuration.

## Connecting to a System Under Test

Before you connect to the SUT, you must connect the standard probes to the acquisition module. Your SUT must also have a minimum amount of clear space surrounding the SBus connector to accommodate the probe adapter. Refer to the *Specifications* chapter in this manual for the required clearances.

The *Requirements and Restrictions* description in the basic operations user manual shows the vertical dimensions of an acquisition probe connected to square pins on a circuit board.

To connect the DAS to the SUT, follow these steps:

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



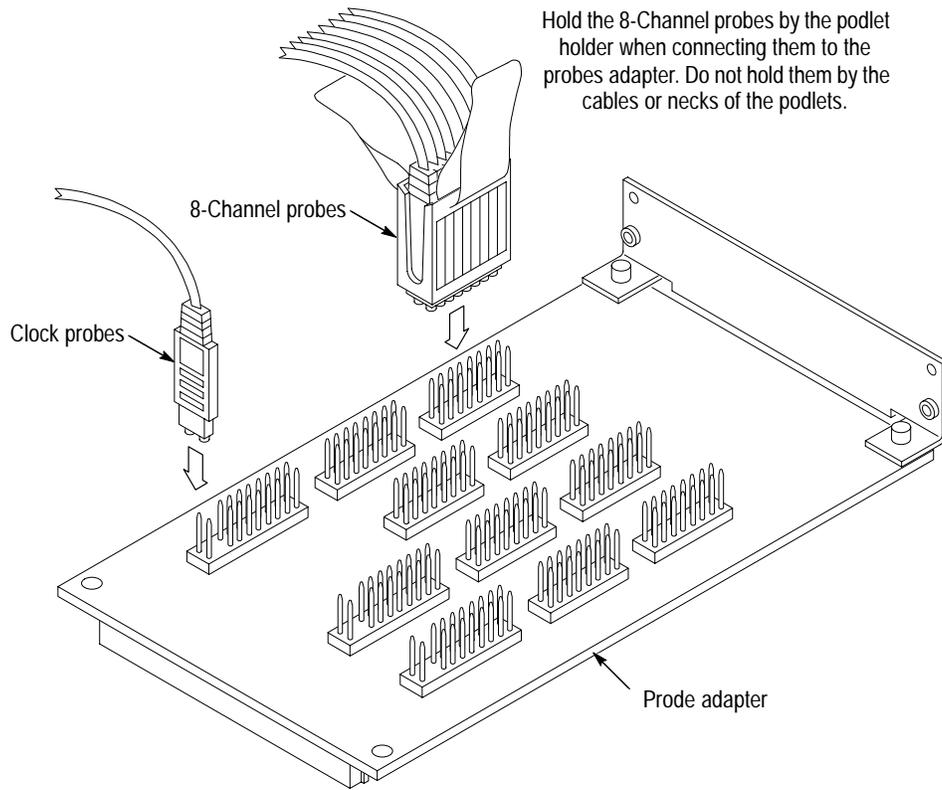
---

**CAUTION.** *Static discharge can damage the microprocessor, the probe adapter, the podlets, or the 92C96 Module. To prevent static damage, handle all of the above only in a static-free environment.*

*Always wear a grounding wrist strap or similar device while handling the probe adapter.*

---

2. To discharge your stored static electricity, touch the ground jack located on the back of the DAS. Then, touch any of the ground pins of the probe adapter to discharge stored static electricity from the probe adapter.
3. Connect the 92C96 clock and 8-channel probes to the probe adapter as shown in Figure 1–1. Match the channel groups and numbers on the probe interface housing to the corresponding pins on the probe adapter. Match the ground pins on the probes to the corresponding pins on the probe adapter.



**Figure 1-1: Connecting podlets to the SBus probe adapter**

4. Align pin 1 on the probe adapter connector with pin 1 on the connector in your SUT and connect the two together as shown in Figure 1-1.

