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User Manual

Tektronix

TLA 510 & 520
Tektronix Logic Analyzer

070-8977-07

This document supports software release 3 version 1.50 and above.

CE

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We

Tektronix Holland N.V.
Marktweg 73A
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The Netherlands

declare under sole responsibility that the

TLA 510 and TLA 520 Logic Analyzers

meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility and Low Voltage Directive 73/23/ECC for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EMC Directive 89/336/EEC:

EN 55011 Class A Radiated and Conducted Emissions

EN 50081-1 Emissions:

EN 60555-2 AC Power Line Harmonic Emissions

EN 50082–1 Immunity:

IEC 801-2 Electrostatic Discharge Immunity
IEC 801-3 RF Electromagnetic Field Immunity
IEC 801-4 Electrical Fast Transient/Burst Immunity

Low Voltage Directive 73/23/EEC:

EN 61010–1 Safety requirements for electrical equipment for measurement, control, and laboratory use

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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

Use Proper Power Cord

To avoid fire hazard, use only the power cord specified for this product.

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.

Ground the Product

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

Do Not Operate Without Covers

To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

Use Proper Fuse

To avoid fire hazard, use only the fuse type and rating specified for this product.

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 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.

Keep Probe Surface Clean

To avoid electric shock and erroneous readings, keep probe surface clean.

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Wear Eye Protection To avoid eye injury, wear eye protection if there is a possibility of exposure to high-intensity rays.

Product Damage Precautions

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

Use Proper Voltage Setting Before applying power, ensure that the line selector is in the proper position for the power source being used.

Provide Proper Ventilation To prevent product overheating, provide proper ventilation.

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

Do Not Immerse in Liquids Clean the probe using only a damp cloth. Refer to cleaning instructions.

Safety Terms and Symbols

Terms in This Manual These terms may appear in this manual:



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



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

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

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

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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

Certifications and Compliances

CSA Certified Power Cords

CSA Certification includes the products and power cords appropriate for use in the North America power network. All other power cords supplied are approved for the country of use.

Safety Certification of Plug-in or VXI Modules

For modules (plug-in or VXI) that are safety certified by Underwriters Laboratories, UL Listing applies only when the module is installed in a UL Listed product. CSA Certification applies only when the module is installed in a CSA Certified product.

Compliances

Consult the product specifications for IEC Installation Category, Pollution Degree, and Safety Class.

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Preface

The TLA 510 and 520 User Manual is the main reference manual for the Tektronix TLA 510 and TLA 520 Logic Analyzers. It includes an overview of the TLA 510 and 520 Logic Analyzers, basic installation information, a tutorial for new users, and reference information for system-level menus.

The manual is part of the Digital Analysis System (DAS) documentation set. In addition to the TLA 510 and 520 User Manual, you should consult the following documentation to get the most out of your logic analyzer:

- The *92A96 & 92C96 Module User Manual* provides detailed information on the 92C96 Data Acquisition Module. Consult this manual for information on the Setup and Display menus for the acquisition module and for information on connecting the probes to the logic analyzer and the system-under-test.
- The *92S16/32 Module User Manual* provides detailed information on the 92S16 Pattern Generation Module. Consult this manual for information on the Setup menus for the pattern generation module and for information on connecting the probes to the logic analyzer and the system-under-test.
- The *TLA 510 and 520 Service Manual* provides service information for qualified service technicians to isolate problems to the module level.
- A series of microprocessor disassembler instruction manuals that describe the various microprocessor support packages available with the DAS and TLA 510 and 520 Logic Analyzers.
- A series of application software user manuals that accompany the various software support packages.

How to Use This Manual

The TLA 510 and 520 User Manual consists of the following:

- Getting Started. This chapter briefly describes the TLA 510 and 520 Logic Analyzer, provides installation instructions, and information for first-time users.
- Operating Basics. This chapter provides a functional overview of the logic analyzer. It also provides a tutorial for new users who are unfamiliar with the operation of the logic analyzer.
- Reference. This chapter contains reference information on the system-level menus and guidelines for multimodule operation.

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- Appendices. The appendices contain information on the product specifications (acquisition and pattern generation module specifications are listed in the respective module user manuals), product options and accessories, error messages, software installation procedures, software configuration procedures, the DASdisk utility, and user service procedures.
- Glossary and Index.

Manual Conventions

The following terms and conventions are used throughout this manual:

- The term *system unit* refers to the mechanical chassis of the logic analyzer.
- The term *mainframe* when used in the menus refers to the system unit.
- The term *module* refers to either to the acquisition or pattern generation circuit card. The term also appears in the menus displayed on the terminal.
- The term *92C96* refers to the 92C96 Data Acquisition Module. The 92C96 is the configurable 92A96 Data Acquisition Module. The 92C96 functions identically to the 92A96 Data Acquisition Module.
- The tilde symbol (~) represents active low signals.

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Getting Started

This chapter briefly describes the TLA Logic Analyzer and provides instructions for starting to use the logic analyzer.

Product Description

The Tektronix TLA Logic Analyzers are a series of logic analyzers, each consisting of a system unit, color terminal, application software packages, and probes for acquiring data.

The logic analyzer is available in one of two products: the 100-channel TLA 510 and the 200-channel TLA 520. Both logic analyzers are available with several options including deeper memory depth.

Hardware

The system unit provides computing power, input/output features, and mass storage for the internal acquisition and pattern generation modules.

The standard display device is a color terminal with a keyboard and a mouse. Interactive menus define the contents of the system.

The system unit consists of the following major internal components:

- 100 channels of data acquisition (200 channels for the TLA 520)
- 40 MHz 68EC030 CPU
- Hard and floppy disk drives
- RS-232 ports
- Local Area Network (LAN) interface
- External input and output connections

The mass-storage device in the system unit is a SCSI hard disk drive. The system software is installed on the hard disk.

A 1.44 Mbyte 3.5-inch floppy disk drive is standard in the system unit. The floppy disk drive is used for loading application software from floppy disk, copying files for use on other TLA 510 & 520 Logic Analyzers, and making or restoring backup files.

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The system unit supports three RS-232 communication ports accessible on the rear panel:

- The Terminal port connects the system unit to an optional console terminal.
- The Host port connects the system unit to other RS-232-compatible host computer systems.
- The Auxiliary port connects the system unit to other RS-232-compatible devices (for example, a printer).

The local area network interface connects the system unit to the terminal. The LAN software provides a means to transfer files between the logic analyzer and a host computer through ftp (file transfer protocol) and other protocols. An optional 92LANP application software product allows you to remotely control the logic analyzer through the LAN interface.

A 37-pin female D-connector allows you to monitor or drive external devices with the optional 92PORT application software. The connector provides eight discrete inputs, eight discrete outputs, and corresponding strobe signals.

Configurations

The TLA 510 Logic Analyzer comes with 100 channels of 100 MHz acquisition and is standard with acquisition memory depths of 8 Kbits, upgradable to 32 Kbits, 128 Kbits, 512 Kbits, or 2 Mbits. The TLA 510 Logic Analyzer can be ordered with 16 channels of pattern generation at 50 MHz.

The TLA 520 Logic Analyzer comes with 200 channels of 100 MHz acquisition and is standard with acquisition memory depths of 8 Kbits, upgradable to 32 Kbits, 128 Kbits, 512 Kbits, or 2 Mbits.

To upgrade either logic analyzer, contact your local Tektronix sales representative for upgrade information.

Both logic analyzers come standard with a 14-inch terminal, 101-key keyboard, and mouse.

System Software

The logic analyzer is controlled by system software stored on the hard disk drive.

To determine the version number of the current system software, check the Diagnostics menu. The Version menu displays the version numbers of the internal components and application software in the system unit; both menus are in the Utility menu group.

System software loads into memory (RAM) at power on and performs the following tasks:

- Manages system resources (that is, memory, CPU, storage devices, common control functions, files and file access, and data communication I/O devices)

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- Provides system service subroutines so that internal acquisition and pattern generation hardware and applications programs have a common set of subroutines
- Provides common system control functions such as start/stop control and allocation of system hardware resources
- Controls communication between standard subroutines, modules, application software, and I/O devices (standard, optional, and mass storage)

As a backup, the logic analyzer can also load system software from a set of floppy disks.

Application Software

Tektronix offers application software packages; each package includes a user manual. Refer to the appropriate manual for more detailed information. A list of application software currently installed is shown in the Version menu. To load application software from a floppy disk, refer to the *Install Application Operation* of the Disk Services menu on page 3–32.

The Microprocessor Support packages provide both hardware and software mnemonic disassembly formats. Each support package includes a microprocessor-specific probe adapter which provides the hardware necessary to properly acquire data from the microprocessor. Some of the microprocessor support packages include reference memories that you can use with the manual to become more familiar with the package.

Installation

This section provides information on installing the system unit hardware, terminal, and software. The basic steps to install your logic analyzer follow:

1. Determine the best locations for the system unit and the terminal (refer to *Site Considerations*).
2. Connect the power cord to the system unit; connect the power cord to the appropriate power source.
3. Connect the terminal to the system unit (refer to *System Unit Connections* on page 1–4).
4. Connect the acquisition probes to the rear of the system unit (refer to the *92A96 & 92C96 Module User Manual* for detailed instructions on connecting the acquisition probes).
5. Connect the probes to the system-under-test.

The rest of this section provides more detailed information on installing your TLA 510 and 520 Logic Analyzer.

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Site Considerations

Information provided here describes the environment in which the logic analyzer should be operated; the intended site must meet the stated conditions.

The system unit will operate in a temperature environment between +10° C and +40° C (+50° F and +104° F). The maximum heat dissipation of the system unit is 2400 BTUs per hour. The maximum heat dissipation of the terminal is 613 BTUs per hour.

When the logic analyzer is to be operated on a bench or cart, it should be placed in a normal, upright position. For proper cooling, allow at least eight inches (20.4 cm) of clearance on all sides of the system unit.

If you place the system unit on its side, place it on its side with the floppy disk drive down. You must support the system unit so it will not tip over. You should consider using a commercially available PC-cradle (saddle) to support the system unit.



CAUTION. *To prevent damage from overheating, do not place the system unit on its side with the floppy disk drive towards the top.*

System Unit Connections

After determining the location of your logic analyzer, you are ready to connect the system unit to the power source, to the terminal, or to a computer network.

The acquisition and pattern generation probes attach to the logic analyzer through openings in the back panel. The logic analyzer is shipped with EMI brackets installed on the rear of the system unit. Before installing the probes and probe cable brackets, you must temporarily remove the EMI brackets. Figure 1–1 shows how to install the probe cables, probe brackets, and EMI brackets on a TLA 520. Figure 1–2 shows how to install the probe cables, probe brackets, and EMI brackets on a TLA 510 with the pattern generator module option (Option 30). For detailed information using and connecting the acquisition probes, refer to the *92A96 & 92C96 Module User Manual*. For information on connecting the pattern generation probes refer to either the *92S16/32 Module User Manual* or to the *P6463A Pattern Generation Probe Instruction Manual*.

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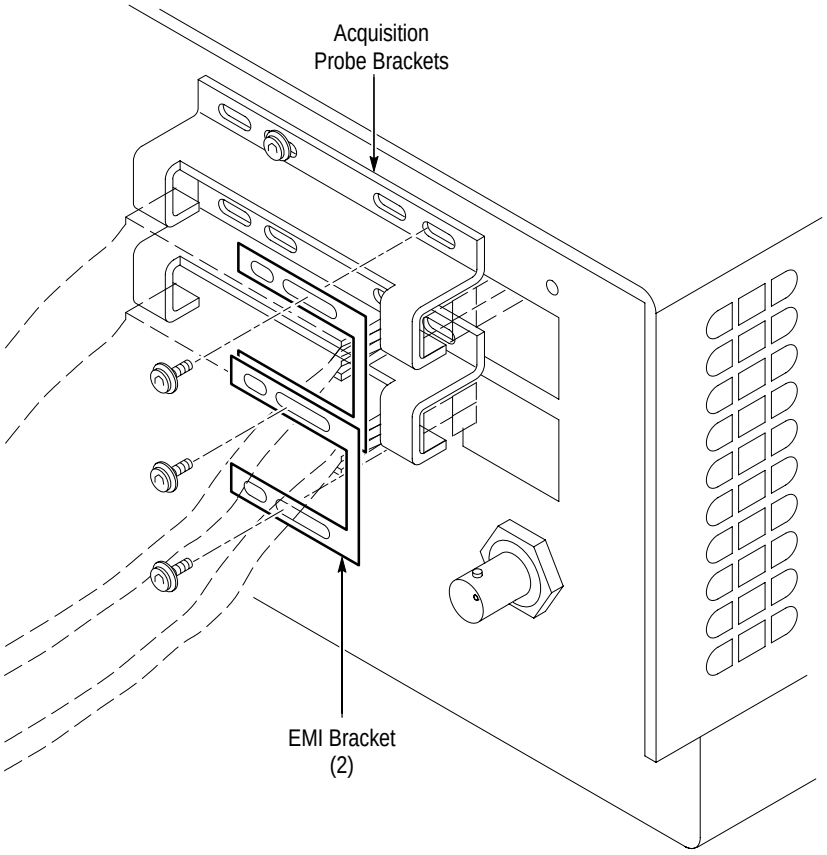


Figure 1–1: Installing EMI Brackets and Acquisition Probe Brackets on a TLA 520

The power cord attaches to the system unit through a power-cord connector on the rear panel. The standard power cord for the system unit is rated at 10 A. Other power cords are available as options.

A different fuse is required for 230 V operation than for 115 V operation. Before connecting the power cord, ensure that the correct fuse is installed. Refer to *Appendix F: User Service* in this manual for information on replacing the fuse.

Connect the proper power cord to the system unit and to an appropriate power source.

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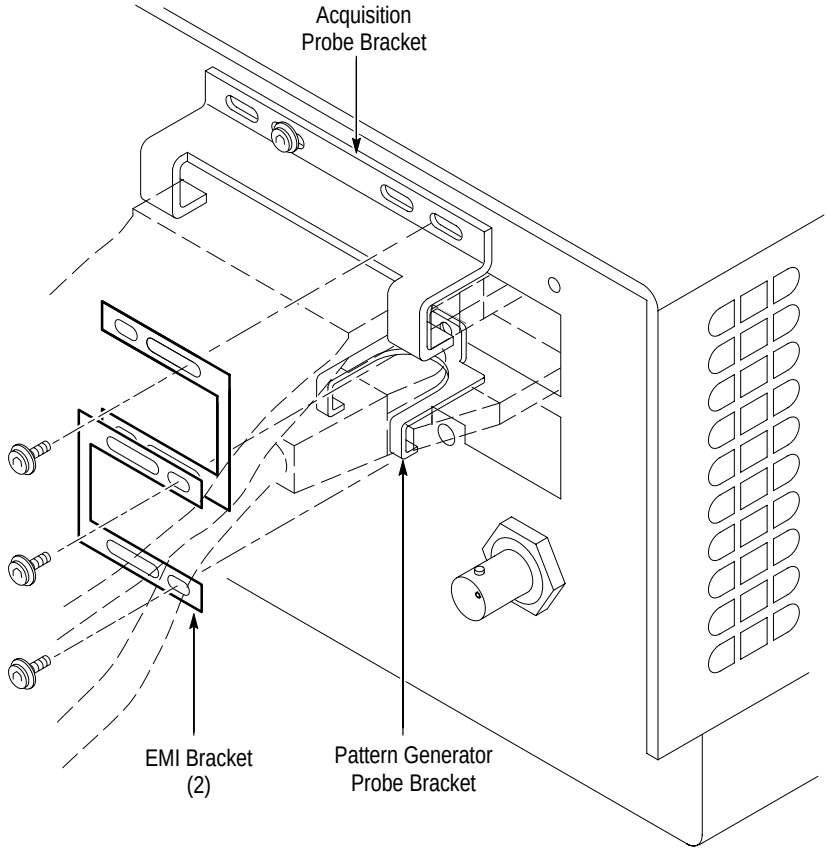


Figure 1–2: Installing EMI Brackets and Acquisition Probe Brackets on a TLA 510 Option 30

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Terminal Connections

The terminal connections differ depending on whether your logic analyzer will be used in a networked or stand-alone operation.

Networked Operation. For networked operation, a console RS-232 terminal is required for selected operations such as displaying error or status messages, setting network parameters using the Configuration utility, or installing software. The terminal connects to the Terminal port on the mainframe. Any RS-232 terminal with VT100 or ANSI compatibility or terminal emulation is acceptable. The terminal should be capable of displaying 24 lines of 80 characters.

The terminal baud rate should be set to 38400. You should change the terminal baud rate to match that of the mainframe. If necessary, you can change the baud rate of the mainframe (refer to *Terminal, Host, and Auxiliary Port Baud Rate Selections* on page 1–10). For information on the mainframe RS-232 pin-outs, refer to *Host Computer or Serial Printer Connections* on page 1–8.

For more information on installing the networked operation, refer to the *92XTerm User Manual*.

Stand-Alone Operation. For stand-alone operation, the X terminal connects to the mainframe with an RS-232 serial cable (provided as a standard accessory) and a Thinnet cable.

Refer to the terminal installation manual that came with your terminal while performing the following steps:

1. Connect the RS–232 serial cable from Terminal Port 0 to the Terminal port on the system unit.
2. Connect a BNC-T connector to the Thin Ethernet BNC connector on the logic module of the terminal. Connect a second BNC-T connector to the BNC connector on the back of the system unit.
3. Connect a 50 Ω terminator to one side of the BNC-T connector on the logic module and another terminator to the BNC–T connector on the system unit.
4. Connect a 50 Ω BNC cable from the unused side of the BNC-T connector on the logic module to the unused side of the BNC-T connector on the system unit.
5. Connect the keyboard and the mouse to the logic module.
6. Connect the monitor cable from the monitor to the logic module.

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7. Connect the power cord (or the power supply) to the logic module.
8. Connect the power cord to the monitor power connector.
9. Power on the monitor and the logic module. Wait for the serial window to appear and then power on system unit.

The terminal should be set for the correct settings to communicate with the system unit when it is shipped from the factory. After powering on the terminal and the system unit, the terminal will display its Boot Monitor. Table 1–1 lists the terminal default boot parameters. If the terminal does not boot properly, you should check the boot parameters against those in the table.

Table 1–1: Terminal Default Boot Parameters

Parameter	Default Value	Parameter	Default Value
IADDR	10.0.0.2	DNODE	0.0
IHOST	10.0.0.1	BMETHOD	ROM
IMASK	255.0.0.0	BDISPLAY	DISABLED
IGATE	0.0.0.0	BAFROM	NVRAM
BPATH[1]	os		

1 **On initial power on, the default value is /XP300/os and then changes to os.**

The terminal should display a series of messages in the Boot Monitor. When the boot process is complete, the serial window will be displayed with the word "Connected." The serial window should then display the file system check messages as the system completes its boot process. After a few moments, the logic analyzer display appears.

Host Computer or Serial Printer Connections

You can connect the logic analyzer to a host computer or to a serial printer with a serial cable. Connect the serial cable to either the Host or Auxiliary 9-pin DCE ports on the rear of the system unit. If the host computer has a 9-pin DTE male connector, connect straight through using a 9-wire cable with a 9-pin female connector on one end and a 9-pin male connector on the other end. If your host computer or serial printer has a 25-pin male connector, use an 8-wire cable with connectors wired as shown in Table 1–2.

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Table 1–2: 9-pin DCE-to-25-Pin DTE Cable Connections

Port Signal Name	9-Pin Male Connector (System Unit End)	Terminal Connector
Protective Ground (Shield)	(Shield)	(Shield)
Carrier Detect	Pin 1	Pin 1
Receive Data	Pin 2	Pin 2
Transmit Data	Pin 3	Pin 3
Data Terminal Ready	Pin 4	Pin 4
Signal Ground	Pin 5	Pin 5
Data Set Ready	Pin 6[2]	No Connection
Request To Send	Pin 7	Pin 7
Clear To Send	Pin 8	Pin 8

[2] **Pin 6 is pulled up to +5 V**

If your host computer or printer has a 25-pin DCE female connector, you must provide a cable wired as shown in Table 1–3.

Table 1–3: 9-pin DCE-to-25-Pin DCE Cable Connections

Port Signal Name	9-Pin Male Connector (System Unit End)	25-Pin Male Connector
Protective Ground (Shield)	(Shield)	Pin 1
Carrier Detect	Pin 1	Pin 4
Receive Data	Pin 2	Pin 2
Transmit Data	Pin 3	Pin 3
Data Terminal Ready	Pin 4	Pin 5
Signal Ground	Pin 5	Pin 7
Data Set Ready	Pin 6[1]	Pin 6
Request To Send	Pin 7	Pin 8
Clear To Send	Pin 8	Pin 20

[1] **Pin 6 is pulled up to +5 V**

The serial printer connects to the Auxiliary port on the logic analyzer; the port connector is accessible on the rear panel. When printing to a serial printer the Auxiliary Port output data format consists of 8-bits/character, no parity and one stop bit. For specific information on using a printer with specific modules, refer to the appropriate module user manual.

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The baud rate and flow control are selectable in the Communications menu. For information on how to set the Baud rate DIP switches, refer to *Terminal, Host, and Auxiliary Port Baud Rate Selections*.

When printing to a serial printer, ensure that your printer communication settings match those of the Auxiliary port. For specific instructions on the use and care of your printer, refer to its supporting documentation.

Output data is transmitted on pin 2 of the Auxiliary port connector and is received on pin 3. For recommended cable connections to either DTE or DCE type serial printer ports, refer to Tables 1–2 and 1–3 on page 1–9.

Terminal, Host, and Auxiliary Port Baud Rate Selections

There are two different ways that you can select the baud rates for the Terminal, Host, and Auxiliary Ports on the logic analyzer. The easiest way is to set the baud rates in the Communications menu as described on page 3–43. You can also override the selections in the Communications menu using the DIP switches mounted on the Controller board. You can access these switches through an opening on the rear panel of the system unit as shown in Figure 1–3.

DIP switch pairs 3 and 4, 5 and 6, and 7 and 8 select the baud rates for the RS-232 ports as listed in Table 1–4. DIP switch 1 is the left-most switch as you face the rear of the system unit. The operation of DIP switches 1 and 2 is described later in this manual.

For example, if you set DIP switches 7 and 8 both in the up position, the baud rate for the Auxiliary Port (serial printer port) will always power on to a default baud rate of 9600. You can use the other switch settings to provide alternative baud rate settings. The restore parameters setting causes the three ports to power on with the baud rates specified in the Communications menu.

It is recommended that you operate your logic analyzer with all DIP switches in the up (or open) position.

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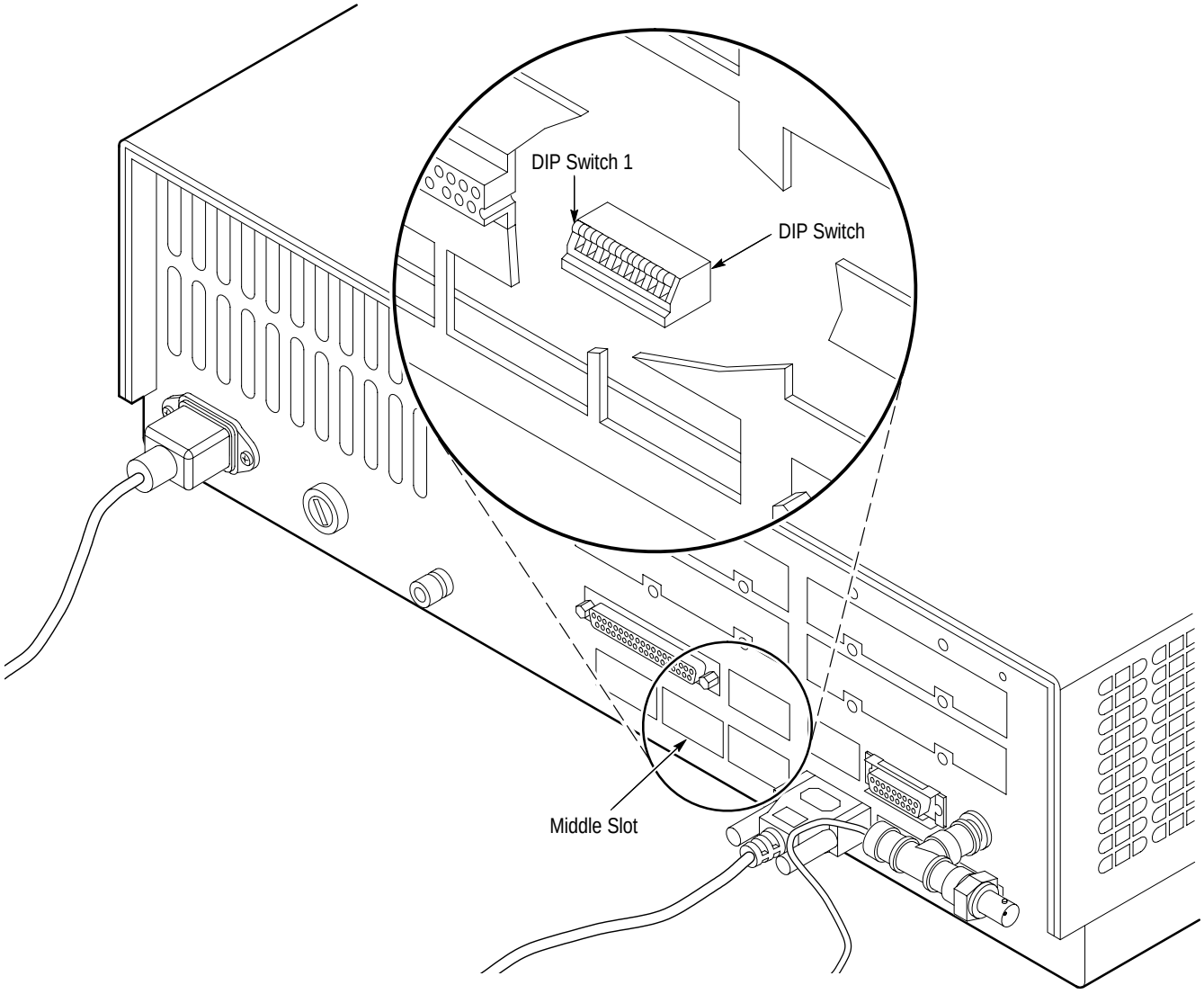


Figure 1–3: DIP Switch Location

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Table 1–4: Baud Rate DIP Switches

Switch Use	Setting (Up=Open, Down=Closed)	Result of Setting
Boot Control (Switches 1 & 2)	Up / Up	Normal system boot
	Down / Up	BOOT?> prompt
	Up / Down	Not used
	Down / Down	Not used
Terminal Port (Switches 3 & 4)	Up / Up	38400 baud (default)
	Up / Down	2400 baud
	Down / Up	1200 baud
	Down / Down	Restore Parameters
Host Port (Switches 5 & 6)	Up / Up	9600 baud (default)
	Up / Down	2400 baud
	Down / Up	1200 baud
	Down / Down	Restore Parameters
Auxiliary Port (Switches 7 & 8)	Up / Up	9600 baud (default)
	Up / Down	2400 baud
	Down / Up	1200 baud
	Down / Down	Restore Parameters

Software Installation

The logic analyzer comes with the system software already installed and ready to use. If you order your logic analyzer with any application software products (such as one of the microprocessor disassembler products), you must install the software on the hard disk before using it. Refer to your application software user manual for information on installing the application software.

A copy of the back-up system software is available on floppy disks. For information on installing or reinstalling the system software, refer to *Appendix D: Loading System Software*.

There may be occasions when you must set some of the software configuration requirements to communicate with the terminal. Details on setting the communication requirements are provided in *Appendix E: Configuration Utility.*

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First Time Operation

After connecting the terminal and the probes, you should be ready to power on the logic analyzer.

Power on the terminal and then the system unit. The terminal performs its power-on checks; then the power-on sequence for the system unit begins. The logic analyzer temporarily displays a power-on screen with the product logo, system software version, and information on the hard and floppy disk drives.

When the power-on sequence is complete, the system displays the Menu Selection overlay. You are now ready to use the logic analyzer.

Performing an Acquisition

Acquire data by using the following basic steps:

1. Connect the prober from the logic analyzer to the system-under-test. If necessary, refer to your acquisition module user manual for details on connecting probes.
2. Set up the acquisition parameters by either programming the Setup menus or by restoring a setup from the hard disk drive.
3. Acquire data (normally you can press the F1: START function key).
4. Use the Display menus to analyze the results of the acquired data.

These are the basic steps for acquiring data. You should refer to the acquisition module user manual for more details on setting up and using the menus.

Moving Forward

The TLA 510 and 520 logic analyzers are powerful tools for solving complex problems. Using the logic analyzers can be as simple as pressing the start button. For more complex applications, you can restore or load setups from application software programs and analyze the resultant data on a host computer network.

The following tools or products can be used with the TLA 510 and 520 Logic Analyzers to help you solve hardware or software problems.

Microprocessor Disassemblers. The logic analyzer can be used with several microprocessor disassembler application software packages. Each application comes with software and an instruction manual.

Networked X-Windows Interface. The 92XTerm product allows you to connect the logic analyzer to an X-window interface. You can display the logic analyzer menus on a workstation while the actual logic analyzer is located in a remote location. The 92XTerm product comes with software and user manual.

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Programmatic Command Language (PCL). The 92LANP product allows you to control the operation of the logic analyzer from a host computer over a LAN (local area network) using the Programmatic Command Language. The 92LANP product comes with manuals and software.

Discrete I/O Port. The 92PORT product allows you to monitor and send signals to a system-under-test using the 37-pin D-connector on the rear of the logic analyzer.

In addition to the various application software products available for the TLA 510 and 520 Logic Analyzer, you may also want to refer to the following documentation for more information on the data acquisition and pattern generation capabilities.

92A96 and 92C96 Data Acquisition Module User Manual. The *92A96 & 92C96 Module User Manual* provides detailed information on using the 92C96 Data Acquisition Module in the logic analyzer. The 92C96 Module is the heart of the logic analyzer and has its own user manual. The manual describes setup and display menus; it also provides probe connection information.

92S16/32 Pattern Generation Module User Manual. The *92S16/32 Module User Manual* provides detailed information on using the 92S16 Pattern Generation Module. The manual describes all of the setup menus available for the module as well as information on connecting the pattern generation probes.

P6463A 9 or 16-Channel Pattern Generation Probe Instruction Manual. The *P6463 Probe Instruction Manual* provides instructions for using the probe with the pattern generation capabilities of the logic analyzer.

Other applications, software, and documentation are available to use with the logic analyzer; contact your local Tektronix representative for more information.

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Functional Overview

This chapter provides brief introductory information on the TLA 510 and 520 Logic Analyzers. It provides a physical description of the logic analyzer, an overview of its menus, and provides a tutorial for first time users.

The logic analyzer uses a common system unit for the TLA 510 and TLA 520 Logic Analyzers; the main difference is that the TLA 510 Logic Analyzer comes standard with 100 channels of acquisition while the TLA 520 Logic Analyzer comes with 200 channels of acquisition.

The logic analyzer uses the 92C96 Data Acquisition Module to acquire data. The 92C96 Module is a subset of the 92A96 Data Acquisition Modules. The TLA 510 Logic Analyzer can also be ordered with the 92S16 Pattern Generation Module that provides 16 channels of pattern generation. The term Module refers to either the acquisition or pattern generation unit in the logic analyzer and is used throughout this document.

Figure 2–1 shows a front view of the system unit. The DC ON/OFF switch and the floppy disk drive are located at the front of the system unit as shown. An LED located in the lower right corner on the front of the system unit illuminates when the hard disk is being accessed.

The DC ON/OFF switch illuminates when the logic analyzer is powered on. The switch is located in the lower-left corner on the front of the system unit. When in the OFF (Standby) position, the DC voltages are removed from the circuitry; however, AC voltages still exist inside the system unit. The switch is illuminated when it is in the ON position. To remove AC voltages from the system unit, you must remove the power cord.

The DC ON/OFF switch, not the power cord, should be used for powering the system unit on and off. Since the power-off sequence is logic-controlled, you will notice a slight delay before DC power is removed from the system unit. During a normal power off, the logic analyzer saves information on the type of shutdown occurring and saves the current state of the file system.

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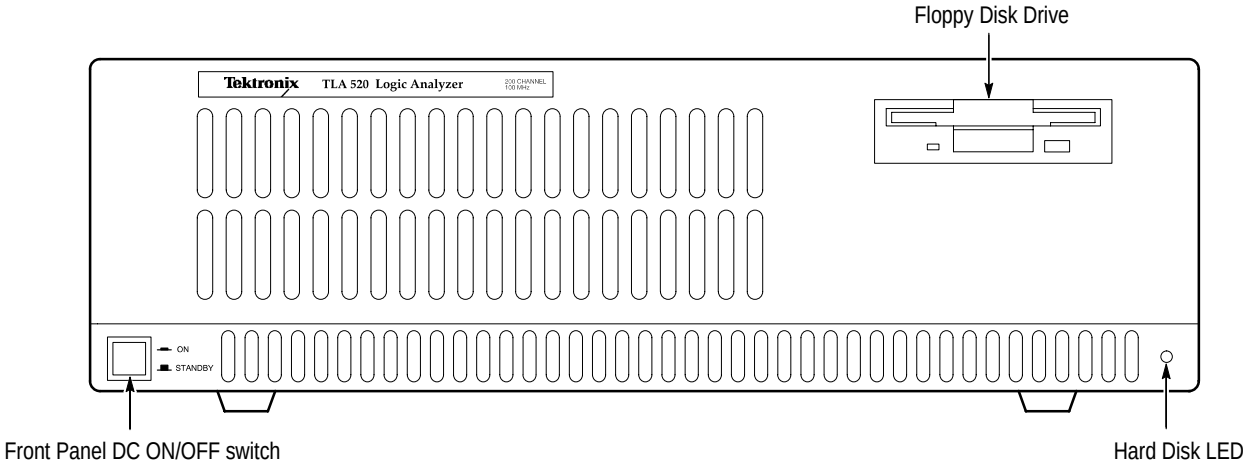


Figure 2–1: Front View of the System Unit in the Normal Upright Position

Figure 2–2 shows a rear view of the system unit with probes connected to the acquisition module. The acquisition module provides connections for up to four probe assemblies. A probe power connection provides power for the probe assemblies. A Sync-out connector lets you connect a triggering signal to an external device, such as an oscilloscope or back to the system under test.

Figure 2–3 shows the rear view of the system unit with its external connectors. Three 9-pin RS-232 ports provide connections to a terminal, auxiliary (printer), and host computer. The 37-pin female D-connector allows you to monitor or drive external devices with the optional 92PORT application software.

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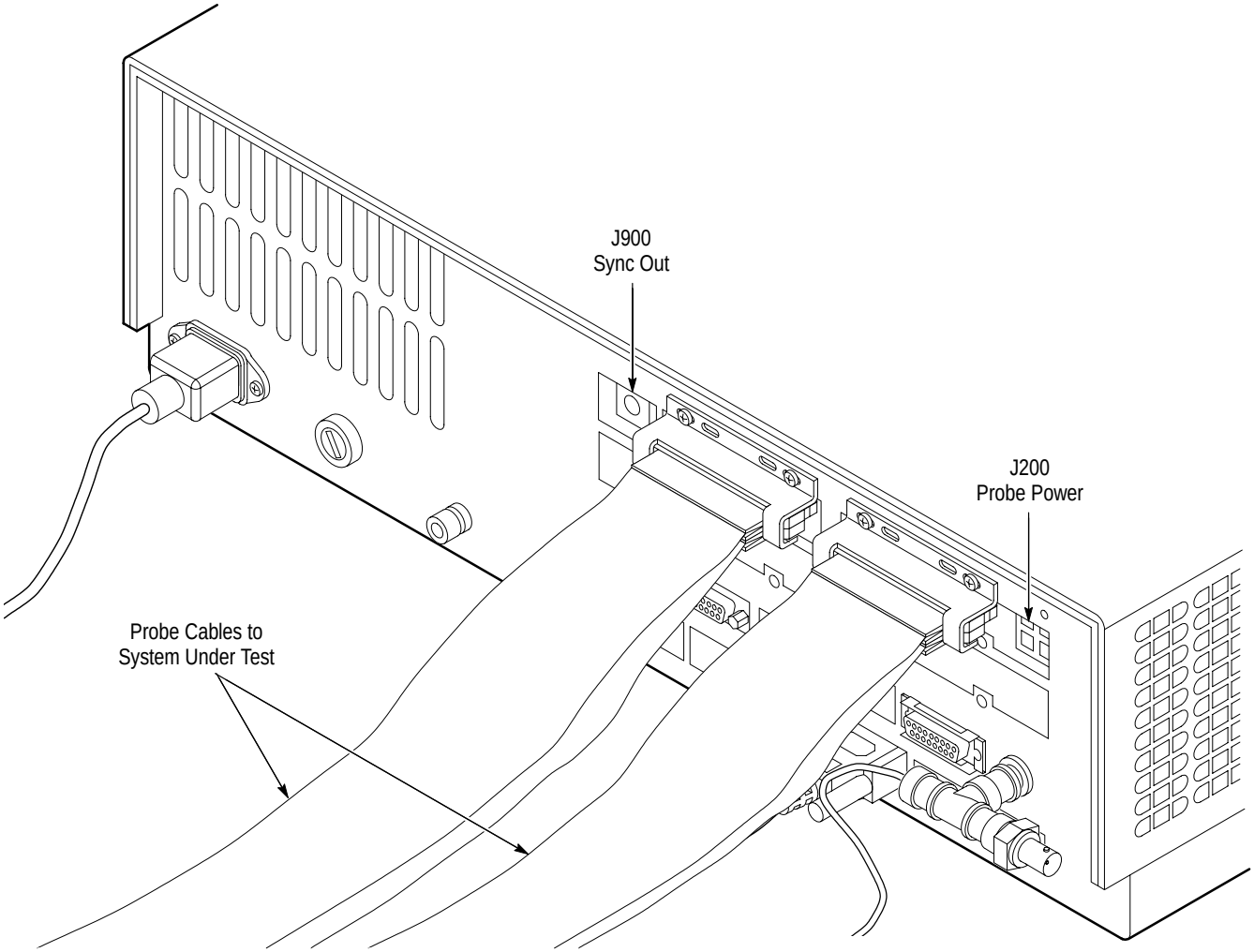


Figure 2–2: Rear View of the System Unit with Probes Attached

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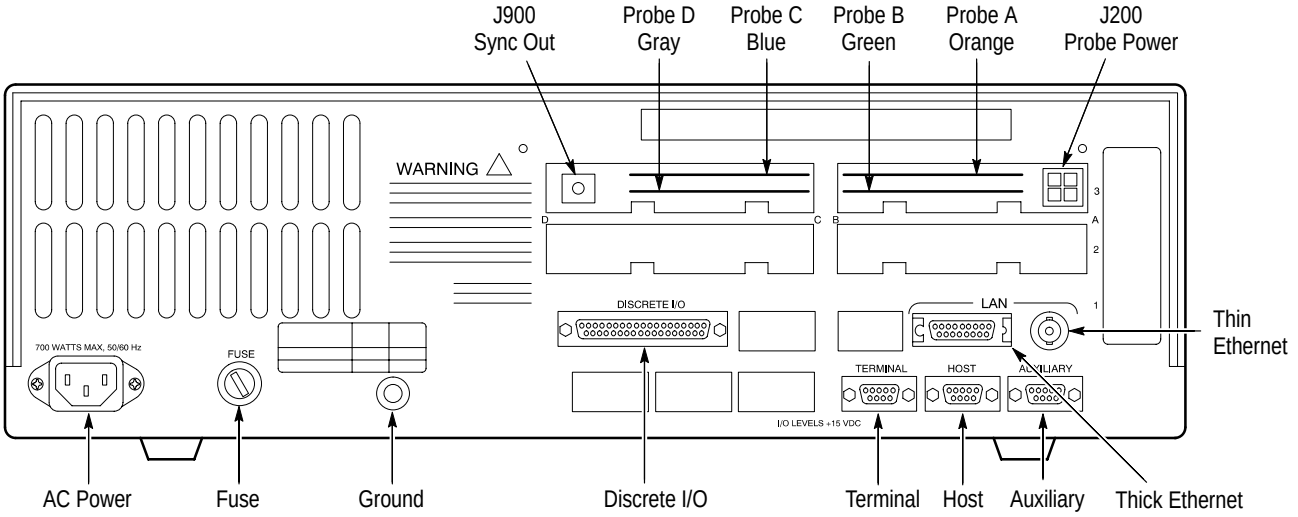


Figure 2–3: Rear View of the System Unit with External Connectors

Powering On and Powering Off

The power on and power off procedures differ depending whether you have a networked or stand-alone logic analyzer. If your logic analyzer is connected to a network, you should not power off the system unit; operation is controlled from a workstation (refer to the *92XTerm User Manual* for information on controlling the logic analyzer from a workstation).

Powering On a Stand-Alone Logic Analyzer

To normally power on a stand-alone logic analyzer, power on the terminal and then the system unit. The terminal goes through its power-on tests before the logic analyzer performs its checks. When all power-on checks have been completed, the Menu Selection Overlay displays. Figure 2–4 shows an example of the Menu Selection overlay.

Powering On a Networked Logic Analyzer

If your logic analyzer is connected to a network, the Menu Selection overlay displays after you start the 92XTerm application. From then on, all menus are similar to those in a stand-alone logic analyzer.

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Figure 2–4: Menu Selection Overlay

Workspace Menu

If your logic analyzer is connected to a network through the 92XTerm software and you have a Tektronix display terminal (such as a 9204XT, 9205XT, or 9206XT X terminal), you can use the Workspace menu of the X terminal to provide additional functions for your logic analyzer. Figure 2–5 shows an example of the Workspace menu.

You can restart the windows by selecting TekLA → Open Window. When you start the logic analyzer in this manner, you can specify the font size of the TLA window using one of the selections in the pull-down menu. If you select Auto fontsize, the TLA window will be automatically sized to your X terminal.

You can close the menus (or shut down a remote window session) by selecting TekLA → Close Window, effectively resetting the logic analyzer making it available for other local or remote users.

You can also start other applications or tools if they are available. For example, if you have the 92Port application, you can start it from the Workspace menu (refer to the *92Port Instructions* for information on the 92Port application). The Print Screen tool lets you capture menus and save them in a file or send them to a printer (refer to *Capturing and Printing Menus* on page 3–65 for instructions on using the Print Screen tool).

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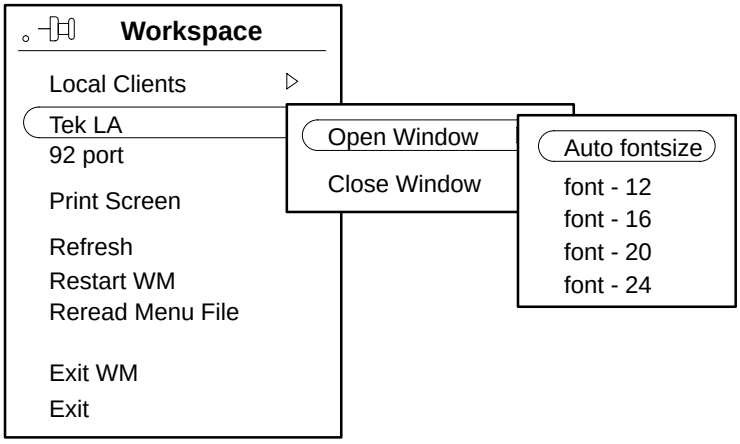


Figure 2–5: Workspace Menu (on 9204XT and 9205XT Terminals)

Powering Off

To power off the logic analyzer, simply turn off the DC ON/OFF switch on the mainframe and then power off the terminal. You can close the application window by clicking on the Quit selection in the pull-down menu on the terminal or workstation (for a networked logic analyzer.).

Menu Overview

The logic analyzer is controlled by interactive menus that display on the terminal. A menu is a screen display that offers selectable or scrollable choices. Some menus associated with overlays (submenus) that provide additional menu selections or information.

The menu set can be divided into four separate groups:

- Setup menus
- Display menus
- Utility menus
- Application menus

Setup Menus

Setup menus define the conditions under which modules will operate and communicate with other modules.

There are two classes of Setup menus: those that control system-wide operating parameters and those that pertain specifically to one module type.

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System Setup Menus. These menus will always appear on the Menu Selection overlay (the Cluster Setup can only be entered after you define a cluster using the System Config menu). The System Configuration, Cluster Setup, and System Monitor menus are described in more detail in the Reference section of this manual.

The following System Setup menus are available:

- System Configuration Menu. This menu lists the modules installed in the logic analyzer. At initial power-on, the default groupings of modules are displayed; you can select different module formations (groups of modules of the same type). A typical example of when you might want to change a module formation is when your application requires more channels in a module than are currently defined.

  The System Configuration menu also displays the current collection of modules in a cluster; you can change the clusters with the Cluster Definition overlay.

- System Monitor Menu. This menu displays the status of the modules as well as the clusters. It lets you see at a glance which modules and clusters are running, which are waiting for their trigger condition, which have acquired data and stopped, and which are autorunning. If you acquire data for the selected module or cluster using Autorun, the number of times that module or cluster has been started is shown in the upper-right corner of the status line.

- Cluster Setup Menu. This menu is only selectable after you create a cluster using the System Configuration menu. It lets you define how modules assigned to the same cluster interact. Specifically, it allows you to define signals passed between modules, time-correlate data acquired by two different modules, and specify Autorun conditions where a module acquires data, compares it to a reference memory file, and based upon the comparison, stops or automatically repeats the acquisition.

Module Setup Menus. Module Setup menus that appear below the System Setup menus correspond specifically to the module currently selected. For example, if 92C96-1 is the active module, the Config, Channel, Clock, Trigger, and Monitor menus pertain only to this one module; other Setup menus will appear when you select a different module (for example, 92S16-1). Refer to your module user manual for complete details on all the menus, overlays, and fields of the Module Setup menus.

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Figure 2–6 shows the Setup menus for each module.

MODULE	SETUP
92C96	System Configuration Cluster Setup* System Monitor Configuration Clock Channel Trigger Monitor
92S16	System Configuration Cluster Setup* System Monitor Configuration Channel Program Monitor

* All modules in a cluster share a Cluster Setup menu.
Modules not in a cluster have no Cluster Setup menu.

Figure 2–6: Setup Menus

The following Setup menus are available for the acquisition module:

- Configuration (Config) Menu. This menu allows you to select the software support mode, default memory size, and whether or not you want to capture signal glitches. This menu shows you the name and type of module, including the number of acquisition channels, and indicates the number of intermodule signals you have defined.
- Channel Menu. This menu allows you to create channel groups and define their names, radix, and order. You can also assign the individual channel names and define their polarities and threshold voltages.
- Clock Menu. This menu lets you select the sample clock source and the internal clock period or the external clock equations and qualifiers. You can choose microprocessor-specific options if you have a microprocessor support application software installed on the hard disk and selected in the Configuration menu.
- Trigger Menu. This menu lets you define the trigger position, trigger specification program—including states, events, and actions. You can also define the type of storage qualification you want. You can use trigger libraries that contain templates for trigger specification programs or create your own trigger libraries.