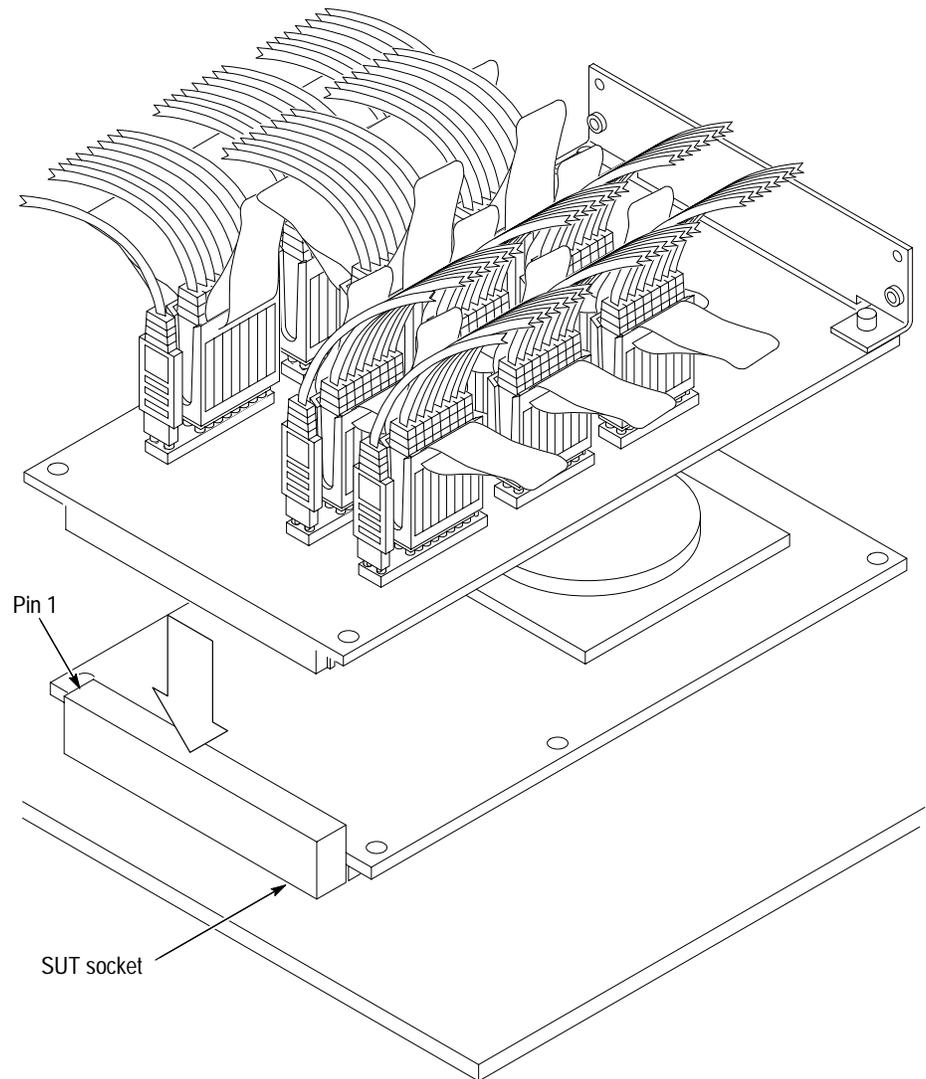


Figure 1-2: Placing the SBus probe adapter onto the SUT

# Setting Up the Application

This section provides information on how to set up the application. Information covers the following topics:

- Channel group definitions
- Clocking options
- Symbol table files

Remember that the information in this section is specific to the operations and functions of the LADM935 SBus bus support product on any Tektronix logic analyzer for which it can be purchased. For information on general tasks and functions, refer to the basic operations user manual.

Before you acquire and disassemble data, you need to load the application and specify setups for clocking, and triggering as described in the basic operations user manual. The application provides default values for each of these setups, but you can change them as needed.

## Channel Group Definitions

The application automatically defines channel groups for the support product. The channel groups for the SBus bus are PhysAddr, Data, Control, Size, Ack, IntReq, and Misc. If you want to know which signal is in which group, refer to the channel assignment tables beginning on page 15.

## Clocking Options

The LADM935 application offers a bus-specific clocking mode for the SBus bus. This clocking mode is the default selection whenever you select SBus Support in the 92A96 Configuration menu.

The LADM935 application acquires all SBus cycles. No clocking options are available.

A description of how cycles are sampled by the acquisition module using the LADM935 application and probe adapter is found in the *Specifications* chapter.

Disassembly will not be correct with the Internal or External clocking modes. The basic operations user manual contains information on how to use these other clock selections with any bus support package in the *Reference* chapter under *General Purpose Analysis*.

Disassembly will not be correct with the Internal or External clocking modes. The basic operations user manual contains information on how to use these other clock selections with any bus support package in the *Reference* chapter under *General Purpose Analysis*.

## Symbols

The LADM935 application supplies four symbol table files. The SBus\_Ctrl file replaces specific Control channel group values with symbolic values when SYM or PATTERN is the radix for the channel group.

Table 1–1 shows the name, bit pattern, and meaning for the symbols in the file SBus\_Ctrl, the Control channel group symbol table.