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- Monitor Menu. This menu monitors the progress of the acquisition. The menu displays if an acquisition is not completed within a few seconds. You can use the Monitor menu to debug trigger specification programs by monitoring the status of the acquisition, the counter or timer values, and the amount of acquisition memory being used.

The following Setup menus are available for the pattern generation module:

- Configuration Menu. This menu shows the current hardware configuration and software mode for the pattern generation module.
- Channel Menu. This menu lets you collect channels into logical groups for data entry and display purposes. You can change the names, radix, and display order of each group.
- Program Menu. This menu allows you to enter data and instructions to stimulate the circuit or system under test. You can also send a signal to the acquisition module.
- Monitor Menu. This menu lets you debug pattern generation programs by watching pattern-generator/circuit under test interactions at a reduced clock rate. You can set breakpoints in the pattern generation programs and single-step through problem areas.

Display Menus

Display menus control the display format and viewing characteristics of acquired data. Display menus are module-dependent (see Figure 2–7). Module display menus are described in detail in the module user manuals.

MODULE	Display
92C96	State Timing Graph Disassembly
92S16	(no Display menus)

Figure 2–7: Module Display Menus

The following Display menus are available for the acquisition module (there are no display menus for the pattern generation module):

- State Menu. This menu displays acquired data as a table of logical states of the input channels. Channels are organized as defined in the Channel menu and data is displayed in the radix you select.

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- Timing Menu. This menu provides a graphic display with each input channel represented as a digital (two-state) waveform. It also shows the bus value of all channel groups defined in the channel menu.
- Graph Menu. This menu displays a graph of data from any two of the selected channel groups plotted against their locations in the acquisition memory.
- Disassembly Menu. This menu is a table display that translates the logic input for specific channel groups into microprocessor-specific mnemonics.

Utility Menus

Utility menus provide system-level tools. They allow you to control data transfers to and from the hard and floppy disks, and they allow you to define the parameters that control the communication ports.

The following Utility menus are available:

- Save/Restore Menu. This menu allows you to save setups and acquisition memory data, restore setups from previously saved files, and delete instrument setup and reference memory files from the hard disk.
- Disk Services Menu. This set of menus provides the tools necessary to duplicate floppy disks, format and verify floppy disks, backup and restore user files with floppy disks, and copy or delete specific files. A directory of all existing file names on floppy or hard disks is provided; accompanying information specifies the size of the file, creation or revision date of the file.
- Symbol Editor Menu. This menu allows you to create and edit symbol tables that you can use to specify trigger word patterns and evaluate acquired data. You can create and edit either range or pattern type symbol tables.
- Communications Menu. This menu specifies RS-232 port settings and view network settings. You can specify baud rates and flow control for each RS-232 port.
- Diagnostics Menu. This menu provides a list of major system components, a diagnostic report indicating operational status at power on, a summary and brief description of the modules installed in the logic analyzer, the system software version, date and time, and some general user instructions.
- Version Menu. This menu displays the version numbers of all installed modules, the system software, and all installed application software.

Application Menus

Application menus control the operation of application software packages. Most software supporting the application packages resides on floppy disks and must be loaded onto the system hard disk before being used. Microprocessor Support packages provide mnemonic disassembly formats. All nonresident application software and corresponding menus are described in separate manuals supporting each application software package.

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Tutorial

This tutorial is intended to familiarize you with the menus, operator controls, and the display conventions of the logic analyzer. This section is intended for beginning users or for experienced users who want to review individual controls or display functions. The tutorial begins by explaining the mouse-driven interface and the use of fields and function keys within the menus. It then briefly explains how to set up menus to acquire and display data with the acquisition module. It is recommended that you perform the steps in sequence throughout this tutorial.

While this section describes the use of the logic analyzer with basic menus and fields, it does not contain an exhaustive list of all possible combination of menus, keystrokes, mouse selections, and display contexts.

When you power on the logic analyzer an initial menu displays the product logo, copyright information, and system software version. The menu continues to display while the system software completes the initialization process. After a few seconds the Menu Selection overlay appears.

Selecting Menus

The Menu Selection overlay lists all available menus that you need to operate the logic analyzer. You can move through the menus using the mouse or keys on the keyboard. Table 2–1 describes the mouse buttons and their functions on a typical three-button mouse. The table provides a brief overview of using the mouse; more details of using the mouse in menus are provided later in this tutorial.

Table 2–1: Three-Button Mouse Description

Button	Name	Description
Left	Select	Selects a field. Move the pointer to the field and press the left button. Use this button to select on-screen function keys, move the data cursor in display menus, and scroll acquired data in display menus.
Center	–	No action.
Right	Open	Opens a field or displays a pop-up menu. When a field is open, use the left button to change the active value of the opened field; use the right button to select a new value and close the pop-up menu.

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Figure 2–8 shows an example of the Menu Selection overlay. The display from your logic analyzer should be similar. Note that the overlay has four different types of menus in the center of the overlay. All of the menus are briefly described under *Menu Overview*, earlier in this manual. The function key legends for each of the menus appear near the bottom of the overlay.

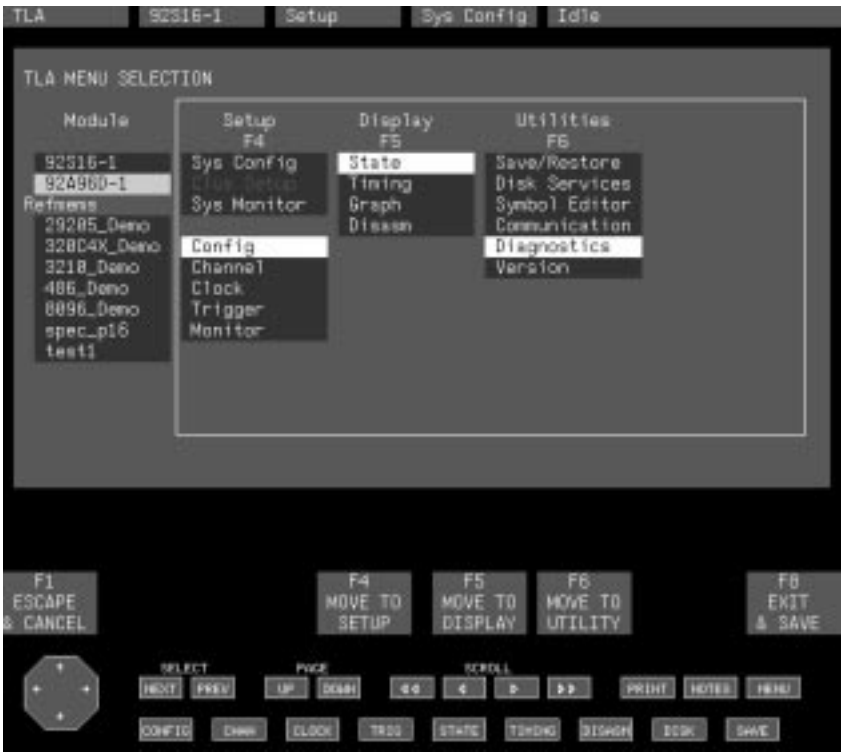


Figure 2–8: Menu Selection Overlay

There are different ways to access menus. The easiest way is to point the mouse at the menu selection and press the left button. The active (yellow) cursor automatically moves to the selection and displays the selected menu.

You can also access the menus in one of the following ways:

- Point the mouse at the menu selection and press the right button; the yellow cursor will move to the selection (but will not display the menu). Press the left mouse button to display the menu.
- Move the yellow cursor to the menu that you want and press the Return Key. The menu highlighted by the yellow cursor will display.
- Point the mouse at one of the function key legends and press the left button. The menu highlighted by the white cursor will display.

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- Press the appropriate function key on the keyboard corresponding to the function key legend in the window. The menu highlighted by the white cursor will display.

The following steps show how to move between menus using the mouse:

1. Point the mouse at the Diagnostics menu selection under the Utilities column and press the left button. The Diagnostics menu will display.

   The diagnostics menu provides a brief overview of the system. It shows the contents of the system unit and the results of the power-on diagnostics. It also shows the current system software version, type of floppy and hard disk drives, and the current date and time. You can change the date and time by calling the Set Date/Time overlay. You will use this overlay to become familiar with the use of the fields and the mouse.

2. Call the Set Date/Time overlay by pointing the mouse at the F5: SET TIME function key legend and pressing the left button. You can also press the F5 function key on the keyboard. The Set Date/Time overlay appears over (over lays) the diagnostics menu; it should look similar to Figure 2–9.



Figure 2–9: Set Date/Time Overlay

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Fields

Most overlays have areas of information (called fields) that you can modify or select data. You change or modify operating parameters in fields. There are two kinds of fields: Select fields and Fill-in fields.

Select Fields

A Select field contains a number of predefined choices from which you can select. While this type of field may contain several choices, it only displays the current selection until it is opened. You must open a select field to display all the choices. There are three basic ways of selecting the contents in a Select field:

- View the entire list of choices and make a selection. With the mouse pointing at the field, press the right button to display a list of selections. Point the mouse at the selection you want and press the right button; the specified selection is highlighted and the pop-up list closes.
- Cycle through the entire list of choices one at a time and make a selection. With the mouse, point at the NEXT or PREV buttons at the bottom of the window and press the left button to cycle through the list of choices. You can also use the plus (+) or minus (–) keys on the terminal keypad to cycle through the list of choices.
- Type in a string of characters that match one of the selections. Type in the first few characters of the string until the selection appears. Press the right mouse button or the Return key to finalize the selection. The typed-in character is not case sensitive.

Try each of the three methods by changing the information in the Set Date/Time overlay as follows:

3. Point the mouse at the field to the right of the word Date: and press the right button.

   A pop-up menu appears on the right side of the window with the current selection highlighted.

4. Point the mouse at the selection you want. If your selection is outside of the numbers displayed in the pop-menu, you can scroll to the correct selection.

   Note the small arrows near the top or bottom of the pop-up menu. These arrows show that there are more selections outside of the range of selections displayed in the pop-up menu. You can scroll through the numbers near the top of the pop-up menu by pointing the mouse just outside and towards the top of the pop-up menu and pressing the left mouse button. Alternately, you can scroll through the numbers near the bottom of the pop-up menu by pointing the mouse just outside and to the bottom of the pop-up menu and pressing the left mouse button. You can also scroll through the data by pointing the mouse at the NEXT and PREV buttons on the bottom of the window and pressing the left button.

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5. Confirm your selection by pressing the right mouse button. The pop-up menu closes and the new value will display in the select field.

6. With the cursor in the Day select field, point the mouse at either the NEXT or PREV buttons near the bottom of the window. Press the left button to cycle through the choices in the select field.

7. Point the mouse at the Month field and press the left button to move the cursor to the field.

   You can cycle through the data using the methods described earlier. However, another way to enter data is to type in characters until the desired selection appears.

8. Type the letter J. The contents of the field changes to one of the words beginning with the letter J, for example, January.

9. Type the letter u. The contents of the field changes to one of selections containing the letters Ju, for example, June.

10. Type the letter l. The field contents change to July. Once the correct selection appears, press the right mouse button to close the field.

    If you type an invalid letter an error message will display.

11. If you have not already done so, enter the current date and time and select the F8: EXIT & Save function key to exit the overlay. The overlay closes and the full diagnostic menu displays.

Fill-in Fields

A fill-in field is essentially a box that lets you enter information such as a file name. To use a fill-in field, move the cursor to the field, type in a value, and press the Return or Enter key, or move the cursor to another field. Using the mouse, press the left mouse button to select the field and then type in a value; then press the right button to accept your value. To blank or clear an entire field, press the Return or Enter key, or press the right mouse button twice.

There are limitations to some fill-in fields. For example, you cannot end a file name with the underscore character (_). Some fill-in fields do not allow spaces; while others only allow certain letters or digits. Also, some fill-in fields do not allow editing — you must reenter the whole message or name.

You will use a fill-in field later in this tutorial.

Field Color Conventions

Different colors identify the type and status of menu fields. The following conventions apply to all fields in all menus:

- White text on blue background indicates a closed field.
- Black text on yellow background indicates a closed field (cursor present).

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- White text on orange background is an open field; you can enter characters for fill-in field or match-choice selections.
- Gray text on orange background indicates a select field (matched selection registered) or a field with nonselectable items.

Exiting Overlays

There are two ways to leave an overlay: you can close the overlay saving changes you have made or close the overlay discarding any changes. To leave the overlay and save the changes, point the mouse at the F8: EXIT & SAVE function key legend and press the left button; alternately, you can press function key F8 on the keyboard.

To leave the overlay without saving any changes, select F1: CANCEL & ESCAPE, or press function key F1. You will be prompted to confirm your action so you do not accidentally lose any of your changes. Press the Return key to confirm your actions; the overlay closes and any changes you made are discarded. Press the Esc (Escape) key to abort the close operation.

There may be some exceptions on what changes are saved or discarded when you exit the overlays. If you are unsure of the changes and actions for leaving specific overlays, refer to the discussion of the specific overlays in the *Reference* chapter of this manual.

On-Screen Buttons

Notice the two rows of on-screen buttons at the bottom of the menu. These same buttons appear at the bottom of every menu. These buttons are activated by pointing the mouse and pressing the left button. Figure 2–10 shows the on-screen buttons as they appear at the bottom of each menu. Table 2–2 lists the on-screen buttons and their functions.

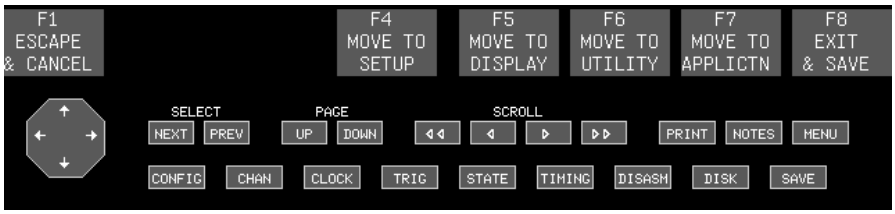


Figure 2–10: On-Screen Buttons

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Table 2–2: On-Screen Menu Buttons

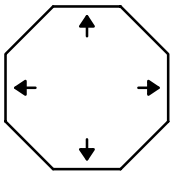
On-screen Button	Button Name	Description
	Joydisk	Use this button to scroll through acquired data. Point to one of the arrows on the Joydisk to scroll data in the direction of the arrow.
NEXT	Select Next	Use this button to cycle through items in a Select field. Pointing at this button displays the next item in the list.
PREV	Select Previous	Use this button to cycle through items in a Select field. Pointing at this button displays the previous item in the list.
UP	Page Up	Scrolls up one half a window of data.
DOWN	Page Down	Scrolls down one half a window of data.
⏪	Shift Scroll Left/Up	Scrolls to the left one half a window at a time in Timing or Graph menus and up one half a window at a time in State or Disassembly menus.
◁	Scroll Left/Up	Scrolls to the left in Timing or Graph menus and up in State or Disassembly menus.
▷	Scroll Right/Down	Scrolls to the right in Timing or Graph menus and down in State or Disassembly menus.
⏩	Shift Scroll Right/Down	Scrolls to the right one half a window at a time in Timing menus and down one half a window at a time in State or Disassembly menus.
PRINT	Print	Calls the Print overlay allowing you to print the data in a Display or Setup menu to a printer or to a file.
NOTES	Notes	Displays on-screen notes.
MENU	Menu	Calls the Menu Selection overlay.

Table 2–3 briefly describes the bottom row of on-screen buttons. These buttons are sometimes called macro buttons. The macro buttons, although visible, do not operate when an overlay is open (excluding the Menu Selection overlay). You can use these buttons to quickly move between key menus.

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Table 2–3: On-Screen Macro Buttons

On-screen Button	Button Name	Description
CONFIG	Configuration	Calls the Configuration menu for the selected module.
CHAN	Channel	Calls the Channel menu for the selected module.
CLOCK	Clock	Calls the Clock menu for the selected module.
TRIG	Trigger	Calls the Trigger menu for the selected module.
STATE	State	Calls the State Display menu for the selected module.
TIMING	Timing	Calls the Timing Display menu for the selected module.
DISASM	Disassembly	Calls the Disassembly Display menu for the selected module.
DISK	Disk	Calls the Disk Services menu.
SAVE	Save	Calls the Save/Restore menu.

The on-screen buttons also have their keyboard equivalents. Table 2–4 shows the keyboard equivalents for Tektronix X Terminal keyboards.

Table 2–4: Keyboard Equivalents

Key Function	Typical X Terminal key	Tektronix X Terminal Key
Cursor Up	R8 (Keypad 8)	Keypad 8
Cursor Right	R12 (Keypad 6)	Keypad 6
Cursor Down	R14 (Keypad 2)	Keypad 2
Cursor Left	R10 (Keypad 4)	Keypad 4
Home	R11 (Keypad 5)	Keypad 5
Page Up	R9 (Keypad 9)	Keypad 9
Page Down	R15 (Keypad 3)	Keypad 3
Select Previous	Keypad –	Keypad –
Select Next	Keypad +	Keypad +
Open & Close	Keypad Enter	Keypad Enter
Scroll Left/Up	Ins (Keypad Ins or Keypad 0)	Ins (Keypad Ins or Keypad 0)

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Table 2–4: Keyboard Equivalents (Cont.)

Key Function	Typical X Terminal key	Tektronix X Terminal Key
Scroll Right/Down	Del (Keypad Del or Keypad .)	Del (Keypad Del or Keypad .)
Call Menu Selection Overlay	Function Key F9	Function Key F9
Print	L6 (Copy)	Not Present
Notes	Help	Not Present
Break	L1 (Stop)	Not Present
Rubout	Shift-Backspace	Shift-Backspace

You may want to experiment moving between menus using the on-screen buttons to become familiar with their operation. Later in this tutorial, you will learn how to go through the basic Setup menus and use the on-screen buttons to scroll through data.

NOTE. *You can always return to the Menu Selection overlay by selecting the MENU button at the bottom of the menu or by pointing the mouse at the Status bar at the top of the menu and pressing the left mouse button.*

Function Keys

You have already seen how to use the basic function keys to enter and leave the Set Date/Time overlay. You have also learned how to use the function keys with the mouse and from the keyboard. This section provides more information on using the function keys.

Function keys F1 through F8 are display dependent. In other words, the purpose of the function key changes as the display changes. For example, function key F6 in the Channel menu calls the Channel Definition overlay; however, in the Trigger menu, function key F6 calls the Trigger library. All active function keys for the current menu are shown. The numbers on the function key legends (F1–F8) correspond to the numbered function keys on the keyboard (see Figure 2–11).

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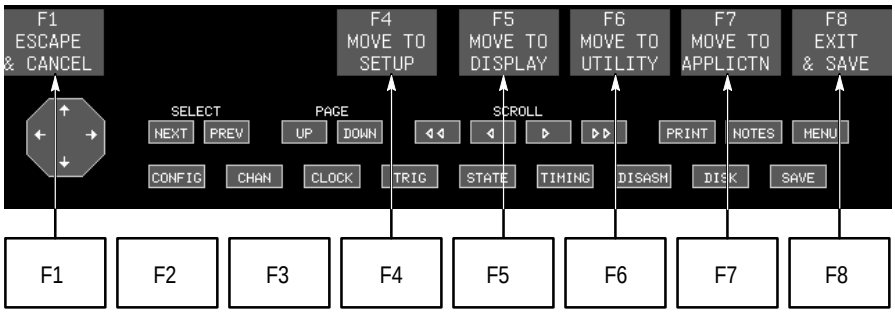


Figure 2–11: Function Keys Map to the Function Key Legends

On-Line Notes

Occasionally there are situations when you want to learn information about a function key or field without having to take the time to look up the information in the manual. Other times you want to know the purpose of a function key when the name of the function key legend is not obvious. The on-line notes system is designed to address these problems.

The on-line notes system provides information in the form of brief, quick-access notes. Two types of notes are available: *Field notes* and *Key notes*. The Notes text appears on the menu in a small window. You call the notes by selecting the Notes button at the bottom of the menu or by pressing the Help key on the keyboard.

Field Notes

A Field note gives you a brief, on-line description of the field (or individual selection, in the case of an opened select field) where the cursor currently resides. A note is available for each menu field and selection, but only displays when you select the Notes button. The note disappears when you press the Esc key or press the left mouse button while pointing inside the thin message window (displayed directly above the function key legends). If you press any other key (except function keys), the note disappears and the key works as usual.

Key Notes

A Key note describes what happens when you press any currently active function key. If a function key legend does not give you enough information, a Key note is available to provide more detail. A Key note appears when you select the Notes button and then select or press a function key; the note disappears when you press the Esc key. If you press the function key a second time, its function will be activated. If you press any other key (except another function key), the note disappears and the key works as usual.

Try using the on-line notes with the Diagnostic menu and the fields in the Set Date/Time overlay.

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1. Before continuing with this tutorial, make sure that the Diagnostics menu is displayed.
2. Select the Notes key and then select function key F5: SET TIME. A brief description of the function key and the Set Date/Time overlay appears.
3. Select function key F1: START. A description of the purpose of the function key appears.
4. Now point the mouse at the location where function key F2 would normally appear. A note appears telling you that there is no function for key F2. The logic analyzer knows that there is no valid function assigned for the key.
5. Point the mouse in the middle of the Diagnostics menu and press the left button. A message appears describing the purpose of the left mouse button.
6. Press the Esc key to erase the messages on the menu.
7. Select function key F5: SET TIME to call the Set Date/Time overlay.
8. Point the mouse at the Month field and press the left button to move the cursor to the Month field.
9. Select the Notes button. A message appears describing the purpose of the field.
10. Point the mouse at the long message window just above the function key legend and press the left button. The message window closes and the notes disappear.
11. With the cursor still in the Month field, point at the field and press the right button. A pop-up menu opens listing possible selections for the Month field.
12. Select the Notes button. A set of notes describing the current highlighted selection appears.

    Depending on the contents of the field, different messages appear for each field. Other times, when the notes information is not critical, the same note appears for each selection.
13. Clear the notes by pressing the Return key. The notes disappear and the field closes.
14. Before closing the overlay, verify that the correct date and time are selected. Close the overlay by selecting function key F8: EXIT & SAVE.

Whenever you need information on a field or function key, the on-line notes can be quite helpful.

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Defining Setup Menus

Now that you have become familiar with the basic mouse operation, you are ready to learn more about using the Setup and Display menus for acquiring data and displaying results.

The first step would be to connect the logic analyzer to the system-under-test. This basically means connecting probes. For the purposes of this tutorial, you will not connect probes to a system-under-test.

Set Up the Config Menu

After you connect the probes to the system-under-test, you will normally set up the Config (Configuration) menu.

***NOTE**. If your logic analyzer has a pattern generation module, select the acquisition module in the Menu Selection overlay. Do this by selecting the MENU button at the bottom of the menu and pointing the mouse at the acquisition module under the Module column. Press the left mouse button and then return to the Diagnostics menu.*

1. To quickly select the Config menu, point the mouse at the CONFIG button on the lower-left side of the window and press the left mouse button. The system displays the Config menu.
2. Point the mouse at the highlighted Software Support field and press the right button to open and display the different software support selections.

   The Software Support field lists all of the software applications that support the acquisition module in addition to the General Purpose and High-Speed Timing support. Once you choose a software support, your instrument will automatically define the Setup menus.
3. Point the mouse at the High-Speed Timing selection and press the right button. The pop-up menu will close and the High-Speed Timing selection will be listed in the field. However, before any changes can take effect, you will be asked to confirm your action.

   You can always respond to a query by pressing the keys as described in the query message or use the mouse. To confirm your action with the mouse, point the mouse to the center of the query message and press the left button. To abort or reject your action, point the mouse anywhere outside of the message and press the left button; the select field will return to its previous selection and no changes will take place.
4. While the query message is displayed, point the mouse outside of the message and press the left button to abort the selection.