**Table 1–1: Control group symbol table definitions**

Symbol	Control group value						Meaning
	BR-	BG-	AS-	Sel-	Rd	Reset-	
WRITE	X	X	X	X	0	X	Any write cycle
READ	X	X	X	X	1	X	Any read cycle
RESET*	X	X	X	X	X	0	Asserted Rest cycle
Undefine	X	X	X	X	X	X	Reserved for future use or undefined

\* Symbol used only for triggering with Internal or External clocking; it does not appear in the Disassembly or State menus.

Table 1–2 shows the name, bit pattern, and meaning for the symbols in the file SBus\_Size, the Size channel group symbol table.

**Table 1–2: Size group symbol table definitions**

Symbol	Size group value			Meaning
	SIZ2-	SIZ1-	SIZ0-	
WORD	0	0	0	Word access; 32 bits
BYTE	0	0	1	Word access; 8 bits
HALF	0	1	0	Half word access; 16 bits
EXTENDED	0	1	1	Extended transfer
BURST4	1	0	0	Burst 16 bytes
BURST8	1	0	1	Burst 32 bytes

**Table 1–2: Size group symbol table definitions (cont.)**

Symbol	Size group value			Meaning
	SIZ2-	SIZ1-	SIZ0-	
BURST16	1	1	0	Burst 64 bytes
BURST2	1	1	1	Burst 128 bytes

Table 1–3 shows the name, bit pattern, and meaning for the symbols in the file SBus\_Ack, the Ack channel group symbol table.

**Table 1–3: Ack group symbol table definitions**

Symbol	Ack group value			Meaning
	ACK2-	ACK1-	ACK0-	
IDLE	1	1	1	Idle cycles
ERRACK	1	1	0	Error acknowledgement
BYTE	1	0	1	Word acknowledgement
RERUN	1	0	0	Retry acknowledgement
WORD	0	1	1	Word acknowledgement
DWORD	0	1	0	Double-word acknowledgement
HALF	0	0	1	Half-word acknowledgement

Table 1–4 shows the name, bit pattern, and meaning for the symbols in the file SBus\_IntReq, the IntReq channel group symbol table.

**Table 1–4: IntReq group symbol table definitions**

Symbol	IntReq group value						Meaning	
	IntReq7-	IntReq6-	IntReq5-	IntReq4-	IntReq3-	IntReq2-		IntReq1-
INT 7	0	1	1	1	1	1	1	Interrupt request level 7
INT 6	1	0	1	1	1	1	1	Interrupt request level 6
INT 5	1	1	0	1	1	1	1	Interrupt request level 5
INT 4	1	1	1	0	1	1	1	Interrupt request level 4
INT 3	1	1	1	1	0	1	1	Interrupt request level 3
INT 2	1	1	1	1	1	0	1	Interrupt request level 2

Table 1-4: IntReq group symbol table definitions (Cont.)

Symbol	IntReq group value						Meaning
	IntReq7-	IntReq6-	IntReq5-	IntReq4-	IntReq3-	IntReq2- IntReq1-	
INT 1	1	1	1	1	1	1 0	Interrupt request level 1
-	1	1	1	1	1	1 1	No interrupt

The basic operations user manual contains information on how to use symbolic values for triggering, and displaying other channel groups symbolically, such as the PhysAddr channel group.

# Acquiring and Viewing Disassembled Data

This section describes how to acquire data and view it as disassembled data. Information covers the following topics:

- Viewing disassembled data in various display formats
- Cycle type labels
- How to change the way data is displayed

## Acquiring Data

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

If you have any problems acquiring data, refer to *Appendix A: Error Messages and Disassembly Problems* in the basic operations user manual.

## Viewing Disassembled Data

You can view disassembled data in four different display formats: Hardware, Software, Control Flow, and Subroutine. The basic operations user manual describes how to select the disassembly display formats.

---

**NOTE.** *Selections in the Disassembly Format Definition overlay must be set correctly for your acquired data to be disassembled correctly. Refer to Changing How Data is Displayed on page 12.*

---

The default display format shows the PhysAddr, Data, and Control channel group values for each sample of acquired data. The PhysAddr group column in the Disassembly display shows values for the address at each sequence.

### Hardware Display Format

In Hardware data format, all bus cycles are shown in the order that they occurred. Instruction Mnemonics are displayed on assumed instruction Fetch cycles and cycle-type information is displayed for all other cycles. The disassembler cannot detect flushes following a branch instruction.

The Data in the Disassembly display shows value for the DATA bus. Valid data bytes will be shown during data transfers. All invalid bytes are dashed (--) out.

Table 1–5 shows cycle type labels and gives a definition of the cycle they represent.

**Table 1–5: Cycle type definitions**

Cycle type	Definition
( RD )	Any memory or I/O read
( WR )	Any memory or I/O write

Figure 1–3 shows an example of disassembled SBus data in the Hardware display format.

1	2	3	4		5	6
↓	↓	↓	↓		↓	↓
Sequence	PhysAddr	Data	Mnemonics		Control	Timestamp
45	0010A3C	01000000	NOP		READ	1.350 us
46	0010A40	ECA4C5E0	STA %16, [%13 + %g0] 2F		READ	1.500 us
47	0010A44	AC1020FF	OR %g0, 00FF, %16		READ	1.350 us
48	0010A40	ECA4C5E0	STA %16, [%13 + %g0] 2F		READ	1.450 us
49	0010A44	AC1020FF	OR %g0, 00FF, %16		READ	1.350 us
50	0010A48	2F3C4800	SETHI 3C4800, %17		READ	1.500 us
51	0010A4C	AE15E00F	OR %17, 000F, %17		READ	1.350 us
52	0010A50	AA102004	OR %g0, 0004, %15		READ	1.650 us
53	0010A54	AAA56001	SUBcc %15, 0001, %15		READ	1.350 us
54	0010A58	12BFFFFFF	BNE 0010A54		READ	1.500 us
55	0010A5C	ECADC5F5	STBA %16, [%17 + %15] 2F		READ	1.350 us
56	0010A60	27380004	SETHI 380004, %13		READ	1.500 us
57	0010A64	A614E008	OR %13, 0008, %13		READ	1.350 us
58	1200012	----FF--	( WR )		WRITE	850 ns
59	0010A50	AA102004	OR %g0, 0004, %15		READ	1.450 us
60	0010A54	AAA56001	SUBcc %15, 0001, %15		READ	1.350 us
61	0010A58	12BFFFFFF	BNE 0010A54		READ	1.500 us
62	0010A5C	ECADC5F5	STBA %16, [%17 + %15] 2F		READ	1.350 us
63	0010A60	27380004	SETHI 380004, %13		READ	1.500 us
64	0010A64	A614E008	OR %13, 0008, %13		READ	1.350 us
65	1200011	--FF----	( WR )		WRITE	850 ns
66	0010A50	AA102004	OR %g0, 0004, %15		READ	1.450 us

**Figure 1–3: Hardware display format**

- 1 **Sequence or Location Column.** Lists the memory locations for the acquired data.
- 2 **PhysAddr Group.** Lists data from channels connected to the SBus Address bus.

- 3 **Data Group.** Lists data from channels connected to the SBus Data bus.
- 4 **Mnemonic Column.** Lists the disassembled instructions and cycle types.
- 5 **Control Group.** Lists data from channels connected to control signals.
- 6 **Timestamp.** Lists the timestamp values when a timestamp selection is made in the Disassembly Format Definition overlay for the 92A96 module.

**Software Display Format** The Software display format displays all assumed instruction fetches. Labels that indicate the beginning of exception handler routines are displayed. All other cycle types are suppressed. The disassembler cannot detect flushes following branch instruction. The display is designed to resemble assembly language listings.

**Control Flow Display Format** The Control Flow display format shows instructions that change the flow of control. Some instructions that do not actually change the control flow are displayed, such as a conditional branch that is not taken.

Exception handler entry labels and the instruction at that location will be displayed for control flow instructions. The label is always displayed regardless of the type of instruction.

**Subroutine Display Format** The Subroutine display format shows the first fetch of subroutine calls and return instructions. Subroutine call are assumed to be branch and jump instructions that perform a link. Because the disassembler cannot detect when a flush occurs, conditional branches are always displayed.

## Changing How Data is Displayed

There are fields and features that allow you to further modify displayed data to suit your needs. You can make selections unique to this application to do the following tasks:

- Change how data is displayed across all display formats
- Change the interpretation of disassembled cycles
- Display exception vectors

**Optional Display Selections** You can make optional display selections for disassembled data to help you analyze the data. Fields in the Disassembly Format Definition overlay of the 92A96 module allow you to change the way data is displayed.

In addition to the common display options (described in the basic operations user manual), you can change the displayed data in the following ways:

- Specify the starting address of the trap area
- Specify the total number of traps
- Specify the starting address of program code area
- Specify the size of program code area

The SBus bus support product has four additional fields: Trap Base Address, Total Number of Traps, Program Area Begin [31-0], Program Area Begin [35-32] and Program Area Size. These fields appear in the area indicated in the basic operations user manual.

**Trap Base Address.** You must enter the base address for the trap area. The default trap area base value is 0.

**Total Number of Traps.** You must enter the total number of hardware and software traps. The default number of traps is 100.