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Besides selecting the software support, you can also use the Config menu to define the memory depth of the acquisition. The Config menu also gives you a visual indication of how the module input and output signals are defined.

Set Up the Channel Menu

After defining the contents of the Config menu, the next step is to set up the Channel menu. The Channel menu lets you assign probe input channels to desired groups for easier recognition and interpretation of the acquired data.

5. Point the mouse at the button labeled CHAN and press the left button. The Channel menu displays.

   If you selected one of the software support packages, the Channel menu will be setup according to the software support package. You can still change the Channel menu as necessary for your particular application.

   The default Channel menu assigns 32 channels for the Address Group, 32 channels for the Data Group, and 32 Channels for the Control Group. For the purposes of this tutorial, assume that you only need 16 channels for the Data Group and four channels for the Control Group. You can change the Channel menu using the mouse and the function keys.

6. Point the mouse at the Data Group Section D3 field and press the left mouse to move the cursor.

7. Point the mouse at the legend for function key F7: DELETE and press the left button.

8. Point the mouse at the selection “Delete Section From Group” and press the right button to delete the Section. The pop-up window closes and the Section D3 is deleted from the Channel menu.

9. Select function key F7: DELETE again and press the right button to delete Section D2.

   Assume that you were getting ready to delete Section D1 but you changed your mind. If you still have the pop-up window open, you can abort the delete operation by pressing the Esc key on the keyboard. Alternately, you can go ahead and delete Section D1 and then add it back in by using function key F8: ADD.

10. Delete Section D1. Then point the mouse at function key F8: ADD and press the left button. A pop-up window appears.

11. Verify that the cursor in the pop-up window shows “Add Section To Group” and press the right button. Section D3 will be added to the group.

    Section D3 is not the section that you wanted and it may not have been added in the position where you wanted. As long as the channels you need are unused by the system, you can edit the necessary channels into the menu.

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12. Point the mouse at Section D0 (which should be at the top of the Data Group) and press the right button. A new pop-up window appears.

    The new pop-up window lists the status of all channel groups (which channels are used and which are unused).

13. Point the mouse at the selection “D1 unused 76543210” and press the right button to select Section D1 and close the pop-up window. Section D1 should now appear in the field.

14. Repeat the previous step to change Section D3 to Section D0.

15. Point the mouse at the Control group and delete sections C3, C2, and C1.

16. Point the mouse at the Channels field of Section C0 and press the right button. The Channels field goes blank.

17. Type the numbers 1 and 0 and press the right button. You have just changed the Section C0 group to have channels 1 and 0; the remaining channels of Section C0 are unused.

18. Select function key F8: ADD, select Add Group, and press the right button. A new group appears below the Control group.

19. With the cursor in the new name field, type the word “Qual” and press the Return key. You have just assigned the name Qual to the new group.

20. Point the mouse at the new Section field, press the left button, and type C0. The unused channels of Section C0 appear in the Channels field.

21. Point the mouse at the Channels field, press the left button, type the number 2, and press the Return key. You have just assigned Channel 2 to be the single component of the Qual group.

22. Repeat steps 18 through 21 to add a Clock group with Section C0 and Channel 3.

The Channel menu should look similar to Figure 2–12.

You can continue changing the Channel menu to suit your needs. If for any reason you need to return to the default settings, you can select function key F4: DEFAULT GROUPING.

You can use the other function keys in the Channel menu to further define the input polarity of each data channel and specify the input threshold voltages for each probe. But describing these operations is beyond the scope of this tutorial. Refer to your module user manual for information on these function keys.

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Figure 2–12: Channel Menu

Set Up the Clock Menu

After you have defined your channel setup, you should set up your clocking requirements.

23. Point the mouse at the button labeled CLOCK at the bottom of the menu and press the left button; the Clock menu displays. The menu should look similar to Figure 2–13.

24. Point the mouse at the Clock field and press the right button. A pop-up window appears.

You have basically three clocking choices: Internal, External, and Custom. Custom clocking is used with the microprocessor support packages and provides additional clocking choices for the particular package. If you have not selected one of the software support packages, the Custom selection field is grayed out indicating that it is nonselectable. Internal clocking allows you to use asynchronous clocking; you can select the clock period in the clock rate field. External clocking allows you to use synchronous clocking from the system-under-test. You can further define your external clocking choices by setting up clock equations.

25. Select Internal Clocking and close the clocking selection.

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Figure 2–13: Clock Menu

Set Up the Trigger Menu

The Trigger menu is probably the most important menu when setting up the logic analyzer to acquire data. You can use the Trigger menu to create programs to control when (or where) the trigger occurs and what sampled data to store in the acquisition module. You can also use trigger libraries to load preconfigured trigger setups. For the purposes of this tutorial, you will keep the Trigger menu simple.

26. Point the mouse at the button labeled TRIG and press the left button to display the Trigger menu.

Notice that the Trigger menu displays the channel grouping as you defined in the Channel menu (see Figure 2–14).

27. Select function key F6: ACCESS LIBRARY to display the default trigger library.

Trigger libraries let you use preconfigured trigger setups. You can select any of the choices that meet your needs and restore that setup. The trigger menu prompts you where to enter information to complete the Trigger menu setup.

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Figure 2–14: Trigger Menu

28. Point the mouse at the library selection “Trigger on Anything” and press the left mouse button.

29. Select function key F5: RESTORE ITEM to restore the trigger setup. You will be prompted to verify your actions.

30. Confirm your selection and then select function key F8: EXIT & SAVE to close the trigger library.

Notice that the Trigger menu has changed according to your selection from the trigger library. Also notice that the name of the trigger library selection appears in the Title field at the top of the Trigger menu.

Using trigger libraries, you can set up the Trigger menu to be very simple or very complex. You can also edit the menu by adding Trigger states, starting and stopping timers or counters, and looking for specific data on specific channels. For detailed information on all of the Trigger capabilities, refer to the user manual for your data acquisition module.

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Acquiring Data

After defining the Trigger setups, you are ready to acquire data. From any of the Setup menus, you can begin acquiring data by selecting the F1: START function key.

31. Select function key F1: START to start acquiring data.

The logic analyzer starts acquiring data according to the conditions specified in the Setup menus (Trigger and Clocking). When the conditions are satisfied, the logic analyzer switches to the last selected display menu. In most cases, this will be the State menu.

If the display menu does not appear within a few seconds, the logic analyzer will switch to the Monitor menu. Because you have not defined any specific Trigger conditions, the display menu should appear. If not, go back to the Clock menu and verify that the Clock is set to Internal.

32. If the State menu is not displayed, move the mouse to the button labeled STATE at the bottom of the menu and press the left button. The State menu should appear and look similar to Figure 2–15.



Figure 2–15: State Menu

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Notice that the State data in Figure 2–15 is displayed in the same manner as the Trigger menu and as defined by the Channel menu. The names of the individual channel groups appear at the top of the menu.

Scrolling State Data

There are several different ways to scroll data in the State menu:

- You can use the scroll buttons at the bottom of the screen (point the mouse at the buttons and press the left button).
- You can use the Joydisk (point the mouse at the up or down arrows and press the left button).
- You can scroll directly with the mouse on the menu.
- You can move to a specific cursor sequence by entering a number in the Cursor Sequence field.

33. Point the mouse at one of the single-arrow buttons and press the left button. The data (or line cursor) will move one sequence each time you press the button.

34. Point the mouse at one of the double-arrow buttons and press the left button. The data will move several (one-half page of) sequences each time you press the button.

35. Point the mouse at either the up-arrow or down-arrows on the Joydisk button on the bottom-left side of the menu and press the left button. The data will move one sequence each time you press the button.

36. While still pointing at the Joydisk button, hold down the Shift key on the keyboard and press the left button. The data will move several (one-half page of) sequences each time you press the button.

37. Point the mouse to an area on the menu just above the function key legends and press the left button. The line cursor will move to the approximate location of the mouse pointer. Each time after that, the data will scroll one sequence each time you press the mouse button.

38. Point the mouse at approximately three sequence lines from the top of the data in the menu and press the left button. The line cursor will move to the approximate location of the mouse pointer. Each time after that, the data will scroll one sequence each time you press the button.

39. Enter a number (for example 500) in the Cursor field and press the right button. The line cursor will be positioned at the indicated sequence location.

In addition to scrolling to specific data, you can also define search parameters to search for data using the Search Definition overlays. However, describing these operations is beyond the scope of this tutorial. Refer to your module user manual for specific information on Search Definition overlay.

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Scrolling Timing Data

You can use the Timing menu to graphically display digital data as a two-state waveform. Data can be displayed in groups known as busforms or as individual channels. You can view the timing over the entire acquisition, or you can magnify the data to look at data over small clock increments.

40. Point the mouse at the Timing button and press the left button to display the timing menu. The menu should look similar to Figure 2–16.

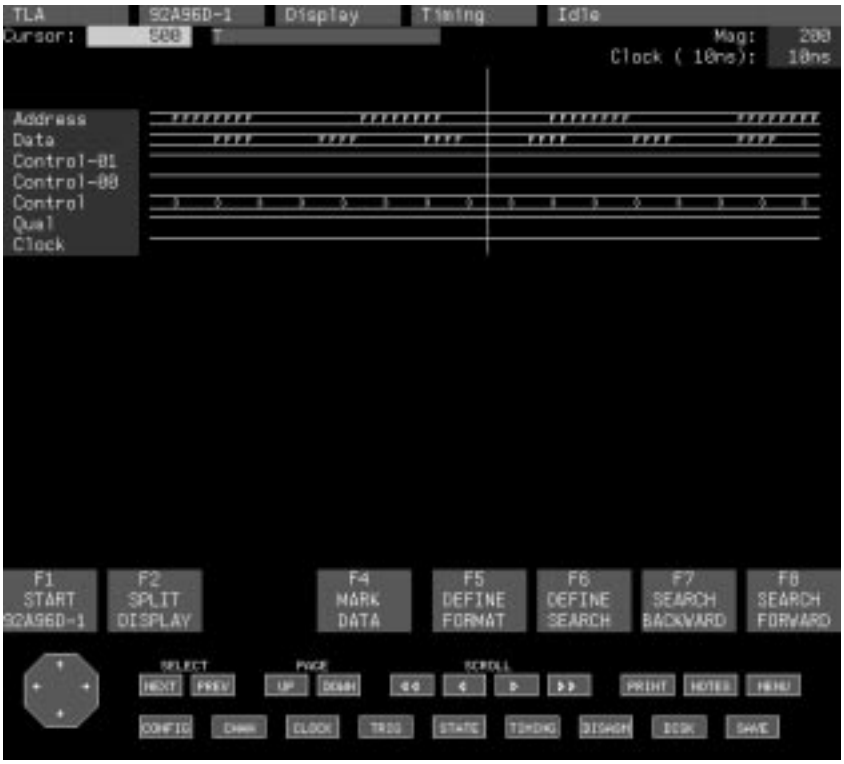


Figure 2–16: Timing Menu

Like the State menu, the data channels are grouped according to the definitions in the Channel menu. All of the address channels are grouped together, and all of the data channels are grouped together.

You can scroll through timing data in similar manner as in the State menu. However, instead of scrolling data up or down, you scroll the data to the right or to the left.

41. Point the mouse at either of the two double-arrow or single-arrow scroll buttons and press the left button to scroll the data.

42. Point the mouse at the right or left arrows on the Joydisk and press the left button to scroll the data. The data will scroll in the direction you indicated.

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43. Point the mouse at the up or down arrows on the Joydisk and press the left button. Notice that the data does not scroll and that the instrument beeps at you telling you that you cannot scroll data using the up or down arrows.

    If the timing menu has several channels of data displayed that fill up more than the window can display, you can use the up or down buttons on the Joydisk to position the channels you want to view on the screen.

44. Point the mouse over the timing data just inside the right edge of the window and press the left button. The cursor will move towards the pointer location.

45. Press the left button a few more times. The data will scroll every time you press the button.

You can also use the function keys at the bottom of the menu to further define your display data or to search for specific data. For more information on the features of the Timing menu, refer to the acquisition module user manual.

In addition to the Timing and State displays, you can also view data in a Disassembly menu or Graph menu. The Disassembly menu has features similar to the State menu and will not be discussed in this tutorial. In most cases you will want to use the Disassembly menu with one of the microprocessor support packages. For detailed information on the Disassembly menu, refer to the manual that came with your microprocessor support package. Refer to your module user manual for information on the Graph menu.

Split Screen Display

An important feature of the Display menus is the capability to display a split-screen menu. In other words, you can create a Display menu to show part of the data as Timing data, and the other data as State or Disassembly data.

1. While still in the Timing menu, select function key F2: SPLIT DISPLAY. A new overlay appears giving you the choice of how to split the data.

2. Verify that Timing is highlighted for the Window 1 data and State is highlighted for the Window 2 data. Change the selections if they are different.

3. Select function key F6: SPLIT VERT. You have the choice of splitting the screens horizontally or vertically.

   Some new information and new function keys appear letting you define the ratio of the window widths. You can use function keys F3 or F4 to change the ratio. You can also lock the cursors to track between the two windows.

4. Select function key F2: LOCK CURSORS to lock the cursors together (locking the cursors allows the cursors in each window to track each other over the same data sequence).

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5. A pop-up window appears. Verify that the selection “lock cursors at the same sequence” is highlighted and press the right button. The pop-up window closes and the cursors are locked together.

6. Select function key F8: EXIT & SAVE. The overlay closes and the split-screen menu appears. The menu should look similar to Figure 2–17.

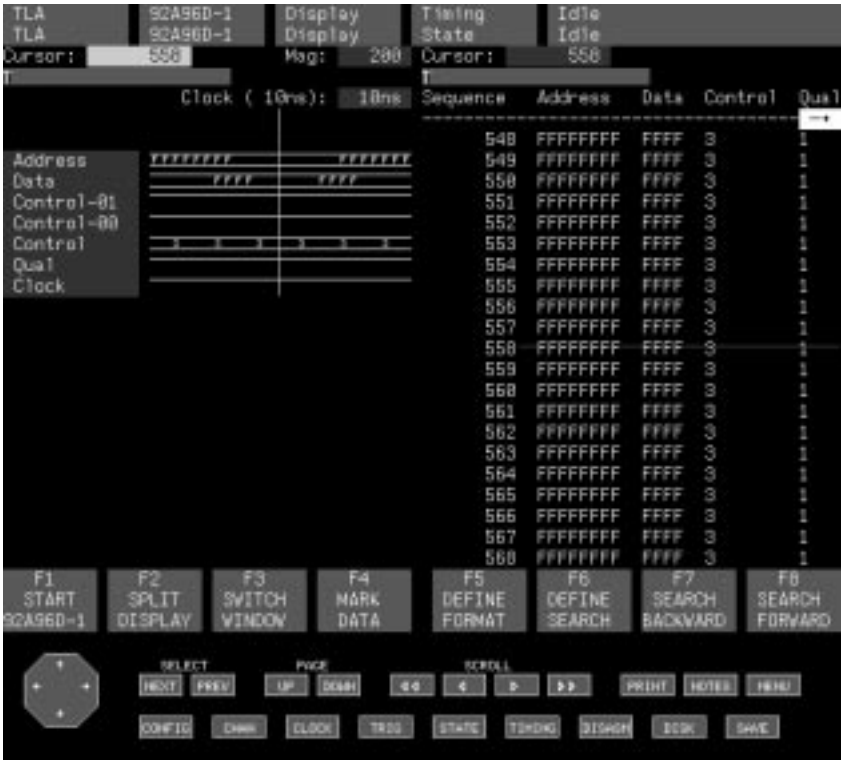


Figure 2–17: Split-Screen Menu

You can use the mouse to scroll data in either side of the split screen. Because you have locked the cursors together, scrolling data in one screen automatically scrolls the data in the other (the cursors will track each other).

Conclusion

You have now had the opportunity to become familiar with operating the menus. You may want to spend some time experimenting with other menus to become more familiar with the operation. For more details on the individual Setup and Display menus, refer to the user manual for your acquisition module. For more information on the system menus and the utility menus, refer to Chapter 3 of this manual.

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Reference

This chapter provides reference information for the system menus, utility menus, and the overlays for those menus. It also provides information on multimodule operation. For detailed information on the Setup and Display menus for the acquisition and pattern generation modules, refer to the *92A96 & 92C96 Module User Manual* and to the *92S16/32 Module User Manual*. For information on the Application menus, refer to the appropriate manual for that application.

System Configuration Menu

The System Configuration menu provides an inventory of your logic analyzer. It displays the following information:

- The contents (installed cards) of your logic analyzer
- The identification number of the currently selected module formation
- The contents of clusters

This menu provides the mechanisms for changing module formations and creating clusters. These mechanisms are discussed in the following paragraphs of this chapter.

Module Formation

The modules in the logic analyzer are automatically arranged into module formations. For systems with more than one module, the system software assigns a module formation identification number to each valid combination. The default module formation selection appears the first time you call the System Configuration menu. By changing the module formation number, you can view the various module formations for that type.

A module formation consists of one or more similar-type modules, and each module may contain one or more cards of that type. In the case of the TLA 520 Logic Analyzer the default module formation is made of two 92C96 Modules.

For example, suppose your logic analyzer contains two 92C96 Modules. System software establishes the valid combinations when you power on the logic analyzer and assigns each combination a module formation number. A module formation (identified by number) now exists for the 92C96 Modules.

The System Configuration menu looks similar to Figure 3–1.

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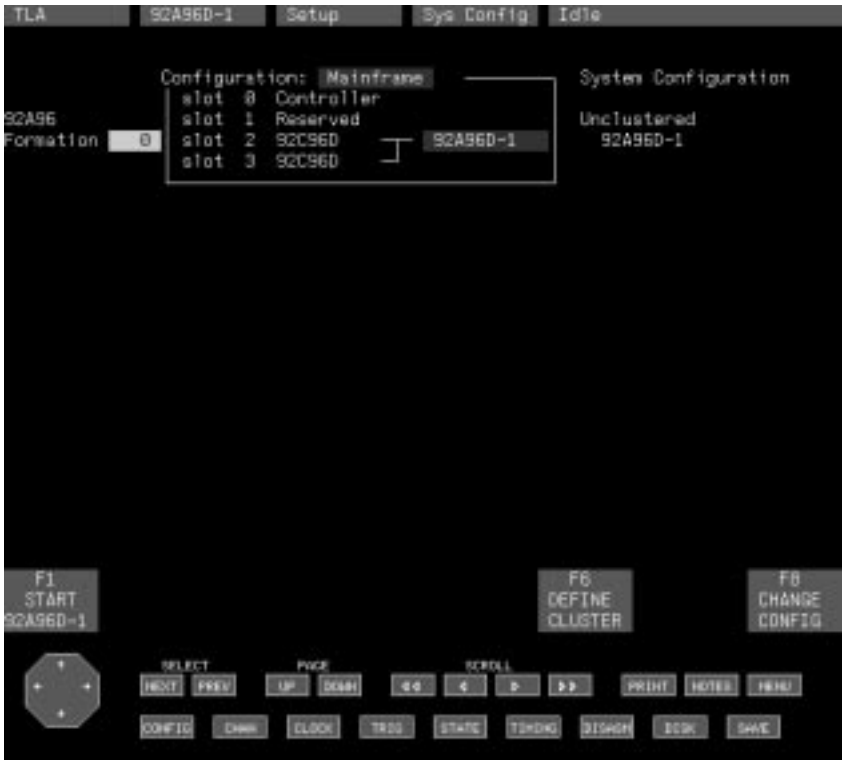


Figure 3–1: System Configuration Menu

The System Configuration menu has the following key fields and features:

- Cluster Status. The status of clusters is displayed on the right side of the menu. The contents of currently defined clusters and unclustered modules are displayed. You define clusters in the Cluster Definition overlay.
- Module Formation Number (only valid for logic analyzers with more than one acquisition card). This field displays the number assigned to the current module formation.
- Module Formation List. This list indicates the name of the module formation. The name consists of the module type plus a number to differentiate multiple module formations of the same type (for example, 92A96-1, 92A96-2). You can change the name of the module by moving the cursor to the fill-in field and typing in a new name; each module name must remain unique. Changing the name of the module also changes the name of the module in the legend of function key F1.

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Function key F1 starts the module or cluster named on the function key legend. Function key F6: DEFINE CLUSTER calls the Cluster Definition overlay. Function key F8: CHANGE CONFIG reconfigures the logic analyzer as shown in the upper-right corner of the menu and returns to this menu. Selecting this key has no effect if the configuration has not been changed.

Creating Clusters

A cluster is a defined group of instrument cards intended to handle a specific application. Clusters are started and stopped as a unit.

Clustered modules allow the following interactions:

- Time correlation
- Interactive triggering between acquisition cards
- Acquisition and pattern generation

After you select a module formation, you can combine modules into clusters. Only clustered modules can be time-correlated or pass signals (described later in this section).

Figure 3–2 offers a visual representation of the entire multimodule operation.

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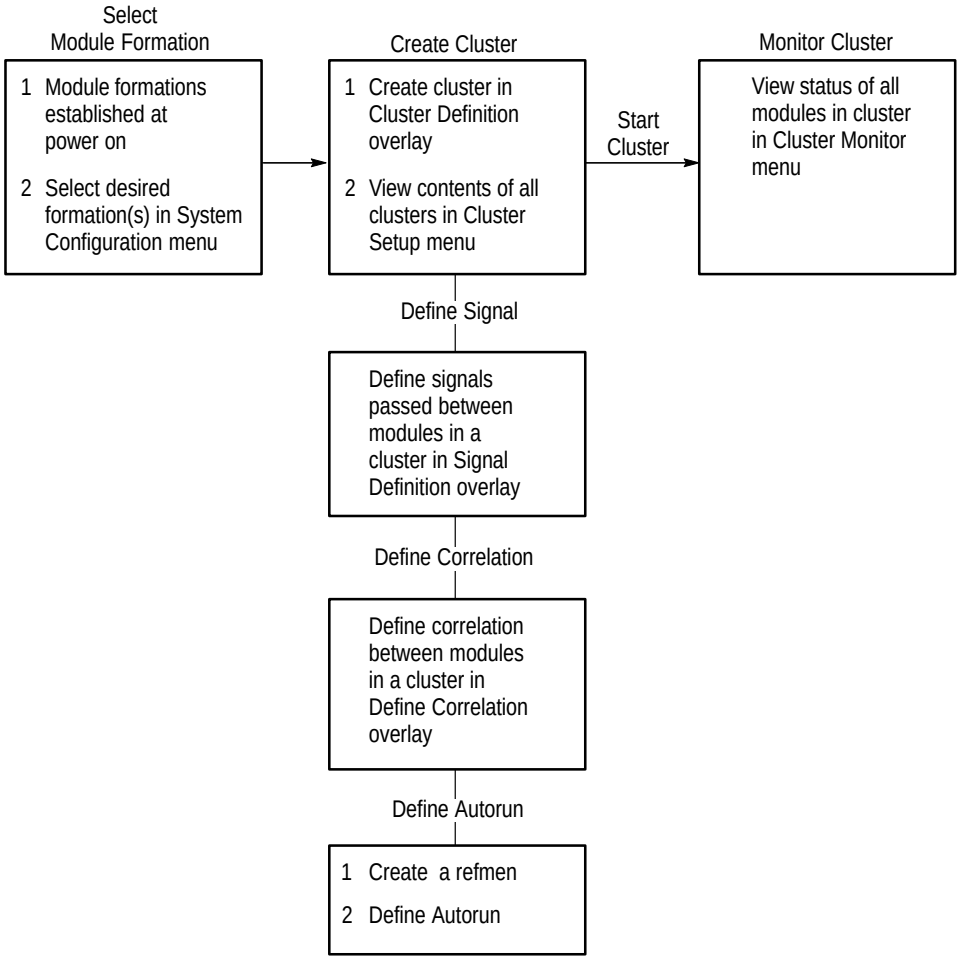


Figure 3–2: Multimodule Operation Sequence

Cluster Definition Overlay

You can use the Cluster Definition overlay to create and define the contents of the clusters. You access the overlay from the System Configuration menu by selecting function key F6: DEFINE CLUSTER.

If you have defined a cluster and want to change or clear it, you should first stop all modules or clusters before making any changes.

The Cluster Definition overlay is shown in Figure 3–3; in this example, the system has one acquisition card and a pattern generation card.

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Figure 3–3: Cluster Definition Overlay

The Cluster Definition overlay displays a list of cards (modules) under the Modules column and a list of clusters under the Clusters column. The contents of the clusters are displayed under the Cluster Contents column. You can change the name of any cluster under the Cluster Contents column by selecting the Cluster Name field and entering a new name using up to ten alphanumeric characters.

Function key F2: CLUSTER ALL clusters all of the modules in the logic analyzer. The cards are put in either Cluster-1 or the cluster that the cursor is positioned on in the Cluster Name field. Function key F3: CLEAR CLUSTER clears all of the modules from the cluster that the cursor is positioned on in the Cluster Name field. Modules that were part of the cluster become unclustered and <none> is shown for them in the Cluster Select field. Function key F4: CLEAR ALL clears all of the modules from all the clusters in the logic analyzer. All cards become unclustered indicated by <none> in the cluster Select field. Function key F6: ALT CLUSTER alternates the contents of the screen to display the other four clusters.

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To create a cluster, access the Cluster Definition overlay (select function key F6: DEFINE CLUSTER in the System Configuration menu) and move the cursor to the Cluster field next to the card you want to cluster. Open the field and select the cluster name. The default cluster names are Cluster-1, Cluster-2, and so on. To change the cluster name, move the cursor to the Cluster Name field of the cluster name you want to change. Enter the new name. All the modules assigned to that cluster will reflect the new cluster name. The new cluster name will also be listed as one of the selections when you open the Cluster field.

A module cannot be in more than one cluster at a time. If you add a module that is already part of a cluster to another cluster, it will be removed from the old cluster.

When the cluster has been defined, select function key F8: EXIT & SAVE to change the system configuration.

After you define the module formation and define a cluster (if appropriate), you can start the card or cluster by selecting function key F1: START.

Cluster Setup Menu

You can define the coordination and communication between modules in a cluster. You can specify which modules you want to link as well as how each module behaves in relation to another. This lets you solve integration problems quickly.

NOTE. *You cannot access the Cluster Setup menu until you define a cluster in the System Configuration menu.*

After you create a cluster, you can call up the Cluster Setup menu for that cluster and see the default communication parameters for modules in the cluster. You can then use the Cluster Setup menu and its overlays to change any of the parameters.

The Cluster Setup menu is shown in Figure 3–4. Each cluster has its own Cluster Setup menu. The name of the cluster appears in the upper-left corner of the display.

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Figure 3–4: Cluster Setup Menu

The Cluster Setup menu has the following key fields and features:

- A list of the contents of the cluster.
- A list of user-defined input signals for each module. You define signal events for each module in the Signal Definition overlay, as described on page 3–9.
- A list of user-defined output signals for each module. You define signal events for each module in the Signal Definition overlay, as described on page 3–9.
- A field describing whether a module is time correlated with another. You specify which modules you want to correlate in the Correlation Definition overlay, described on page 3–11. You can only correlate acquisition modules in the same cluster.
- A list of the names of reference memories used with Autorun for each module.

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- Run Mode field. This field specifies the run mode for the cluster. The default mode is Normal (when acquisition is complete, operation ceases and a Display menu appears); the other selection is Autorun (acquisition is compared to a refmem and repeats until user-defined conditions are satisfied; refer to *Autorun Definition Overlay* on page 3–13).
- Start Mode field. This field specifies the start mode for the cluster. The default is Normal (all modules are started together); the other selection is ATE (the acquisition module is started before pattern generation module).
- Stop Mode field. This field specifies the stop mode for the cluster. The default is Auto (operation automatically ceases when acquisition is complete); the other selection is Manual (you must select function key F1: STOP CLUSTER to stop operation).

Function key F2: DEFINE SIGNAL calls the Signal Definition overlay. Function key F4: DEFINE CORRELATN calls the Correlation Definition overlay and function key F5: DEFINE AUTORUN calls the Autorun Definition overlay. All three of these overlays are discussed later in this chapter.

Function key F3: SIGNAL TYPES displays the signal types next to signal names in the Inputs and Outputs columns. Signals are designated NOR (normal) and HIG (high–speed). Displayed signal types are based on information you enter in the Signal Definition overlay. After you select this key, the legend changes to REMOVE TYPES. When you select it again, signal types disappear from the display.

You can change the default parameters of the Cluster Setup menu. For instance, you can define additional signals and correlation for each module. You can also determine what types of lines the signal events are assigned to and monitor an acquisition at the cluster level. The first of these tasks, signal event assignments, is accomplished with the overlays described in the following paragraphs; the second, monitoring an acquisition, is accomplished with the System Monitor menu.

Signal Definition Overlay

The Signal Definition overlay lets you define signal events for the current cluster. (A signal event might be one module waiting for a signal from another before it can trigger.) You can specify the following parameters:

- Signal name
- Signal type (speed)
- Event line the signal will be assigned to
- Direction the signal will travel (input or output) for a given card

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To define a signal event, call the Signal Definition overlay (select function key F2: DEFINE SIGNAL in the Cluster Setup menu). Then, select function key F7: ADD SIGNAL. The Signal Name field will change to fill-in mode, allowing you to type in the name of the signal event you want to define. After you enter the name, press the Return key. You can then use the other fields in the overlay to specify the various parameters you desire for that signal event.

Note that you can only designate a specific line for your signal event if you've selected Normal in the Type field; if you select High-Speed, the Line field disappears. Note also that you can only specify a Boolean operator in the Combination field if you have defined two (or more) output signal components; if you have less than two output signal components defined, the Combination field disappears.

Table 3–1 shows the number and type of signal event resources available with different modules.

Table 3–1: Signal Event Resources

Module	Input	Output
92C96	Two normal or high-speed	Two normal or high-speed
92S16	One normal or high-speed	One normal or high-speed

Figure 3–5 shows an example of the Signal Definition overlay.

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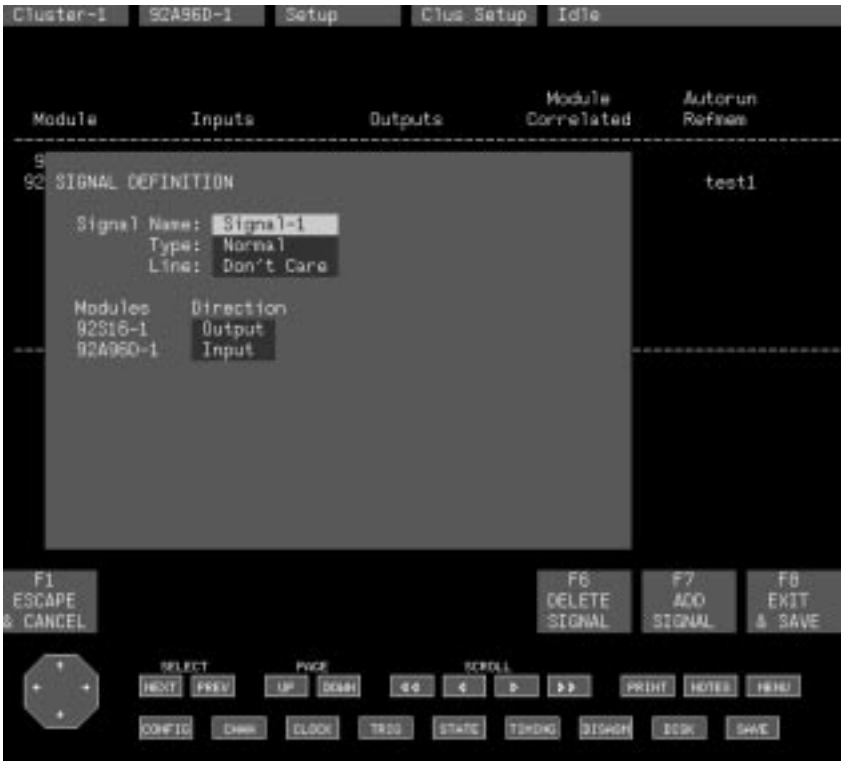


Figure 3–5: Signal Definition Overlay

The Signal Definition overlay has the following key fields and features:

- Signal Name field. Use this field to enter the name of a signal you want to define. Select function key F7: ADD SIGNAL to change this field to the fill-in mode and enter a name of your choice. If you do not enter a name, a default name (for example, Signal-1) will appear when you press the Return key. Click on the right mouse button, while pointing at this field, to view a list of all currently defined signals.
- Type field. This field specifies the type (that is, speed) of the signal you define. The choices are Normal and High-Speed. The High-Speed selection is useful for applications that require high-speed communication lines.
- Line field. This field assigns a signal to a specific event line (1 – 16). Modules in different clusters can use the same event line, as long as the line is specified by number in this field for each cluster. This field only appears when you select Normal in the Type field since high speed events can only be internal. Selections are 1, 2, 3, . . . 16, and Don't Care (default).

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- Combination field. This field determines the relationship between outputs you have defined for a signal. Selections are OR and AND. This field only appears if you define two or more output lines for the same signal. Output and input assignments are shown in the Direction column in this overlay.
- Modules column. All modules contained in the current cluster are listed here. The name of the current cluster is shown in the status line at the top of the menu.
- Direction column. Entries in this column let you specify whether an output will be used by the signal being defined, or whether the module will receive the signal as an input. Selections are Input, Output, and None.

Function key F6: DELETE SIGNAL deletes a signal that is currently displayed. Cycle through the signal names until the name of the signal you want to delete appears in the Signal Name field. Then select function key F6: DELETE SIGNAL. That signal will no longer appear in the list of defined signals. If there are no signals to delete, this function key will not appear on the menu.

Function key F7: ADD SIGNAL adds a signal. Select function key F7: ADD SIGNAL; the signal name field will change to fill-in mode. You can type in the name of a signal event you want to define, or press the Return key and cause a default name to appear in the field (for example, Signal-1). This function key does not appear on the menu after you have defined all possible signals.

Correlation Definition Overlay

The Correlation Definition overlay lets you specify correlation from two acquisition modules in the current cluster. To call this overlay, select function key F4: DEFINE CORRELATN in the Cluster Setup menu.

Only clustered acquisition modules can be time-correlated. Figure 3–6 shows a simple correlation application for one cluster. In this example, two acquisition cards have been time correlated. This means that data acquired by each of the cards is time aligned, allowing you to determine where each data sample occurred relative to each other sample in time.

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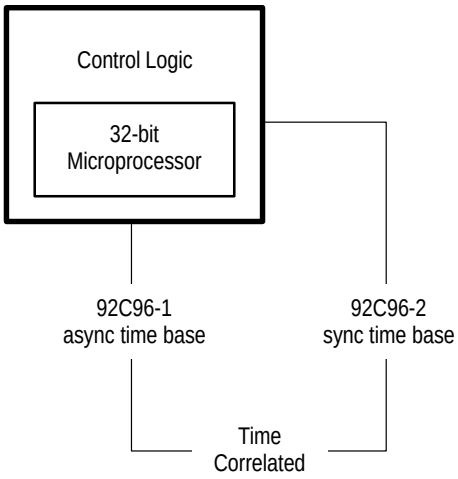


Figure 3–6: Time Correlation Between Two Acquisition Modules in a Cluster

The Correlation Definition overlay lets you enter the names of modules you want to correlate. Figure 3–7 shows an example of the Correlation Definition overlay.

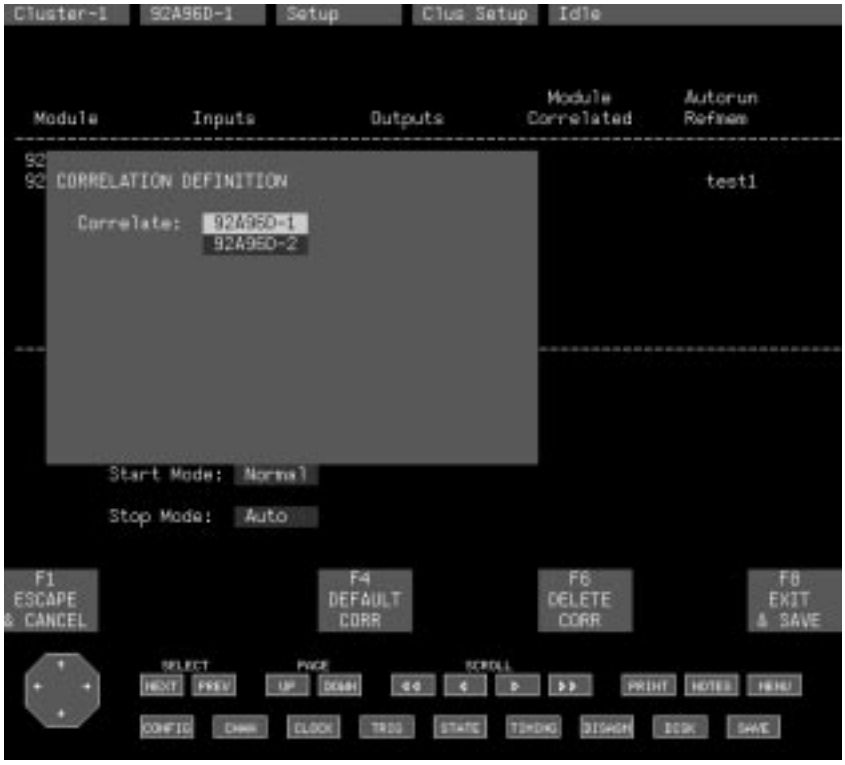


Figure 3–7: Correlation Definition Overlay

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The fields in the Correlated Module column let you select modules you want to correlate. Press the right mouse button while pointing at the blank field to view a list of choices. If you want to add another module to the list, select function key F7: ADD CORR; a blank field will appear below the current list. Available selections are the acquisition cards in the cluster (pattern generation modules cannot be correlated).

Function key F4: DEFAULT CORR resets correlation to the default value (that is, no correlation). This overlay will then consist of a single blank field. If you exit the overlay at this point, the Correlation column in the Cluster Setup menu shows no cards are correlated.

Function key F6: DELETE CORR deletes (or blanks) the field the cursor is on. If there are no lines to delete, this function key will not appear on the menu.

Function key F7: ADD CORR adds a new blank field below the last module currently listed and places the cursor on it. If all modules of a cluster have been defined, this function key will not appear.

Autorun Definition Overlay

Use the Autorun Definition overlay to set up automatic comparisons between acquired data and reference memory data files that you have established in the Save/Restore menu. The overlay, shown in Figure 3–8, defines the conditions under which repeated or multiple acquisitions will stop.

After you identify the Autorun parameters in the Autorun Definition overlay and you change the Run Mode field (in the Cluster Setup menu) to Autorun, you are ready to compare reference memory data to acquired data. Select function key F1: START to begin the compare operation. Instead of stopping after the first acquisition, the system compares the acquired data to the data contained in the selected reference memory file(s). If the selected module or cluster is autorunning, the number of times it has started and restarted is shown in the upper right corner of the status line. You can view the status of all modules and clusters operating in the Autorun mode along with the number of times each has started in the System Monitor menu. The Autorun count for the selected module is also displayed on the Module Status line at the top of the current menu.

The system compares the acquired data and reference memory data sequentially for each module with a compare definition. The system continues the comparison until it finds a difference between the acquired data and the reference memory data or until there is no more data to compare. If the system meets the stop conditions identified in the Compare Definition fields of the Autorun Definition overlay (or if you press F1: STOP), the system stops. If it does not meet the stop conditions, it continues acquiring data until the stop conditions are met or until you select function key F1: STOP. After starting the system in the Autorun mode, it may take a few moments for the label on the key to change to F1: STOP.

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Pattern generation modules clustered with acquisition cards restart with each Autorun comparison. This capability lets you perform repeated functional tests on a board or device, without using an external controller.

You can use External clocking (in most cases) for acquisition modules operating in the Autorun mode to ensure that data is acquired consistently on each cycle.

For each module with a compare definition, the system determines a reference point within the data to use as comparison point. If a single trigger exists for both the acquisition memory and the reference memory, the system uses the trigger position as the comparison point. Otherwise, the system uses the end-of-data point as the comparison point.

The sequence range is limited by the sequences in the reference memory. You can define the sequence range using the Sequence Range fields (in the Autorun Definition overlay) within the reference memory that you want to compare against. If the length of the reference data, the length of the acquired data, or the trigger positions do not match, you must adjust the sequence range. The system truncates the sequence range if the trigger positioning is shifted or if the acquisition memory is shorter than the reference memory. If the entire range of the acquisition memory is out of the specified range, the system ignores the comparison as if no comparison definition was made for the module.

For example, the logic analyzer uses a reference memory that contains 5000 sequences with the trigger position at sequence 3000. The Sequence Range in the Autorun Definition overlay is from 1900 to 2099 (200 sequences in a block before the trigger). Three examples of comparing data follow:

- The acquisition acquires 3000 sequences with the trigger position at sequence 2000. In this case, sequences 900 – 1099 in the acquisition will be compared with those specified in the reference memory.
- The acquisition acquires 3000 sequences with the trigger position at sequence 1000. In this case, sequences 0 – 99 in the acquisition will be compared with sequences 2000 – 2099 in the reference memory. The range is truncated because the relative sequences do not exist in the acquired data.
- The acquisition acquires 3000 sequences with the trigger position at sequence 100. In this case, no sequences will be compared. The system continues checking other compare conditions for the cluster as if no comparison definition was defined for the acquisition module. If no other module is present, the Autorun stops.

Once the logic analyzer determines the comparison range, it compares the data applying the global compare mask and the individual sequence masks as indicated in the Mask file. The logic analyzer determines if the compare conditions are met for each module. It combines this information with the information from the other module using the Autorun Stop condition to determine whether or not to restart the cluster.

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Figure 3–8: Autorun Definition Overlay

The Autorun Definition overlay has the following key fields and features:

- Autorun Stop field (not available with single card logic analyzers). This field specifies the conditions for two-module comparisons. Select Any True to tell Autorun to stop when any of the comparison conditions are met. Select All True to tell Autorun to stop when all comparison conditions are met. The default value is Any True. If you compare only one module, this field is not present in the menu.
- Module field. This field specifies the acquisition module within the cluster. By specifying a corresponding reference memory you can define a compare condition for the card selected in this field. The Module field selection also determines the correlation for comparing correlated cards.
- Refmem field. This field specifies the reference memory to compare with the selected module. A blank Refmem field indicates that the selected module will not be compared with reference memory data. Selecting a correlated reference memory adds a stop condition for each module.

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- Mask File field. This field specifies the mask file to be used in the compare. A blank field indicates that the comparison between the selected module and reference memory will not use a mask file. This field will not be present if the Refmem field is blank. Mask files are created on a host computer and downloaded to the system.
- Upper Bound Sequence Range field. This field defines the upper bound of a range of inclusive sequence numbers to be used in the comparison. The system displays an error message if you try to set this number less than the lower bound sequence range or more than the maximum sequence range. This field is not present unless the reference memory and module (or the correlated set defined by the module) match. The reference memory and module are considered a match if they have the same type, data width, and channel grouping.

  The upper bound field applies only to the selected module. To apply an upper bound to another module, you must select that module in the Module field and then enter the upper bound sequence number.
- Lower Bound Sequence Range field. Defines the lower bound of a range of inclusive sequence numbers to be used in the comparison. An error message will be displayed if this number exceeds that of the upper bound sequence range. This field will not be present unless the reference memory and module (or the correlated set defined by the module) match.

  The lower bound field applies only to the selected module. To apply a lower bound to another module, you must select that module in the Module field and then enter the lower bound sequence number.
- Compare field. This field specifies the general method of comparison for the module or the correlated set. There are two selections: “Until Equal” and “Until Not Equal.” This field will not be present unless the reference memory and module (or the correlated set defined by the module) match.
- Refmem Module column. This column lists the modules within the reference memory. For a non-correlated reference memory, the column lists only one module. For a correlated reference memory, the list consists of the modules in the reference memory. The one associated directly with the selected module is highlighted in yellow.
- Group Name column. This column lists the group names defined by information in the current selected reference memory. For a multiple-module reference memory, the names for the current selected card are highlighted in yellow.
- Radix column. This column specifies the radix used by the Compare Mask column display.

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- Compare Mask column. This column specifies a global mask for that portion of the data indicated by the group name to the left. Values translating to a binary 1 mean “use this bit in the comparison,” and those translating to a binary 0 mean “ignore this bit.” Select function key F3: DEFAULT MASK to reset this field to the default value (compare all bits).

Function key F3: DEFAULT MASK resets the comparison mask for the current acquisition memory to the default condition, (all binary ones). If the mask fields are not present, this function key will not be present.

Function key F5: RESTORE AUTORUN displays a list of saved definitions; the one you select will be restored. Function key F6: DELETE AUTORUN displays a list of saved definitions; the one you select will be deleted. These fields will not be present if there are no saved definitions.

Function key F7: SAVE AUTORUN displays a field where you can enter the file name to save the definition under.

System Monitor Menu

The System Monitor menu displays the current status of the modules in the logic analyzer. The current selected cluster and modules are highlighted in yellow. The System Monitor menu, shown in Figure 3–9, is not interactive. The display is for information purposes only.

The status column displays a status message for each card or cluster. Possible messages are Idle, Waiting For Enable, Waiting For Trigger, Waiting For Stop/Store, Waiting For Stop, and Running. Possible Autorun messages are Idle or Running followed by an Autorun count.

The Modules column lists all modules and clusters in the logic analyzer.

Function key F1 starts or stops the selected module or cluster. If none of the modules in the cluster are running, this legend will read START (Cluster name); if any of the modules in the cluster are running, this legend will read STOP (Cluster name). The function key is not present if you select a reference memory.

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Figure 3–9: System Monitor Menu

Save/Restore Menu

The Save/Restore menu lets you *save* setups and acquisition memory data, *restore* setups from previously saved files, and *delete* setups or reference memory files from the hard disk. Once in the Save/Restore menu, you can access any of the save, restore, or delete operations; the Save/Restore menu has one overlay (Restore Formation overlay). To move a copy of a stored setup or reference memory file from the hard disk to a floppy disk, use the Disk Services menu described later in this section.

There are a few guidelines that you should be aware of when you use the Save/Restore menu:

- Do not use any remote file transfer or file removal commands while the files are being used by the logic analyzer.
- Do not use a host computer to remove a file currently being used by the system. For example, do not remove a reference memory file being displayed or symbol tables used for triggering or display.

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- Do not use a host computer to access files that are being written to by the system (for example, reference memories and setup files).
- Do not use a host computer to place inappropriate files in application specific directories.
- When working with the pattern generation menus, the contents of the IRQ Jump and Ext Jump fields cannot be saved and restored; these fields will contain the default selections after a restore operation.