**Program Area Begin.** Since the SBus does not indicate whether a read is filling the instruction cache or the data cache, you must enter the upper four bits of the beginning address and size of the program code area. The default value is 00000000.

The disassembler assumes that read cycles are instructions within the address range specified in the Program Area Begin fields and the Program Area Size field.

**Program Area Size.** You can enter the size of the program code area. The default value is 100000.

**Marking Cycles** The disassembler does not have a Mark Opcode function.

## Viewing the Reference Memory

A demonstration reference memory file is provided so you can see an example of how your bus cycles and instruction mnemonics look when they are disassembled. Viewing the reference memory is not a requirement for preparing the acquisition module for use. You can view the reference memory file without connecting the logic analyzer to your SUT.

The basic operations user manual describes how to view the demonstration reference memory file.

# Specifications

This chapter contains the following information:

- Probe adapter description
- Dimensions of the probe adapter
- Channel assignment tables
- Description of how the acquisition module acquires SBus signals
- List of other accessible SBus signals and extra acquisition channels

## Probe Adapter Description

The probe adapter is a nonintrusive piece of hardware that allows the acquisition module to acquire data from an SBus in its own operating environment with little affect, if any, on that system. The basic operations user manual contains a figure showing the logic analyzer connected to a typical probe adapter. Refer to that figure while reading the following description.

The probe adapter consists of a circuit board and a socket for an SBus connector. The probe adapter connects to the bus in the SUT. Signals from the SBus system flow from the probe adapter to the podlet groups and through the probe signal leads to the acquisition module.

All circuitry on the probe adapter is powered from the SUT.

The probe adapter accommodates the SBus signals in a 96-pin connector.

Figure 1–4 shows the dimensions of the probe adapter.

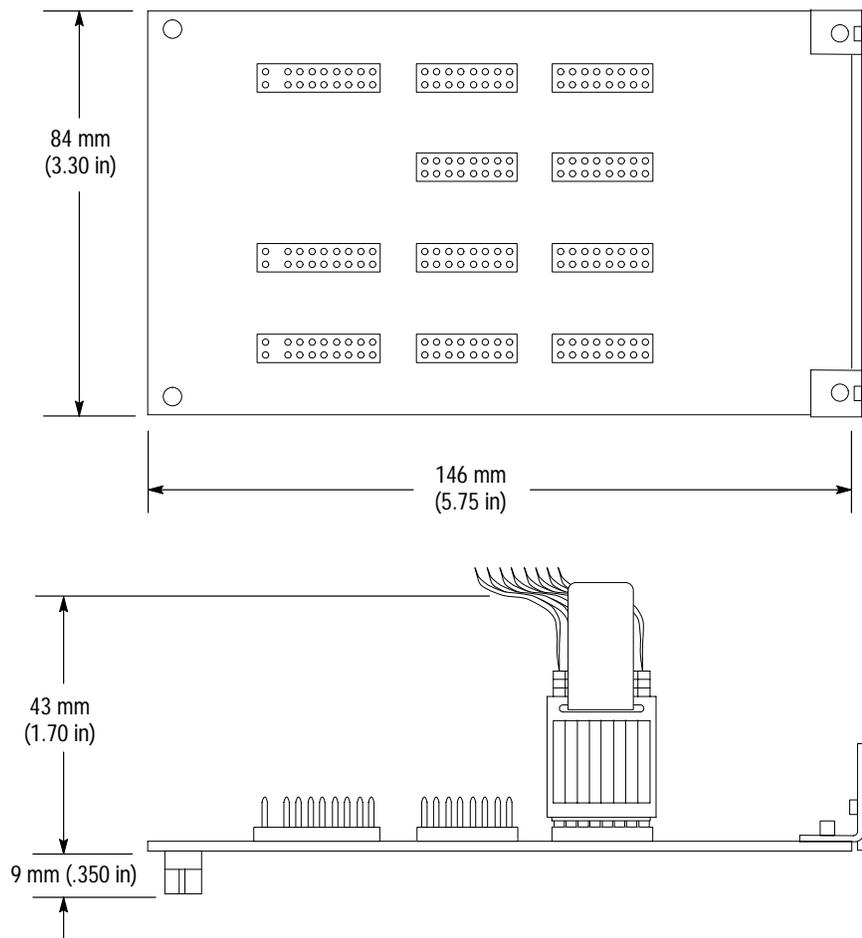


Figure 1-4: Minimum clearance of the probe adapter

## Channel Assignments

Channel assignments shown in Table 1-6 through Table 1-13 use the following conventions:

- All signals are required by the application unless indicated otherwise.
- Channels are shown starting with the most significant bit (MSB) descending to the least significant bit (LSB).
- A tilde (~) following a signal name indicates an active low signal.
- An equals sign (=) following a signal name indicates that it is double probed.