Save setup operations let you save setups for acquisition and pattern generation modules. Figure 3–10 shows a menu with the Save System Setup operation selected. Menu descriptions for other save setup operations follow this figure; these menus look similar to Figure 3–10. The save setup operations follow:

- Save System Setup
- Save Cluster Setup
- Save Module Setup

Save refmem operations allow you to save copies of the acquisition memory data. (Once the data has been acquired and saved on hard disk, it becomes a reference memory.) Figure 3–11 shows a menu with the Save Correlated Refmem operation selected. The save refmem operations follow:

- Save Correlated Refmem
- Save Module Refmem

The restore setup operations allow you to restore setups for acquisition and pattern generation modules from previously saved files. Figure 3–12 shows the Restore Setup operation selected. The restore setup operations follow:

- Restore Setup
- Restore Partial Setup

The delete operations let you delete stored setups and reference memory files from the hard disk. Figure 3–14 shows the Delete Setup operation selected. The delete operations follow:

- Delete Setup
- Delete Refmem

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Save Setup Operations

Using the Save Setup operations, you can save a copy of the menu setups for the entire system, for a cluster, or for a single module. Setups are saved on the hard disk. The Operation field selects which level of setup information is stored. The Save System Setup selection stores the setups of all modules in the system. Save Cluster Setup stores the setups of the modules assigned to the specified cluster. Save Module Setup stores the setup information for an individual module. You can also save any one of these setup types in a file named “Power_Up” and the logic analyzer will automatically restore this setup at power on.

The Display field in the Save/Restore menu changes the type of information presented within the menu; selections are Directory, File Contents, Sys Config, and File Contents/Sys Config.

The Directory selection (shown in Figure 3–10) displays a directory that lists all the setup files or all the refmem files (depending on the selected operation) residing on the specified disk.

The Sys Config selection displays a list of the currently configured clusters and modules in the mainframe; this display is similar to the information in the System Configuration menu.

The File Contents selection displays information on clusters and modules that were previously saved in the specified file. The File Contents/Sys Config selection (shown in Figure 3–11) is a combination of the two previous selections. This selection simultaneously displays both types of information. Use this side-by-side display during save/restore operations to help you decide which cluster or module is best suited to the operation being performed.

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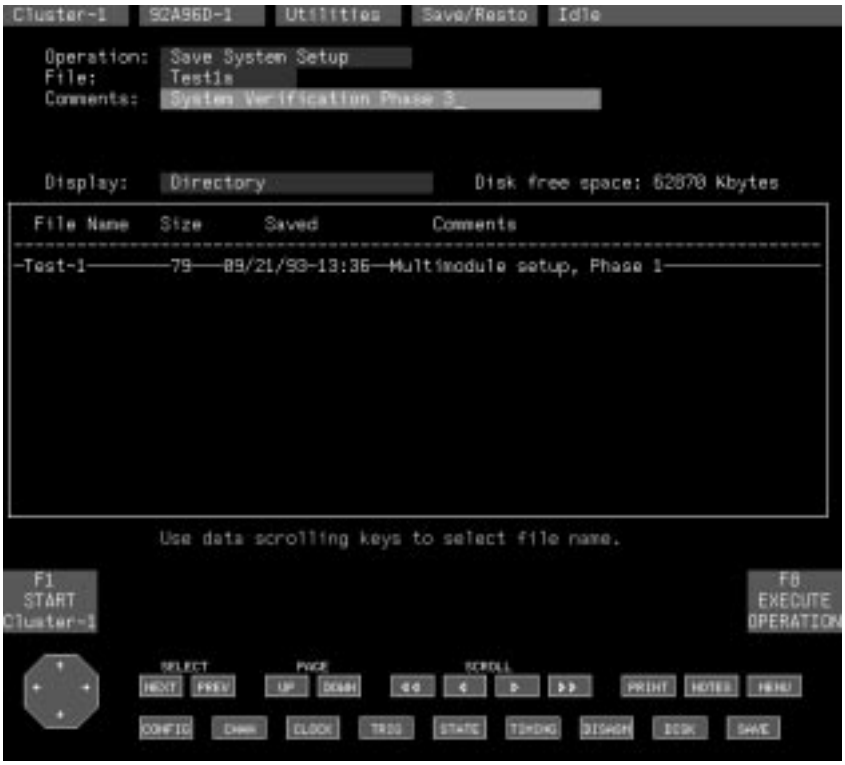


Figure 3–10: Save/Restore Menu: Save Setup Operation

The Save/Restore menu has the following fields and features:

- Operation field. This field specifies the operation to perform when you select function key F8: EXECUTE OPERATION.
- File field. This field lets you specify the name of the file that will contain the saved setup; selections are all file names that appear in the directory listing. For save operations, this field is a fill-in field; blank characters are not allowed. The new file name is not created until you press function key F8: EXECUTE OPERATION. For restore and delete operations, this field is a select field. If you save a setup using the file name Power_Up, the logic analyzer will restore this file when you power on the logic analyzer.
- Comments field. This field displays the comments you enter to describe the contents of the selected file. This field becomes a fill-in field when a save operation is selected; blank characters are allowed. During other operations, this field contains comments from the currently selected file.
- Display field. Selects the type of display shown in the lower half of this menu.

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- File information. This area of the menu displays information about the file selected in the File field above. Information includes file name, size (in kilobytes), date and time originally saved, and any entered comments.

Save System Setup. This operation stores setup information for each existing cluster and unclustered module as well as any existing display formats for acquisition memories.

Save Cluster Setup. This operation stores the following setup information for the cluster specified in the Save Cluster field:

- Clustering information
- Intermodule signal definitions
- Time correlation definitions
- Individual module setups

The Save Cluster field appears only when you select the Save Cluster Setup operation.

Save Module Setup. This operation stores setup information for the module specified in the Save Module field. The Save Module field appears only when you select the Save Module Setup operation.

Saving the Power-Up Setups

Rather than starting from the default setup each time you power on the logic analyzer, you can save a predefined setup in a setup file named Power_Up. This setup will automatically be restored each time you power on the logic analyzer.

If you use the power-on restore feature you must use the correct file name (Power_Up). If there are any deviations from the spelling and case-sensitivity of the file name, the logic analyzer will ignore the file and return to the default settings.

If the previous shut down was abnormal, the logic analyzer will restore to the default setups instead of the setups in the Power_Up file. The logic analyzer will display an error message indicating this in the Diagnostics menu. This feature prevents the logic analyzer from restoring a faulty setup that may have caused the abnormal shut down.

Save Refmem Operations

Using the save refmem operation, you can store the contents of a current acquisition either from a correlated set of modules or from a single module; the selections are Save Correlated Refmem and Save Module Refmem. After being stored, the acquisition memory file is called a reference memory, or refmem. The list of refmem files displayed with the operation can also be viewed in the Menu Selection overlay. The file containing the refmem is saved on the hard disk.

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To specify a save refmem operation, make the desired selection in the Operation field and select a destination file. You can add notes in the Comments field to describe the file contents. To complete the save process, select function key F8: EXECUTE OPERATION. The logic analyzer will estimate the size of the refmem and ask you to confirm your choice; press the Return key to save the refmem. If there is not enough space on the hard disk, you can select function key F1: ESCAPE & CANCEL to cancel the process. You can then delete files from the hard disk to create room for the refmem.



Figure 3–11: Save/Restore Menu: Save Refmem Operation

When you select the save refmem operations in the Save/Restore menu, the following features are displayed:

- Master Module field. This field specifies the master module of the correlated set of modules. Only the master module needs to be defined; data acquired from the other module in the set is automatically stored.
- Display field. This field specifies the type of display shown in the lower half of this menu. You can display the directory contents, system configuration, file contents, or a combination of the file contents and system configuration (as shown in Figure 3–11).

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- Display Information. This part of the menu contains a combination of information. The left side shows the File Contents display that contains information on cluster/modules that were previously saved; information includes the name of the cluster/module used to acquire the data, the module used, the slot number the module occupied, and the number of slots used. The right side shows the System Configuration display that contains information on the cards currently configured into clusters/modules in the logic analyzer. The information presented here is equivalent to that displayed in the File Contents listing. To switch the active cursor between the two sides, select function key F4: CHANGE CURSOR.

Save Module Refmem. This operation stores acquired data from a specified module as a reference memory file. The Save Module field appears when you select Save Module Refmem.

If you acquire a correlated acquisition and save the data of each module as a separate refmem, the modules cannot be correlated when you view them. This restriction is true even if you use the split-screen display to view the refmems simultaneously.

Restore Setup Operations

Use the restore setup operation (see Figure 3–12) to restore a setup for a specific module or cluster, or to restore all setups for the entire system; the selections are Restore Setup and Restore Partial Setup. Use Restore Setup to restore any module, cluster, or system setup file. If only a partial restore is possible, the logic analyzer will display the Restore Formation overlay when you select function key F8: EXECUTE OPERATION. Use the Restore Formation overlay to specify how to match the setup file to the current hardware configuration.

Restore Partial Setup. This operation allows you to restore only part of a previous setup file. When you select function key F8: EXECUTE OPERATION the Restore Formation overlay displays.

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Figure 3–12: Save/Restore Menu: Restore Setup Operation

Restore Formation Overlay

The Restore Formation overlay lets you assign the module setups in the saved setup file to the current hardware in the system. This overlay appears when you select the Restore Partial Setup operation or when the current hardware configuration does not match the saved setup configuration on a Restore Setup operation. Figure 3–13 is an example Restore Formation overlay.

The left side of the configuration box shows the current hardware configuration. The select fields on the right side of the configuration box allow the saved module setups to be assigned to the hardware in the system.

Saved module setups can be assigned to any compatible hardware. This allows setups from systems (including setups from the Digital Analysis Systems) with different card placement to be interchanged. It also allows setups saved from one module to be restored into a different module. Hardware cards can be reconfigured to form compatible modules during the restore operation.

All modules and clusters in the saved setup are listed at the bottom of the overlay. When modules are placed, they are highlighted in yellow. This allows remaining and currently placed modules to be easily identified.

If the saved setup file contains any clusters (cluster setup or system setup), each cluster is listed on the right side of the overlay.

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When all the modules of a cluster are assigned, the Restore Cluster field for the cluster appears that allows the cluster to be restored with the placed modules. When this field is set to Yes, the placed modules from the indicated cluster will be restored as a cluster. If the field is set to No, the modules will be restored as unclustered module setups.

Function key F4: PLACE MODULES causes the logic analyzer to try to place all modules in the saved setup. Module placement can be changed after auto placement by changing the selected saved modules manually. Since modules can only be placed in one position at a time, it may be necessary to remove a saved module from its position (by selecting a blank) before selecting it in the desired position.

Function key F1: ESCAPE & CANCEL closes the overlay and discards any changes made to the overlay; no clusters or modules are restored. Function key F8: EXIT & SAVE saves the new configuration and closes the overlay.

In addition to restoring setups saved on the TLA 510 and TLA 520 Logic Analyzers, you can also restore setups from the Tektronix Digital Analysis Systems (DAS). The Restore Formation overlay (Figure 3–13) shows eight slots from which you can restore setup information from DAS systems.



Figure 3–13: Restore Formation Overlay

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Delete Operations

The delete operations let you delete setup files or reference memories stored on the hard disk; selections are Delete Setup and Delete Refmem. Select the file to delete, and select function key F8: EXECUTE OPERATION. You will be asked to confirm your actions before the delete operation begins.

Delete Refmem. This operation deletes the reference memory file specified in this menu; the file is not deleted until you select function key F8: EXECUTE OPERATION and confirm the operation. Figure 3–14 shows an example of the Save/Restore menu with the Delete Refmem operation selected.



Figure 3–14: Save/Restore Menu: Delete Refmem Operation

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Disk Services Menu

The Disk Services menu allows you to do the following operations:

- Copy or delete files on the hard or floppy disk.
- Format and verify floppy disks.
- Duplicate the entire contents of a floppy disk on another floppy disk.
- Install or remove application software.
- Identify the floppy disk and file type.
- Backup user files from the hard disk to floppy disks.
- Restore user files from floppy disks to the hard disk.

Once in the Disk Services menu, you can access all operations for file and floppy disk manipulation; the menu has no overlays.

The Disk Services menu cannot be used for reinstalling system software on the hard disk; for information on reinstalling system software, refer to *Appendix D: Loading System Software*. However, you can use the Disk Services Install Application operation (described on page 3–32) when loading application software to the mainframe hard disk.

There are a few guidelines that you should be aware of when you use the Disk Services menu:

- Do not use file transfer or removal programs with a host computer while the files are being used by the logic analyzer.
- Do not use a host computer to remove a file currently being used by the system. For example, do not remove a reference memory while it is being displayed or symbol tables while they are being displayed or used for triggering.
- Do not use a host computer to access files that are being written to by the logic analyzer (for example, reference memories and setup files).

The following list briefly describes some of the file types that can be selected in the Disk Services menu. These files and directories are also used with other file transfer operations such as Kermit, DASdisk, ftp, and PCL.

- A96 Trigger. Files containing saved user-defined trigger setups. Refer to the description of the Trigger Library in the *92A96 and 92C96 Module User Manual*.
- Autorun. Files containing saved Autorun specifications.
- Compare Mask. Files containing bit masks for Autorun or Compare operations.

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- Print Output. Files containing previously stored data saved using the print overlay for the State, Disassembly, and Timing Display menus.
- Reference Mem. Files containing previously stored cluster/module acquisitions.
- Setup. Files containing the Setup menu selections for cluster/module acquisitions.
- State Format, Disasm Format, Graph Format, and Timing Format. Files containing the Display menu selections for that type of display.
- Symbol Table. Files containing symbol table information.

Other types of files may be available depending on the types of applications you have installed.

Copy File Operation

Using the Copy File operation (Figure 3–15), you can copy individual files from the hard disk to a floppy disk (and vice versa) or make a copy of a hard-disk file on the hard disk. For floppy-to-floppy disk copies, you must first make a copy in a temporary hard-disk file. Once made, you can complete the copy operation using the desired destination floppy disk. Refer to *Duplicate Floppy Operation* on page 3–32 for information on copying the entire contents of a floppy disk.

When you select the Copy File operation, a directory listing displays the files available for the specified source disk and source file type; a directory for the destination disk is also displayed. Using the scroll keys (buttons) or joydisk, you can move through the files in the directory; this operation automatically updates the source and destination file names. If more file names are listed than can be displayed, you can scroll through the file names. The copy file operation is performed after you select function key F8: EXECUTE OPERATION.

You can also rename files during the Copy File operation. To rename a file, position the cursor on the Destination File Name field and enter the desired file name. You then must delete the original file name. In cases where an existing file would be overwritten, you are asked to confirm the choice.

To copy a large number of files from one system to another using floppy disks, you should consider using the Backup User Files operation and the Restore User Files operation (beginning on page 3–33).

You can also copy files to and from 720 Kbyte floppy disks that have been previously formatted on a 720 Kbyte machine. However, you cannot copy the contents of a 720 Kbyte floppy disk to a 1.44 Mbyte floppy disk or vice versa.

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Figure 3–15: Disk Services Menu: Copy File Operation

The Disk Services menu has the following features and fields:

- Disk Free Space field. This field displays the available storage space for the hard disk and floppy disk. This information can be used to determine when it is necessary to create additional space on the hard disk.
- Operation field. This field specifies the operation to be performed on the files residing on floppy or hard disk. The selection made here determines what fields appear in the display.
- Source Disk and Destination Disk fields. These fields specify the disk that contains the source file to be copied and the destination disk where the file will be stored. The floppy disk cannot be selected as both the source and destination disks.
- Source File Type field. This field specifies the file type to be copied from the source disk. The destination will always be the same file type. Use the scroll keys to view all available files.
- Source and Destination File Name fields. These fields specify the source file and destination file for the Copy File operation. The default destination file name will be the same as the source file name.

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- Disk Information. These areas on the screen list information about each file on the selected source and destination disk. Source file information is displayed on the left side of the menu and destination file information is displayed on the right side. Displayed information includes the file type, file name, file size (in kilobytes), and the time and date the file was created. If the selected file is divided between two or more floppy disks, the message "Diskette Volume *n* of *m*" will be display.
- Function key F5: IDENTIFY FLOPPY displays updated information about the floppy disk. Use this function key when you install another floppy disk and want to know the contents of the disk.

Delete File Operation

Using the Delete File operation (Figure 3–16), you can delete individual files from hard disk and floppy disk. Deletions made with this operation only affect the contents of a specified file; other files on the disk are not affected.

When you select the Delete File operation, a directory listing is displayed that contains the file names, file sizes (in kilobytes), and creation/revision dates and times for all files on the specified disk. To delete a file, make selections in the Source Disk, Source File Type, and Source File Name fields. You can also select a file to delete by moving the active cursor through the directory list with the scroll keys. Complete the delete operation by selecting function key F8: EXECUTE OPERATION and confirm your choice.

Format Floppy Operation

The Format Floppy operation prepares an unformatted 1.44 Mbyte floppy disk for file storage. This operation destroys the contents of the disk. The format used by the logic analyzer can be read and written by IBM PC disk drives through the DASdisk utility. You can also read and write this same format on SUN workstations using the tar command. For more information on the DASdisk utility, refer to *Appendix G: DASdisk Utility.*

Verify Floppy Operation

The Verify Floppy operation checks that all blocks on the installed floppy disk match their corresponding checksums. Floppy disks with bad blocks cannot be used.

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Figure 3–16: Disk Services Menu: Delete File Operation

Duplicate Floppy Operation

The Duplicate Floppy operation duplicates the entire file contents for the installed floppy disk. You can duplicate system software disks, application software disks, and user file disks. If you want to copy an individual file, use the Copy File operation. Messages displayed at the bottom of the menu instruct you when to insert the source and destination disks; you are prompted to verify each step by pressing the Return key.

You can also duplicate 720 Kbyte floppy disks that have been previously formatted on a 720 Kbyte machine. However, you cannot duplicate the contents of a 720 Kbyte floppy disk to a 1.44 Mbyte floppy disk or vice versa.

Prior to duplicating a floppy disk, the system checks the destination floppy disk to see if it has been formatted. If the disk has not been formatted or if it has an incompatible format, the disk will be reformatted.

Install Application Operation

The Install Application operation loads an application program from floppy disks onto the hard disk. This operation lets you access the functions of that application through the menus. Included with each application software package is a manual that describes the operation of that application. Messages displayed on the screen instruct you on how to proceed with the Install Application operation. Any application-specific instructions are included in the application user manual.

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Remove Application Operation

The Remove Application operation removes previously installed application software from the hard disk. The Remove Application operation functions the same as the Delete File operation, except it frees disk space by removing application software which consists of multiple files and directories. Messages displayed on the screen instruct you on how to proceed with the Remove Application operation.

Backup User Files Operation

The Backup User Files operation allows you to back up all files stored in the directories of the Disk Services menus to a set of floppy disks. Select function key F8: EXECUTE OPERATION to begin the backup process. The logic analyzer estimates the number of disks that you will need to complete the operation. The estimate can be high or low, so it is a good idea to have at least one more disk on hand. After determining the number of disks required, you will be prompted to continue or abort the operation. Press the Return key to continue the operation; you will be prompted to insert the first blank floppy disk. Insert the floppy disk and press the Return key to continue the process.

The logic analyzer will format (if necessary) and verify the floppy disk before backing up any files. During the backup process, the logic analyzer will display the following status information on the screen:

- The current volume number
- The estimated number of volumes for the backup process
- The percentage of the files backed up to the current volume
- The estimated percentage of the total files backed up
- The current file name

If any errors occur during the process, the logic analyzer will display the error messages on the screen and prompt you to either continue or abort the operation. Press the Return key to continue the operation or press the Escape key to abort; if you continue the operation, you will be prompted to insert a new disk. You can press the Escape (Esc) key at any time to abort the backup process.

NOTE. *Be sure to label each floppy disk with the volume number displayed on the screen. The label will help you keep track of the disks.*

If you decide to continue the backup operation after an error, the logic analyzer will restart the backup operation with the current disk or it will specify the volume number of an earlier disk.

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If the backup operation requires more than one floppy disk, the logic analyzer will prompt you to insert the next disk. Before writing data to the floppy disk, the logic analyzer verifies that the disk does not contain any information from a previous volume in the current backup process; if it does, the logic analyzer displays an error message and prompts you to start over again.

When the backup operation is complete and no errors occurred the logic analyzer displays the message “Backup operation complete with no errors.”

Restore User Files Operation

The Restore User Files operation allows you to restore user files from one or more volumes of floppy disks to the appropriate directories on the hard disk. Select function key F8: EXECUTE OPERATION to begin the restore process. You will be prompted to insert the first floppy disk; insert the disk and press the Return key.

NOTE. *It is not a good idea to restore files over existing files with the same name. Doing so can cause inconsistencies in file sets.*

During the restore process, the logic analyzer displays the following status information:

- The current volume number
- The estimated number of volumes for the restore process
- The percentage of the files restored from the current volume
- The estimated percentage of the total files restored
- The current file name

The logic analyzer checks that the disk you inserted is volume 1; if it is not, it will display the current volume number and prompt you to insert volume 1. If there is insufficient free space on the hard disk, the logic analyzer displays the amount of free space required and then stops the restore operation. To restore all of your user files, you must create additional free space; this may mean deleting other user files, application software, or some of the optional system software.

NOTE. *Do not interrupt a restore operation before it is complete. Doing so can cause the logic analyzer to stop or produce other unexpected results.*

The logic analyzer will prompt you to insert additional disk volumes to complete the restore operation. After reading the final disk volume, the logic analyzer will update the user files to the current format (if necessary). When the restore operation is complete and no errors occurred the logic analyzer displays the message “Restore operation complete with no errors.”

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Symbol Editor Menu

The Symbol Editor menu lets you create and edit symbol tables. Symbol tables are files of alphanumeric symbol names and associated data values. There can be up to 5,000 symbols in each symbol table. Large symbol tables can slow the response time of the operating system. You can use no more than 50 symbol tables at one time. Symbol tables can be created using the Symbol Editor utility menu or transferred from a host computer and edited using this menu.

Each entry in a symbol table consists of an alphanumeric symbol name with its associated numeric value or range of values. After you create a symbol table, you can specify the symbol table file for the appropriate channel group in the Channel menu and use symbolic names as a substitute for numeric values in the Trigger Setup menu and in State and Disassembly Display menus.

Symbol tables perform like look-up tables. For example, if the address of a printer I/O port is at address F734BC, you can define a symbol, printer-port, corresponding to that value. Then, in the Trigger menu, you can specify the symbol name as the word recognizer value and cause the module to trigger when printer-port (F734BC) appears on the address bus. Alternatively, you can specify symbolic display radix for the address channel group and the symbol name printer-port will be displayed in the State menu every time F734BC appears on the address bus.

Two types of symbol tables are possible: range symbol tables and pattern symbol tables. Range symbols represent a contiguous set of integers, marked by specific lower and upper bounds. For example, range symbols can be used to mark the boundaries of subroutines, the location of global tables, or the set of locations used by a peripheral. Range symbols are typically used in displaying the address bus of a microprocessor.

When defining a range symbol table, do not overlap ranges of values. For example, if SYM1 covers the range 1000–3FFF, and SYM2 covers 2000–2FFF, then the values in range 2000–2FFF may be recognized as either SYM1 or SYM2, and the values in the range 3000–3FFF may not be recognized as SYM1 at all.

Pattern symbols describe a pattern of bits. Each bit in a pattern symbol can be 0, 1, or X (don’t care). Pattern symbols are used when a group of signals define a logical state. For example, a microprocessor has a set of pins that indicate the type of bus cycle in progress. A memory read cycle may be indicated when the RD~ and MREQ~ pins are 0 (logic low) and the BUSAK~ and M1~ pins are 1 (logic high). You can define a pattern symbol name called mem-read that corresponds to bit pattern 1100 and thereby mark all memory read bus cycles in the State Display menu. For other bus cycles the logic state of these pins is also important and you can define different bit patterns for each cycle type.