Table 1-6 shows the acquisition probe section and channel assignments for the PhysAddr group, and the bus signal to which each channel connects. The default display radix is HEX.

Table 1–6: LADM935 PhysAddr group channel assignments

Bit order	Section: channel	SBus signal name	Pin number
27	A3:3	PA27	94
26	A3:2	PA26	46
25	A3:1	PA25	93
24	A3:0	PA24	45
23	A2:7	PA23	91
22	A2:6	PA22	43
21	A2:5	PA21	90
20	A2:4	PA20	42
19	A2:3	PA19	89
18	A2:2	PA18	41
17	A2:1	PA17	87
16	A2:0	PA16	39
15	A1:7	PA15	86
14	A1:6	PA14	38
13	A1:5	PA13	85
12	A1:4	PA12	37
11	A1:3	PA11	83
10	A1:2	PA10	35
9	A1:1	PA9	82
8	A1:0	PA8	34
7	A0:7	PA7	81
6	A0:6	PA6	33
5	A0:5	PA5	79
4	A0:4	PA4	31
3	A0:3	PA3	78
2	A0:2	PA2	30
1	A0:1	PA1	77
0	A0:0	PA0	29

Table 1–7 shows the acquisition probe section and channel assignments for the Data group, and the bus signal to which each channel connects. The default display radix is HEX.

**Table 1–7: LADM935 Data group channel assignments**

Bit order	Section: channel	SBus signal name	Pin number
31	D3:7	D31	25
30	D3:6	D30	73
29	D3:5	D29	23
28	D3:4	D28	71
27	D3:3	D27	22
26	D3:2	D26	70
25	D3:1	D25	21
24	D3:0	D24	69
23	D2:7	D23	19
22	D2:6	D22	67
21	D2:5	D21	18
20	D2:4	D20	66
19	D2:3	D19	17
18	D2:2	D18	65
17	D2:1	D17	63
16	D2:0	D16	15
15	D1:7	D15	62
14	D1:6	D14	14
13	D1:5	D13	61
12	D1:4	D12	13
11	D1:3	D11	59
10	D1:2	D10	11
9	D1:1	D9	58
8	D1:0	D8	19
7	D0:7	D7	57
6	D0:6	D6	10
5	D0:5	D5	55
4	D0:4	D4	7
3	D0:3	D3	54
2	D0:2	D2	6
1	D0:1	D1	53
0	D0:0	D0	5

Table 1–8 shows the acquisition probe section and channel assignments for the Control group, and the bus signal to which each channel connects. The default display radix is OFF.

**Table 1–8: LADM935 Control group channel assignments**

Bit order	Section: channel	SBus signal name	Pin number
5	C1:5	BR~*†	2
4	C2:3	BG~*†	50
3	C0:7	AS~	51
2	C1:4	Sel~*†	3
1	C1:7	Rd	75
0	C1:3	Reset~	95

\* Signal not required for disassembly.

† Signal is not available from the SBus slot to which the probe connects.

Table 1–9 shows the acquisition probe section and channel assignments for the Size group, and the bus signal to which each channel connects. The default display radix is OFF.

**Table 1–9: LADM935 Size group channel assignments**

Bit order	Section: channel	SBus signal name	Pin number
2	C1:2	Siz2~*	27
1	C1:1	Siz1~*	74
0	C1:0	Siz0~*	26

\* Signal not required for disassembly.

Table 1–10 shows the acquisition probe section and channel assignments for the Ack group, and the bus signal to which each channel connects. The default display radix is OFF.

**Table 1–10: LADM935 Ack group channel assignments**

Bit order	Section: channel	SBus signal name	Pin number
2	C2:2	Ack2~*	44
1	C2:1	Ack1~*	40
0	C2:0	Ack0~*	36

\* Signal not required for disassembly.

Table 1–11 shows the acquisition probe section and channel assignments for the IntReq group, and the bus signal to which each channel connects. The default display radix is OFF.

**Table 1–11: LADM935 IntReq group channel assignments**

Bit order	Section: channel	SBus signal name	Bit order
6	C0:6	IntReq7*	28
5	C0:5	IntReq6*	24
4	C0:4	IntReq5*	20
3	C0:3	IntReq4*	16
2	C0:2	IntReq3*	12
1	C0:1	IntReq2*	8
0	C0:0	IntReq1*	4

\* Signal not required for disassembly.