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To use symbolic names in module Setup and Display menus, you must first perform the following tasks:

1. Create a symbol table using the Symbol Editor menu, or transfer a symbol table to the logic analyzer from a host computer.
2. Specify the Symbolic radix for the appropriate channel group in the Channel menu. A new File field will appear allowing you to name the symbol table to be used for this channel group. Only one symbol table per channel group is allowed, but each channel group can have its own symbol table.
3. You can now use symbolic names to define word recognizer events in the Trigger menu. After making an acquisition, you can view symbolic values in the State or Disassembly Display menus.

When you first enter the Symbol Editor menu, the default pattern-type symbol table is displayed. You can immediately begin editing this menu. Alternatively, you can select function key F2: FILE FUNCTIONS to create a new symbol table or to open an existing symbol table to edit. Be aware, however, that many applications (microprocessor disassembly programs) supplied with symbol tables are write protected and can only be opened as read-only files.

The Symbol Editor menu provides a variety of function keys that you can use to help create, edit, and search for symbol and pattern values. Selecting function key F3 changes the definition of the function keys from edit mode to search mode.

Figure 3–17 shows a pattern–type symbol table.

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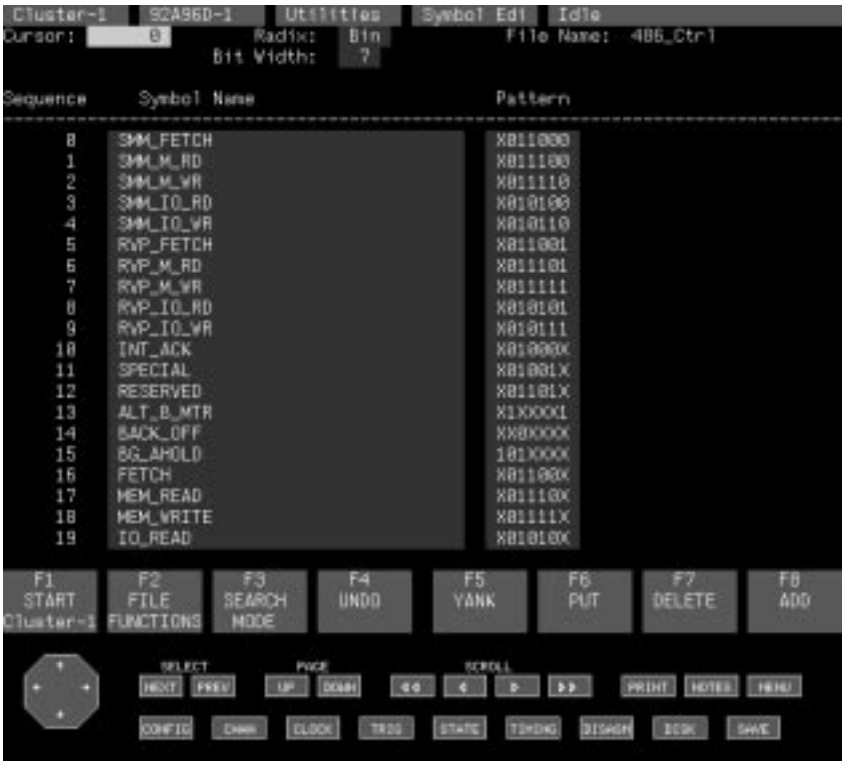


Figure 3–17: Symbol Editor Menu (Pattern Symbol Table Displayed)

The Symbol Editor menu when used with pattern symbol tables has the following fields and features:

- Cursor field. This field lets you move the cursor by specifying a new sequence line number. You can also move the cursor by using the cursor keys, scroll keys, joydisk, or by entering + <number>, – <number>, or $ (for end of list) and pressing the Return key.
- Radix field. This field specifies the entry radix for the bit pattern. This radix is saved in the symbol table. This field also determines the State or Disassembly display radix for any samples that do not match any of the defined symbols.
- File Name field. This field displays the name of this symbol table file. To open a different symbol table file, select function key F2: FILE FUNC-TIONS and refer to the File Functions overlay described on page 3–40 for more instructions.
- Bit Width field. This field defines the width of each pattern in the symbol table. The default value is the widest pattern in the table. You can increase the width, up to a maximum of 32 bits, but never make it smaller than the widest existing symbol pattern.

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- Sequence. This list identifies the sequence number (row number) of each entry in the symbol table.
- Symbol Name. This area of the menu lets you enter the symbolic name for the data pattern appearing on this line. Enter a symbol name using any alphanumeric string up to 32 characters long (trailing blanks are discarded).
- Pattern. This area of the menu lets you enter the bit pattern for each symbol. Your entry must be a valid digit for display radix or an X (don't care). Patterns that contain partial Xs (for example, 0X1 in binary radix) but are then changed to another display radix will be displayed as $.

The following function keys are available for this menu:

- F2: FILE FUNCTIONS. This key displays the File Functions overlay. Use this overlay to create new symbol tables or display existing symbol tables.
- F3: EDIT/SEARCH MODE. This key toggles the definition of function keys F5 through F8 between edit mode and search mode.
- F4: UNDO. This key restores the menu to the state before the last edit operation. The last ten changes are remembered, so selecting function key F4 three times will undo the last three changes.
- (Edit mode) F5: YANK. This key copies the symbol under the cursor into a temporary buffer. You can then move the cursor to a new location and select function key F6 to put the line back into the symbol table.
- (Edit mode) F6: PUT. This key puts the symbol in the temporary buffer in the location below the cursor.
- (Edit mode) F7: DELETE. This key deletes the symbol under the cursor and stores a copy in the temporary buffer; you can move the cursor to a new location and select function key F6: PUT to place the line in a new location.
- (Edit mode) F8: ADD. This key adds a new blank symbol below the cursor.

The following function keys apply when in the Search mode:

- F6: DEFINE SEARCH. This key displays the Search Definition overlay. You can specify search parameters by value or by symbol name. The Search Definition overlay is discussed later in this section.
- F7: SEARCH BACKWARD. This key searches the symbol table from the symbol preceding the cursor location back to the beginning of the file.
- F8: SEARCH FORWARD. This key searches the symbol table from the symbol following the cursor location to the end of the file.

Figure 3–18 shows a range-type symbol table.

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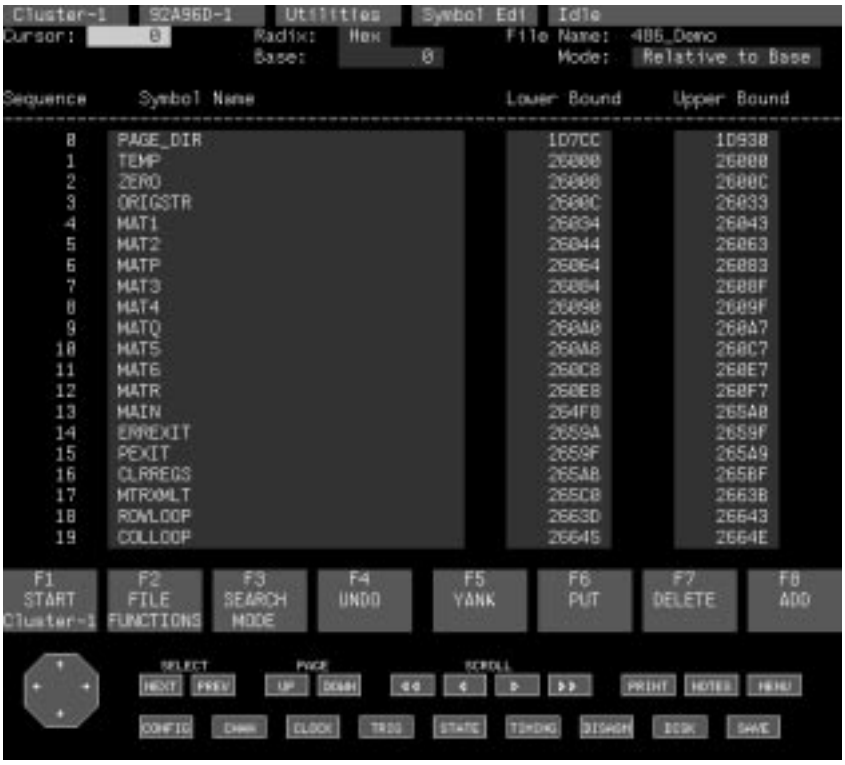


Figure 3–18: Symbol Editor Menu (Range Symbol Table Displayed)

The range symbol table menu is similar to the pattern symbol table with the addition of the following fields:

- Base field. This field specifies a base address; it lets you specify the base address that will be added to all symbolic addresses. Compilers and assemblers typically produce symbol tables with the assumption that the program will be loaded starting at location zero. If the program is actually moved to a different location (for example, 1000), then all symbols would be off by this amount.
- Mode field. This field specifies the “Relative to Base” or “Base Added In” mode. This selection controls whether the upper- and lower-bound values are displayed with the base address added in (true address location) or relative to the base (relative address). In “Relative to Base” mode, the lower- and upper-bound values are displayed as offsets from the table base (as if the base were 0).
- Lower and Upper Bounds. This area of the menu lets you enter the lower- and upper-bound values that correspond to the symbol name. The upper bound must always be greater than or equal to the lower bound.

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File Functions Overlay

You can use the File Functions overlay (see Figure 3–19) to create new symbol tables, open existing symbol tables for editing, sort symbols within a file, rename an output file, and merge two symbol tables together. Use the Delete File utility (Disk Services menu) to remove unwanted symbol tables.

To create a new symbol table, follow these instructions:

1. Select Open File in the Function field.
2. Select New File in the Edit Status field.
3. Enter a unique file name in the New File Name field.
4. Select either Pattern or Range in the Table Type field.

Range symbol tables let you assign a single symbol name to a range of data values; these symbol tables display both upper- and lower-bound data value fields for each symbol name. Pattern symbol tables display only a single data value field for each symbol name. You cannot mix range and pattern types in the same symbol table.



Figure 3–19: File Functions Overlay

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The File Function overlay has the following key fields:

- Function field. This field specifies the desired operation. The fields on the overlay change according to the operation you select.
- Edit Status field. This field lets you create a new file, edit an existing file, or read an existing file. When you select New File, a File Type field appears where you specify the file type. Select either Range or Pattern.
- File Name field. This field lets you enter the name of a new file or specify the name of an existing symbol table file.

Function key F1: ESCAPE & CANCEL closes the overlay and restores the field selections to their previous values. However, the results of any operation you performed while using the overlay will be retained by selecting the F5: EXECUTE FUNCTION key. Selecting function key F5 executes the specified file function; no changes will take place until you select or press this function key.

Search Definition Overlay

The Search Definition overlay (Figure 3–20) is used to search for a symbol by name or by value. To perform a search, enter Search mode (press F3 until the key reads F3: EDIT MODE), and then press F6: DEFINE SEARCH. The Search Definition overlay displays.

After you specify the name or value you want to search for in the Search By field, select function key F8: EXIT & SAVE to store the overlay. To begin the search, select function key F7: SEARCH BACKWARD or F8: SEARCH FORWARD.

You can use the Symbol Name field in the overlay to define the name or value to search for. If you select Symbol Name, you can specify the target name using UNIX style regular expressions. For example, a period (.) will match any character, [a–d] (in brackets) will match any character in the range a to d, and an asterisk (*) will match zero or more occurrences of the preceding character.

If you search for a symbol value in a range table, enter a specific number. The first symbol with a range containing that value will be found. For pattern tables, enter a bit pattern using digits allowed by that radix. Specifying a digit causes a search for that digit at that specific position in the pattern (this is also true for X (don’t care) values). However, a period will match any value in the bit pattern.

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Figure 3–20: Search Definition Overlay

Communications Menu

The Communications menu (Figure 3–21) allows you to specify communication port information. There are three RS-232 ports: Terminal, Auxiliary, and Host. For the Terminal port, you can specify the transmit and receive (baud) rate for communication with a console terminal. For the Auxiliary port, you can specify baud rate and flow control (control of data transmission). The end-of-line characters sent to a serial printer are specified in the print overlay associated with the data you want to send. For the Host port, you can specify the protocol to use (DAS 9200 PCL or Kermit), baud rate, mode (7 or 8 significant bits-per-character), flow control, input/output end-of-line characters, and the interrupt character.

From the Communications menu, you can call the LAN overlay to display the network parameters by selecting function key F5: LAN. You can also call the Print Screen Setup overlay to specify the print screen setup parameters by selecting function key F6: PRINT SETUP.

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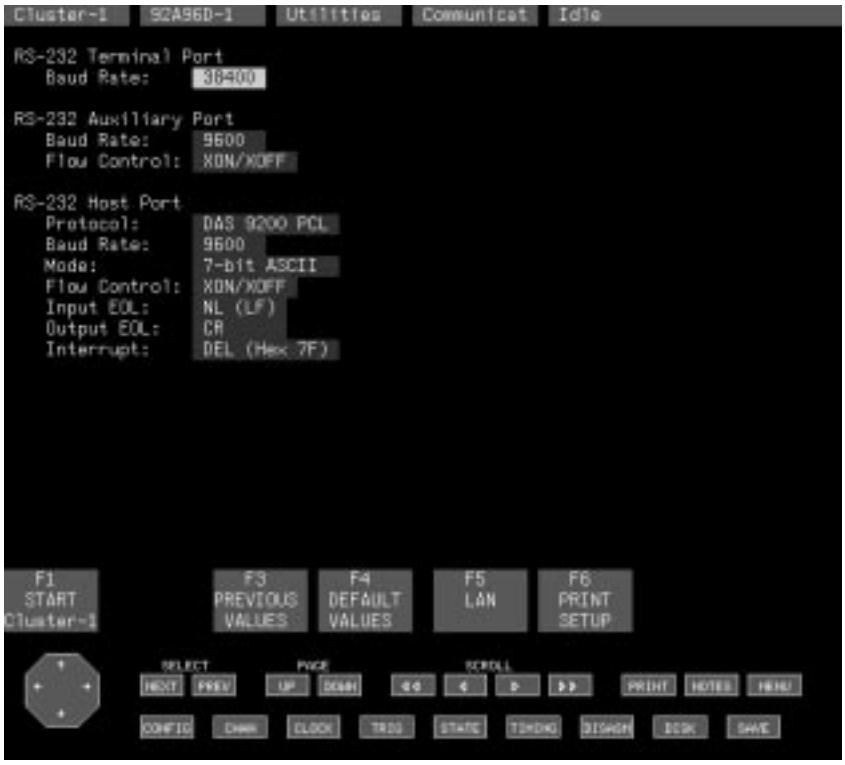


Figure 3–21: Communications Menu

The Communications menu has the following key features and fields:

- Baud Rate fields. You can set the baud rates for the Terminal port, Auxiliary port, and the Host port. The default baud rate for the Terminal port is 38400; the default baud rate for the other ports is 9600. The last selected rate is always stored in nonvolatile RAM and can also be selected by using the DIP switches on the Controller board (accessible through the rear panel).

  The Auxiliary port connects to a serial printer; the Host port connects to a host computer.

- Auxiliary Port Flow Control field. This field defines the type of flow control the Auxiliary port uses when sending data to an attached printer. For XON/XOFF selection, the printer sends XOFF (ASCII DC3) to stop the logic analyzer from sending more data and XON (ASCII DC1) to resume data transmission. For DTR/CTS, the printer sets the DTR control line to a logic low to stop the logic analyzer from sending data and sets the same line high to resume transmission. Avoid changing the settings of this field while printing data; doing so can cause unpredictable results in the output data.

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- Host Port Flow Control field. This field defines the type of flow control the logic analyzer uses when transferring data to and from a host computer; flow control applies to data sent in either direction. For XON/XOFF selection, the host sends XOFF (ASCII DC3) to stop the logic analyzer from sending more data and XON (ASCII DC1) to resume transmission. Similarly, the logic analyzer sends XOFF/ON to stop and start the host. For DTR/CTS, the host sets the DTR control line low to stop the logic analyzer from sending data and sets the same line high to resume. Similarly, the logic analyzer sets the CTS control lead low to stop the host from sending data, and to high to resume transmission.

- Protocol field. This field specifies either the DAS 9200 PCL or Kermit file transfer protocols for the Host port. For more information on the DAS 9200 PCL protocol, refer to the *DAS 9200 Programmatic Command Language User Manual*. The Kermit file transfer protocol is discussed in detail later in this section.

- Mode field. This field selects the number of significant data bits-per-character in a character frame; selections are 7-bit ASCII and 8-bit binary. For either selection, a character frame is composed of 1 start bit, 8 data bits, and 1 stop bit (2 stop bits at 110 baud). In 7-bit mode, the logic analyzer ignores the most significant bit of the data from the host; all flow control characters and an interrupt character are available. The logic analyzer cannot send or receive binary block information; hex block format must be used. In 8-bit mode, all eight data bits are significant. XON/XOFF flow control is not available and there is no interrupt character. In this mode, the logic analyzer can send and receive data using all types of transmission formats, including binary.

- Input EOL field. This field selects the character the logic analyzer recognizes as the end of a message from the host; selections are CR (carriage return) and NL (LF) (new line) (line feed). If your host sends CRLF (both characters) at the end of a message, set this field to NL (LF).

- Output EOL field. This field selects the characters the logic analyzer sends at the end of a message; selections are CR, NL (LF), and CRLF.

- Interrupt field. This field selects the character sent to the logic analyzer to cause a device clear (clear all input/output buffers). For more information, refer to the *DAS 9200 Programmatic Command Language User Manual*.

Function key F3: PREVIOUS VALUES returns all fields to the values prior to entering this menu or to the values set the last time you selected this function key. Function key F4: DEFAULT VALUES restores all fields to their default values.

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LAN Overlay

The LAN overlay contains fields for information that is assigned by your system administrator. This information is needed for your host or X terminal to communicate with the logic analyzer, and is required for initial start up. It also contains status fields that provide you with information on the status of the LAN subsystem. Figure 3–22 shows an example of a typical LAN overlay.

You can view the LAN communication parameters, but cannot change them. You must use the *Configuration Utility* (described in Appendix E) to change the networking parameters.



Figure 3–22: LAN Overlay

The LAN overlay displays the following information:

- Name field. This field specifies the name of the logic analyzer. When you establish communications with the logic analyzer from a host system, you will use the name in this field. This name serves only as a reference for connecting from the host to the logic analyzer.
- Internet Address field. The Internet address is assigned by your system administrator. The address is used by systems that use TCP/IP to communicate with the logic analyzer. The address must be entered before the LAN subsystem will function properly. The field is non-selectable; to change the address, you must use the Configuration utility described in the appendices.

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- Gateway Address field. This address is assigned by your system administrator. The LAN system can communicate with machines outside of its own local network.

  This field is where the address of the gateway machine is recorded. The logic analyzer cannot be designated as a gateway. This field does not have to be filled-in to boot the system. The address 0.0.0.0 disables the gateway function. To change the gateway address, you must use the Configuration utility.

- Subnet Mask field. The subnet mask is assigned by your system administrator. This field specifies the value of the mask used to determine the subnet address component of an Internet address.

  The subnet address specifies a local network, but is not included as part of the Internet address. Instead, the routing software derives the subnet address from the subnet mask and a bitwise AND operation on the Internet address. A subnet mask of 0.0.0.0 disables the subnet addressing function. To change the subnet mask, you must use the Configuration utility.

- Server field. This field specifies the server to view the status of the server. The tftp selection is required for communications with the Terminal. This field also selects a server to enter a password.

- LAN Boot Status. This field indicates the current status of the LAN subsystem.

- Ethernet Address. The Ethernet address is unique to the logic analyzer and is assigned at the factory.

- Server Present Status. This field displays the name and status of the sever specified in the Server field. The status messages and their meaning are:

  - listening — The server is waiting for a remote connection.

  - connected — The server is currently connected to a host system.

  - down — The server is not running. If there is a software problem with the server, or if the LAN system failed to boot, you get this message.

You can assign a unique password to each server in the LAN overlay. To assign a password, perform the following steps:

1. Select the desired server in the Server field.

2. Select function key F5: SET PASSWD.

3. Enter a password of eight characters or less, and press the Return key. You will get a message to confirm the password.

4. Press the Return key to confirm your password or the Esc key to reject the password.

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When you receive your logic analyzer, no passwords are assigned. Once set, a password cannot be viewed. If you want to use a server that has a password and do not know the password, you must enter the overlay and reassign one. To assign a null password, press the Return key in the password field; this turns off the password. Then you will not need a password to communicate with the server.

Print Screen Setup Overlay

Use the Print Screen Setup overlay to specify the setups needed to print any of the menus (screens) using the Print Screen tool. If you have a stand-alone logic analyzer, you can execute the Print Screen tool from the Workspace menu. If you have a networked logic analyzer and your remote host does not have screen-capture utilities, you can execute the Print Screen tool using the remote shell command (rsh). Refer to *Capturing and Printing Menus* on page 3–65 for instructions on capturing and printing menus.

The Print Screen Setup overlay lets you specify where to send the output and lets you define the format of the output. On the local system, you can save the output in a file in the Print_Output directory on the hard disk, or you can direct the output to a printer connected to the RS-232C Auxiliary port. The printer can be a serial printer or you can use a serial-to-parallel converter to print to a parallel printer.

***NOTE**. If you have a stand-alone logic analyzer, ignore the caution message about the /etc/host file that displays when you access the overlay.*

If your logic analyzer is connected to a network, you can send the output to a remote host file or to a network printer with a TCP/IP-compatible lpr spooler. If the /etc/host file on the logic analyzer has an entry for the remote host or remote printer, you can enter the name of the host in the Name field in the overlay. Otherwise you can enter the internet address of the host in the Internet Addr field. When printing to a network printer, you must specify either the internet address of the printer in the Internet Addr field or the host name in the Name field; you should also enter the printer name in the Printer Name field.

If your logic analyzer is part of a self-contained network (for example, a logic analyzer and X terminal with a single TCP/IP compatible printer), you need to specify the internet address of the printer in the Internet Addr field. Depending on your printer, the printer name may be required; refer to your printer documentation for details

Figure 3–23 shows an example of the Print Screen Setup overlay. The field selections depend on settings of the output destination field and the output format. For example, if you specify the output format as PostScript, you can specify the size of the output image (large, medium, or small), include the time and date with the output image, and add a description of the image. However, these fields may not be available if you select other output formats.

Table 3–2 lists the output formats available with the current system software.

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Table 3–2: Print Screen Output Formats

Output Format	Version
PostScript	Adobe-3.0
Microsoft Windows File format (BMP)	Windows 3.1 compatible
PC Paintbrush (PCX)	Version 5
X11 Window Dump (XWD)	X11 R4 compatible
HP Laserjet and Deskjet	

If you encounter problems printing to a remote file or to a remote printer, have your system administrator check the network permissions. You may also need to set up an entry in the *.rhosts* file to allow a connection from the logic analyzer. If necessary, your system administrator can set up the .rhosts file for you.

If you send the output to either a local or network printer, the printer must be capable of printing the output format as specified in the Format field.



Figure 3–23: Print Screen Setup Overlay

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When you direct the output to a network printer, additional information appears in the overlay as shown in Figure 3–24. The bottom of the overlay displays status information in the print queue. Function key F5: CLEAR QUEUE lets you abort any print jobs and clear them from the local print queue on the logic analyzer.

After you enter the changes in the overlay, save the changes by selecting function key F8: EXIT & SAVE. When you use the Print Screen tool, the output will be stored in the format and output destination you specified.



Figure 3–24: Print Screen Setup Overlay with Network Printer Selected

Kermit File Transfers

The logic analyzer can communicate with a host computer connected to the Host RS-232 port. The Communications menu Protocol field lets you specify the protocol to use: either the DAS 9200 Programmatic Command Language (PCL) or the Kermit file transfer protocol. The PCL protocol allows the host computer to control the logic analyzer with the Programmatic Command Language; however, it requires custom software on the host computer. The Kermit file transfer protocol is widely used and available on many host computers. You can use the Kermit protocol to move data between the logic analyzer and the host; you cannot, however, remotely start or control the logic analyzer using Kermit.