Table 1–12 shows the acquisition probe section and channel assignments for the Misc group, and the bus signal to which each channel connects. The default display radix is OFF.

**Table 1–12: LADM935 Misc group channel assignments**

Bit order	Section: channel	SBus signal name	Pin number
2	A3:7	DataPar*	47
1	C1:6	LErr*	32
0	C2:7	Clk*	49

\* Signal not required for disassembly.

Table 1–13 shows the acquisition probe section and channel assignments for the clock probes (not part of any group), and the SBus signal to which each channel connects.

**Table 1–13: LADM935 clock channel assignments**

Section: channel	SBus signal name	Pin Number
CK:2	Clk=	49
CK:1	Rd=	75
CK:0	AS~=	51

These channels are used only to clock in data; they are not acquired or displayed. To acquire data from any of the signals shown in Table 1–13, you must connect another channel probe to the signal, called double probing. An equals sign (=) following a signal name indicates that it is already double probed.

## How Data is Acquired

This part of this chapter explains how the acquisition module acquires SBus signals using the LADM935 probe adapter and application. This part also provides additional information on bus signals accessible on or not accessible on the probe adapter, and on extra acquisition channels available for you to use for additional connections.

### SBus Clocking

A special clocking program is loaded to the acquisition module every time SBus Support is selected in the 92A96 Configuration menu. This special clocking is called Custom for the 92A96.

With this clocking, the module logs in signals from multiple groups of channels at different times when they are valid on the SBus 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 for the 92A96, the module clocking state machine (CSM) generates one master sample for each SBus bus cycle, no matter how many clock cycles are contained in the bus cycle.

Figure 1–5 shows the sample point and the master sample point. All signals are logged at sample point 1 during Write cycles (the Rd signal is low). During Read cycles (the Rd signal is high), only ACK2-ACK0 are logged, then all other signals are logged at the master sample point.

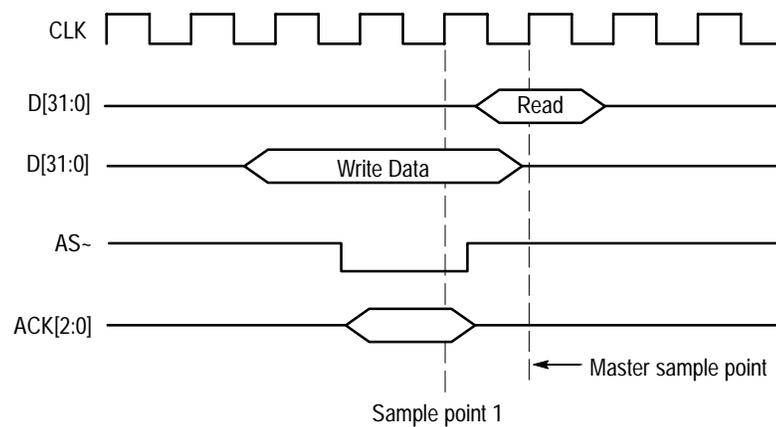


Figure 1–5: SBus bus timing

## Alternate Connections

You can connect to bus signals that are not required by the application so you can do more advanced timing analysis. These signals might or might not be accessible on the probe adapter board. The following paragraphs and table list signals that are or are not accessible on the probe adapter board, as well as extra channels.

For a list of signals required or not required for disassembly, refer to the channel assignment tables beginning on page 15.

### Signals Not On the Probe Adapter

The probe adapter only monitors common bus signals. Bus arbitration signals, BR~, BG~, and Sel~, are not available from the SBus slot to which the probe adapter connects. To access these bus arbitration signals, you can use some of the extra channels (podlets) to make the connections.

**Extra Acquisition Channels**

Table 1–14 lists extra acquisition channels that are left after you have connected all the channels used by the application. You can use these extra channels to make alternate SUT connections.

**Table 1–14: Extra acquisition module sections and channels**

<b>92A96 section</b>	<b>Channels</b>
A3	7-4
C3	7-0

These channels (and signals you connect them to) are not defined as a channel group in the Channel setup menu. You have to access the Channel setup menu and define a new channel group containing the extra channels you are using.

**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

This section contains information on where to find service procedures.

## Replacing Signal Leads

The basic operations user manual contains information on how to replace signal leads (individual clock and channel probes).

## Replacing Protective Sockets

The basic operations user manual contains information on how to replace protective sockets.

# Replaceable Parts

This section contains a list of the replaceable parts for the LADM935 SBus support product. Use this list to identify and order replacement parts.

## 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.

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

## Module Servicing

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

**Module Exchange.** In some cases you may exchange your module for a remanufactured module. These modules cost significantly less than new modules and meet the same factory specifications. For more information about the module exchange program, call 1-800-TEK-WIDE, extension 6630.

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

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

## Using the Replaceable Parts List

This section contains a list of the mechanical and/or electrical components that are replaceable for the LADM935 SBus support product. Use this list to identify and order replacement parts. The following table describes each column in the parts list.

### Parts list column descriptions

Column	Column name	Description
1	Figure & index number	Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.
2	Tektronix part number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No 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.

**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.

## Replaceable Parts

### Manufacturers cross index

Mfr. code	Manufacturer	Address	City, state, zip code
62559	SCHROFF INC	170 COMMERCE DRIVE	WARWICK, RI 02886-2430
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077-0001
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105

### Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
1-0	671-3912-00			1	CIRCUIT BD ASSY:S-BUS,671-3912-00:LADM935	80009	671-3912-00
-1	131-5267-00			3	CONN,HDR:PCB,MALE,STR,2 X 40,0.1 CTR,0.235 MLG X 0.110 TAIL,30GOLD	00779	104326-4
-2	213-1039-00			2	SETSCREW:M2.5 X 0.45,8MM,SLOTTED,STL,WITH CONE POINT	62559	21100-275
-3	none			1	AMP MICRO-STRIP CONNECTOR, 100-PIN	00779	174683-8
<b>STANDARD ACCESSORIES</b>							
	070-9609-00			1	MANUAL,TECH:INSTRUCTION,SBUS,DISSASSEMBLE R,LADM935	80009	070-9609-00
	070-9365-00			1	MANUAL,TECH:BASIC OPS MICRO SUP ON DAS/TLA	80009	070-9365-00

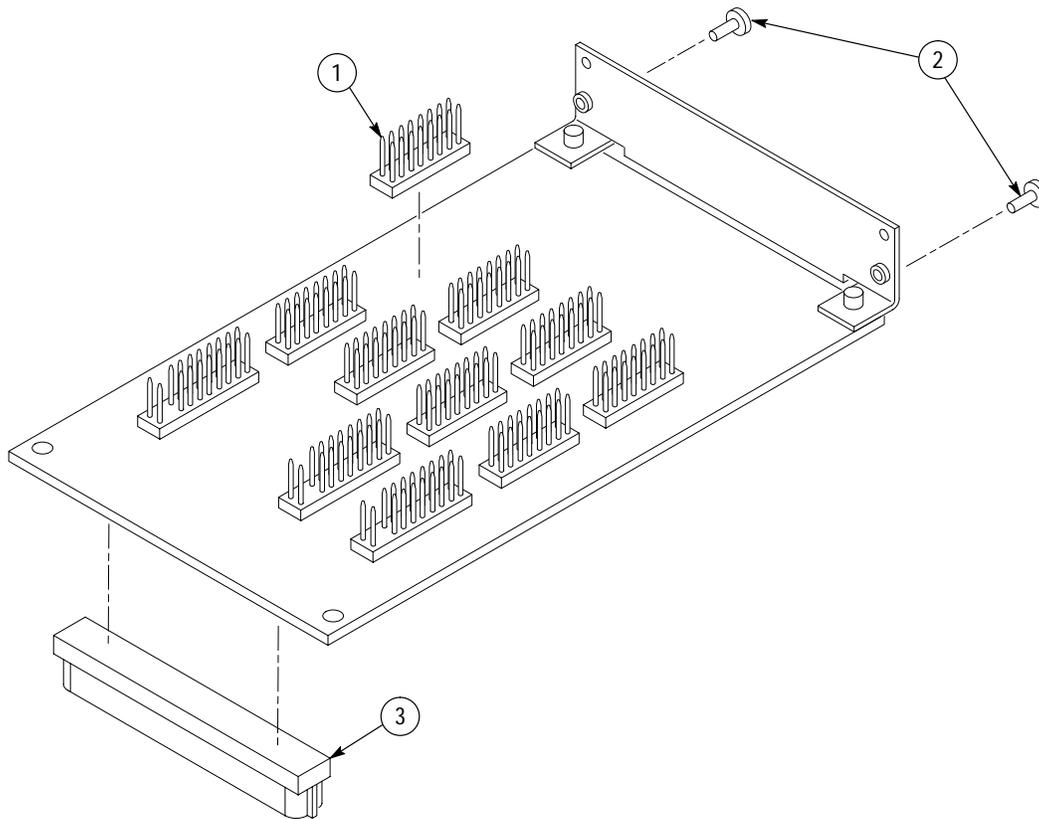


Figure 1: Sbus probe adapter exploded view

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