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When you select the Kermit protocol, all of the Host port fields in the Communications menu (except baud rate) change to predefined values required by the Kermit protocol (see Figure 3–25). These fields return to their previously values when you select the DAS 9200 PCL protocol. Before transferring files, set the Host port baud rate to match the baud rate of your host computer.

NOTE. *Data transfers to and from the logic analyzer may be unreliable at rates above 2400 baud when using the DAS 9200 PCL, or above 9600 baud when using the Kermit file transfer protocol. You must use either XON/XOFF or DTR/CTS flow control with the PCL. Flow control is inherent in the Kermit protocol; no additional flow control is necessary.*

In addition to changes in the Communications menu, a directory appears that contains a list of the files of the type selected in the File Type field. The directory listing shows the file names, file sizes (in kilobytes), and the date the files were created. The File Name field is a fill-in field; the contents change as you move the directory cursor with the joydisk or scroll keys.

NOTE. *Some versions of Kermit (for example, UNIX Kermit, but not PC Kermit) distinguish between ASCII and binary files. If your host Kermit makes this distinction, remember to enter the SET (MODE) ASCII or SET (MODE) IMAGE command on the host before starting the file transfer. If you fail to do so, the data may be transferred incorrectly.*

ASCII files include Disasm Format, Symbol Table, and some Print Output.

To begin the file transfer (send or receive), enter the necessary information and select function key F8: SEND FILE (or RECV FILE). A window appears that lets you track the status of the file transfer. The status window contains informational fields describing the file name, the data currently being transferred, the number of bytes currently transferred, and the number of retries attempted during the transfer. You can abort the file transfer at any time by pressing the Escape key. To force the last packet of data to be retransmitted, press the Return key.

Reference memories, comparison masks, and trigger libraries are sent and received as a UNIX V7 tar archive. When you select function key F8: SEND FILE, the logic analyzer displays a Building Archive message at the top of the screen.

You must wait until the status line changes to Sending File before starting the host Kermit. This may take several minutes, depending on the size of the file to send. If you do not wait, the host Kermit may time out before the logic analyzer sends the file.

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Figure 3–25: Communications Menu with Kermit File Transfer Protocol

The Operation field provides two selections: Receive From Host and Send To Host. When you select receive, the logic analyzer is set to receive data packets from the host via the system unit Host port. Selecting function key F8: RECV FILE starts the file transfer. (When you select receive, the File Name field is no longer a selectable field; the name of the file to be received from the host is predetermined.) When you select send, the logic analyzer is set to send data to the host. Select function key F8: SEND FILE to start the file transfer.

The File Type field specifies the type of file to send or receive. Two main types of files exist: binary and ASCII. A variety of file formats are supported, ranging from binary setups and refmems to ASCII printer and symbol table files.

Function key F7: DELETE FILE deletes the file indicated in the File Name field (and pointed to in the directory by the cursor) from the list of files. To confirm the delete operation, press the Return key. To abort the delete operation, press the Escape key.

The label on function key F8 changes based on whether the Operation field is set to receive or send files. When set to send files, selecting function key F8: SEND FILE causes the logic analyzer to transfer the specified file to the host. When set to receive files, selecting function key F8: RECV FILE prepares the logic analyzer to receive a file from the host.

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Diagnostics Menu

The Diagnostics menu (Figure 3–26) lists the major system components including media drives. Associated with each of the system components is a diagnostic report that indicates the operational status of that component at power on. This menu also provides a summary and brief description of the modules installed, the software version currently installed, the date and time, and some general user information. The menu has two overlays: the Set Date/Time overlay, to set the system date and time, and the Boot Option overlay where you can specify the boot options for power on.

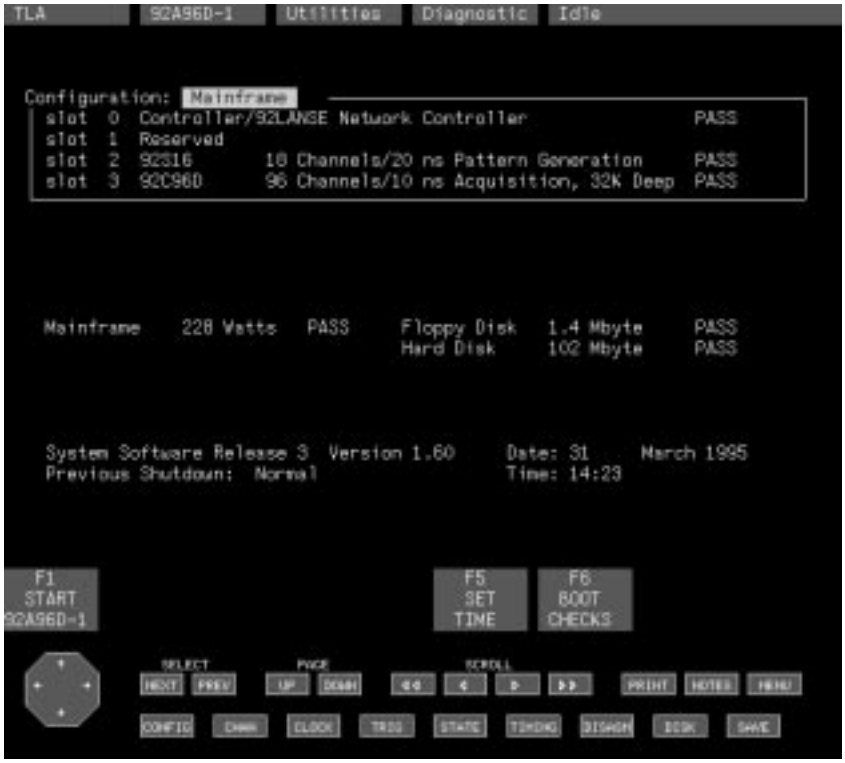


Figure 3–26: Diagnostics Menu

The Diagnostics menu has the following features:

- A report of the results of diagnostic testing with a PASS or FAIL message; FAIL messages also provide a four-digit error code for use by the service technician.
- A summary of the modules installed in each slot. Slots 0 and 1 contain the Controller board and the 92LANSE Network Controller; slots 2 and 3 hold the acquisition module(s) and optional pattern generation module.

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- The version number of the system software currently loaded from the mainframe hard disk.
- A summary of the conditions surrounding the last power off. These and other error messages are described in *Appendix C: Error Messages*.
- The current date and the time (in military format); you can change the values in the Set Date/Time overlay accessed by function key F5: SET DATE/TIME (refer to Figure 3–27).

Set Date/Time Overlay

The Set Date/Time overlay (see Figure 3–27) called by function key F5: SET TIME allows you to set the current date and time of day (in military format) of the 24-hour clock. The clock/calendar feature is backed up by battery power. Once set, the logic analyzer automatically tracks the current time and day. You need to reset the clock/calendar feature only when passing from one time zone to another or when changing to/from Daylight Savings Time.



Figure 3–27: Set Date/Time Overlay

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The Set Date/Time overlay has the following features:

- The Date field which allows you to set the current date (day, month, and year). Selections include all valid calendar values.
- The Time field which allows you to set the current time (the hour followed by the minute value). All time values are expressed in the military format (for example, 1:00 PM becomes 1300 hours).

Boot Option Overlay

The Boot Option overlay, called by function key F6: BOOT CHECKS lets you control how often the logic analyzer will perform the diagnostics and file system check procedures. By default, diagnostics and the file system checks are performed every time you power on the logic analyzer. You can use the selections in the overlay to define how often to run the diagnostics and file system checks. These features allow you to effectively bypass the diagnostics and file system checks to reduce the time for the logic analyzer to complete the power on process.

Figure 3–28 shows an example of the Boot Option overlay.



Figure 3–28: Boot Option Overlay

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The overlay has two main fields: the Diagnostics field and the File System Check field. The default selection for both fields is Execute Each Power Up. Both fields also have an Execute Custom selection where you can specify how often the logic analyzer will run the diagnostics and file system checks.

When you select Execute Custom you can specify the number of days (up to 14) to skip before executing the diagnostics or file system check. You can also specify the number of power up cycles that the logic analyzer can bypass (up to five) before executing the diagnostics or file system check. The logic analyzer will execute the diagnostics and file system check depending on which criteria is fulfilled first, that is, the number of days or the number of power up cycles. The File System Check field has a third selection that allows the logic analyzer to execute the file system check only after an abnormal system shut down.

Information under the BOOT ACTIVITY summarizes the most recent diagnostics and file system check activity. It indicates the last time that diagnostics were checked and the last time that the file system was checked.

Changes to the overlay take effect at the next power-on cycle.

Use function key F4: DEFAULT CHECKS to return the Diagnostics field and the File System Check field to the default settings (Execute Each Power Up).

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Version Menu

The Version menu (Figure 3–29) displays the version numbers of all installed circuit boards, system software, and application software. If there are more entries than can be displayed, you can scroll through the remaining entries.



Figure 3–29: Version Menu

The version number of each card and application software is listed on the right side of the menu. The digit to the left of the period specifies the major version number of the hardware; the digit to the right specifies the minor version number. The logic analyzer uses the major version number to determine hardware and software compatibility; the minor version signifies hardware changes that do not affect hardware and software compatibility. If you have installed a hardware module but not its corresponding software support, you will see an error message in this Version column. This is not a select field; it is for information purposes only.

The System Software field indicates the version number of the system software. The Optional System Software field lists the optional system software support currently available on the hard disk.

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Function key F5: VERIFY SOFTWARE verifies all installed software. The Verify Software function ensures that all installed software files are not corrupted or missing.

Multimodule General Use

Multimodule operation involves two modules in conjunction with one another (for example two acquisition modules or an acquisition module and a pattern generation module). Use multimodule operation to do the following tasks:

- Time-correlate data between two or more modules on the display screen
- Trigger one acquisition module when an event occurs on another module or cross-trigger two modules
- Perform stimulus/response testing with a pattern generator module and acquisition module starting and stopping as a unit
- Repeatedly compare the data acquired by an acquisition module to the data in a reference memory until the data is equal or unequal
- Change the pattern generator output pattern when an event occurs on another module
- Output a trigger signal to external test equipment such as an oscilloscope

You can use the System Configuration and Cluster Setup menus to define module formations, to cluster (to group) modules, and to define interactions between modules within a cluster.

The following pages provide procedures on how to set up the multimodule operations listed above. These are general descriptions only; no specific acquisition module or pattern generator information is given. Refer to your module user manual for specific details such as channel grouping and clocking selections.

Trigger One Module from Another or Cross Trigger Two Acquisition Modules

To trigger one module when an event occurs on another module or to cross-trigger two acquisition modules, follow these steps:

1. Form a cluster of two modules appropriate to your application in the Cluster Definition overlay of the System Configuration menu.
2. Define a signal in the Signal Definition overlay of the Cluster Setup menu. The signal should be an output signal from one module (92C96-1) and an input signal to the other module (92C96-2).

   To cross trigger two modules, you need to define two signals. Define one signal as an output from 92C96-1 and as an input to 92C96-2. Define a second signal as an output from 92C96-2 and as an input to 92C96-1.

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3. Set up the trigger event in the Trigger menu for 92C96-1 such as a word event, counter value, or any other event appropriate for your application.

4. Set up the actions in the Trigger menu for 92C96-1 to assert or pulse the signal defined in step 2, or to trigger 92C96-1 and assert or pulse the signal defined in step 2.

5. In the Event field of the Trigger menu for 92C96-2, select If Signal (user defined signal name) is Asserted.

6. Set up the action in the Trigger menu for 92C96-2 to Trigger. The 92C96-2 will trigger when the signal from 92C96-1 is pulsed or asserted.

7. To cross trigger two modules, repeat steps 3 through 6 and set up the Trigger menu for both modules as follows:

   State One

   If <Event> = <Module Trigger event here>
   or Signal <signal from other module> is Asserted
   then Trigger
   and Assert Signal <signal to other module>

Stimulus and Response Testing

To perform stimulus/response testing with a pattern generator module and acquisition module starting and stopping as a unit, follow these steps:

1. Form a cluster containing a pattern generator and acquisition module in the Cluster Definition overlay of the System Configuration menu.

2. Choose either Normal or ATE Start mode in the Cluster Setup menu. ATE starts the acquisition module before the pattern generator module to ensure that the acquisition can capture the first output data from the pattern generator.

3. Program the acquisition and pattern generator modules according to your application.

   If the pattern generator will either directly or indirectly supply the clock to the acquisition module, be sure to program the pattern generator (Run Control, algorithmic steps, and output vector depth) to provide a sufficient number of clocks to fill the remainder of the acquisition memory after the acquisition trigger event has occurred.

When the acquisition module has triggered and filled its memory, both the acquisition and pattern generator modules will stop. To automatically display the acquired data when the cluster stops, start the cluster from a Setup or Display menu of the acquisition module.

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Autorun Comparisons Between a Refmem and Acquired Data

To repeatedly acquire and compare data acquired by an acquisition module to the data in a reference memory until the data is equal or not equal, follow these steps:

1. Form a cluster containing the acquisition module in the Cluster Definition overlay of the System Configuration menu. Or, form a cluster containing an acquisition module and a pattern generator if you are going to use the pattern generator to stimulate the system under test.
2. Set up the menu of the acquisition module to capture data to which subsequent data will be compared. The initial acquisition will be saved as a reference memory. The reference memory is used when the logic analyzer is operating in the Autorun mode to compare newly acquired data against.
3. Set up the Clock menu (External is usually used) and the Trigger menu to ensure that data is acquired consistently on each cycle.
4. Acquire data for the refmem. Save the data as a refmem in the Save/Restore menu.
5. Select Autorun in the Cluster Setup menu.
6. Select the appropriate acquisition module and reference memory (saved in step 4) in the Autorun Definition overlay. Make other selections appropriate for your application and exit the overlay. Refer to the *Autorun Definition Overlay* for a list of selections.

NOTE. *The System Monitor menu shows the status and Autorun count of all modules and clusters. The status line in any menu shows how often the selected Autorun cluster has started.*

---

7. Start the cluster. When the Autorun stop conditions are met, data is displayed for analysis.

   You may want to use the Memory Differences field in the format definition overlay of the various Display menus to help you analyze acquired data. Another helpful way to view data is to use the split-screen display with reference memory data displayed in one half of the screen and acquired data in the other half.

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Change the Pattern of the 92S16 Pattern Generator

If you have a 92S16 Pattern Generator Module, you can change the output pattern when an event occurs on the acquisition module, by following these steps:

1. Form a cluster containing a 92S16 pattern generator and the acquisition module in the Cluster Definition overlay of the System Configuration menu.
2. Define a signal in the Signal Definition overlay of the Cluster Setup menu. The signal should be an output signal from the acquisition module and an input signal to the pattern generator module.
3. Set up the event in the Trigger menu for the acquisition module to identify a word event, counter value, or any other event appropriate for your application. This event will cause the pattern generator to change its output.
4. Set up the action in the Trigger menu for the acquisition module to assert or pulse the signal defined in step 2.
5. Enter the External Control overlay of the Configuration menu for the pattern generator. Set the IRQ Jump or Ext Jump to be enabled when the signal defined in step 2 occurs.
6. Program the algorithmic actions of the pattern generator Program menu using the If IRQ Jump or If Ext Jump commands to cause the pattern to change at an appropriate point in the output data.

Send an Output Trigger Signal to External Test Equipment

You can set up the logic analyzer to send or receive a TTL level signal to or from external equipment such as an oscilloscope. You can use the Sync Out signal from the SMB connector on the back edge of the acquisition module. You can access these connectors through the slots in the rear panel of the logic analyzer. For a description of how to use the Sync Out signal, refer to your module user manual.

Printer and Hardcopy General Use

The logic analyzer provides different ways of capturing menus and printing data to meet most printing needs. You can send the print data to a printer or save the data in a file for use with a text editor or in a host application. Depending on whether the logic analyzer is connected to a hosted network or is used in a self-contained configuration, you can send the print data to one or more of the following destinations:

- A local file stored in the Print_Output directory of the logic analyzer
- A local printer connected to the RS-232C Auxiliary port of the logic analyzer
- A remote network file

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- A network printer (hosted or self-contained)

The logic analyzer provides two main tools for printing. You can use the Print Screen tool to print an image of any one of the logic analyzer menus (screens). You can use the Print Setup overlays (available with most Setup and Display menus) to print the setup data, state data, disassembly data, and timing data according to the parameters specified in the individual Print Setup overlays.

For most printing you should use the Print Screen tool to capture and print data. Use the Print Screen Setup overlay (in the Communications menu) to specify the print screen setups (refer to *Print Screen Setup Overlay* on page 3–47). Then refer to *Capturing and Printing Menus* beginning on page 3–65 for instructions on using the Print Screen tool for capturing and printing menus.

You can use the Setup Print overlays to print the Setup menu data and data acquired by the logic analyzer in the State, Timing, or Disassembly menus. Unlike using the Print Screen tool, the print data does not include all information displayed on the menu (such as function key legends). You specify the amount and type of data to print in the individual Setup Print overlays.

Select the PRINT button in the Setup or Display menus to display the Setup Print overlay. The individual overlays are described in more detail in the *92A96 & 92C96 User Manual* and to the *92S16/32 User Manual*.

Hard Copy of a Setup, State, or Disassembly Menu

You can print the data from a Setup menu or print acquired data or reference memory data from the State menu or the Disassembly menu. The printed data is generated using ASCII characters and looks similar to the data on the screen.

To print a hardcopy of a Setup menu, or of State or Disassembly data to a serial printer, perform the following steps:

1. If you have not already done so, connect an appropriate RS-232 cable between the serial port on the printer and the Auxiliary port on the rear panel of the logic analyzer.

   Be sure to select a cable compatible with the configuration of the serial interface port on your printer. Refer to your printer manual for information on the characteristics of its serial interface.

2. Set the parameters of the serial communications port on the printer and the logic analyzer. These parameters must match. Refer to your printer manual for information on how to set the parameters for its serial interface. The parameters for the logic analyzer are set from the Communications menu described on page 3–42. You can also set the baud rate using the DIP switches on the Controller board near the rear panel of the logic analyzer.

3. Display the menu or data you want to print on your terminal. With the mouse, point at the Print button at the bottom of the menu; click on the left mouse button to call the appropriate print overlay.

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4. Select RS-232 Auxiliary Port in the Send Output To field.
5. Define the remaining print parameters in the overlay.
6. Select the appropriate function key legend to begin printing data.

   Refer to your module user manual for information on accessing and using the State Print or Setup Print overlays. Refer to your microprocessor support user manual for information on accessing and using the Disassembly Print overlay.

To print data to a local file on the logic analyzer, perform the following steps:

1. Display the menu or data you want to print on your terminal. With the mouse, point at the PRINT button at the bottom of the menu; click on the left mouse button to call the appropriate print overlay.
2. Select File in the Send Output To field and specify a file name in the File Name field (the default file name is output).
3. Define the remaining print parameters in the overlay.
4. Select the appropriate function key legend to print the data to a file.

To print data to a network printer, perform the following steps:

1. If the network printer is connected directly to the logic analyzer and is not part of a hosted network, ensure that the printer has a TCP/IP compatible lpr spooler.
2. Display the menu or data you want to print on your terminal. With the mouse, point at the PRINT button at the bottom of the menu; click on the left mouse button to call the appropriate print overlay.
3. Select Network Printer in the Send Output To field.
4. Define the remaining print parameters in the overlay.
5. Enter the internet address of the network printer in the Internet Addrs field.
6. If the printer is part of a hosted network, you may also need to enter the user name in the User field and the name of the printer in the Printer Name field.
7. Select the appropriate function key legend to print the data to the printer.

To print data to a remote file (assuming the logic analyzer: is properly connected to a hosted network), perform the following steps:

1. Display the menu or data you want to print on your terminal. With the mouse, point at the PRINT button at the bottom of the menu; click on the left mouse button to call the appropriate print overlay.
2. Select Network File (rcp) in the Send Output To field and specify a file name in the File Name field.

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3. Define the remaining print parameters in the overlay.
4. Enter either the internet address of the host in the Internet Addrs field or the name of the host in the Name field.
5. Enter the user name in the User field and the path in the Host Path field.
6. Select the appropriate function key legend to print the data to a network file.

Hardcopy of a Timing Menu

You can also print acquired data or reference memory data in the Timing menu. The traces are printed down the long axis of the paper, running from the top of the paper to the bottom.

To print Timing data to an RS-232 serial printer, perform these steps:

1. Select a printer with a serial interface that is compatible with one of the supported graphics character formats. For information on the supported graphics character formats, refer to the description of the Timing Print overlay in your module user manual.
2. Connect an appropriate RS-232 cable between the serial port on the printer and the Auxiliary port on the logic analyzer.

   Be sure to select a cable compatible with the configuration of the serial interface port on your printer. Refer to your printer manual for information on the characteristics of its serial interface.
3. Set the parameters of the serial communications port on the printer and the logic analyzer. These parameters must match. Refer to your printer manual for information on how to set the parameters for its serial interface. The parameters for the logic analyzer are set from the Communications menu described on page 3–42. You can also set the baud rate using the DIP switches on the Controller board near the rear panel of the logic analyzer.
4. Display the Timing menu or data you want to print on your terminal. With the mouse, point at the Print button at the bottom of the menu; click on the left mouse button to call the print overlay.

   Refer to your module user manual for information on accessing and using the Timing Print overlay.

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PostScript Applications

You can use the print overlays described in the individual module user manuals to print Setup menu data, acquired data, reference memory data, or timing data with PostScript printers, or to save the data as a PostScript file. If you want to use the printed data as an Encapsulated PostScript (EPS) file with a word processor on a host computer or workstation, you must perform a few additional steps. The EPS files consist of a single page of output; while most files can consist of multiple pages of output.

When saving a Print_Output EPS file to include in an application such as a word processor, be aware that the EPS file does not contain a preview image. Applications requiring a preview image are not compatible with the EPS output from the logic analyzer.

To use a PostScript formatted file with a word processor on a host computer or workstation perform the following steps:

1. Save the data to a file as described in the individual module user manuals under the discussions of the print overlays.
2. Transfer the file to the host computer or workstation using one of the file transfer utilities.
3. Edit the file as an ASCII file.
4. Verify that the file contains only a single page of output data.

   Look for a line towards the end of the file containing the following information:

   ```
   %%Pages: 1
   ```

   If there is any other value than 1, the file cannot be a valid EPS file. You will need to readjust the print parameters for only one page of output data on the logic analyzer in the print overlay.
5. Change the first line in the file to the following:

   ```
   %!PS-Adobe-3. 0 EPSF-3. 0
   ```

   Note that the % character must be the first character in the file.
6. Save the file and rename it (if necessary, for your application; some files require EPS files to have specific extensions).

By following the above procedure, you can treat the output file like any other EPS files.

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HP Laserjet Printing

You can use the Setup Print overlays to print data to HP Laserjet printers. The following steps describe how to print data to an HP Laserjet printer.

1. Display the menu or data you want to print on your terminal. With the mouse, point at the PRINT button at the bottom of the menu; click on the left mouse button to call the appropriate print overlay.
2. Set the Lines per Page field to 59.
3. Enter the remaining printer parameters.
4. Select the appropriate function key legend to print the data.

Printing begins with a blank page. Data is printed on the remaining pages.

Capturing and Printing Menus

This section provides information on capturing menus using the Print Screen tool of the pull-down Workspace menu or from the command line interface with the settings specified in the Print Screen Setup overlay to the Communications menu (refer to *Print Screen Setup Overlay* beginning on page 3–47).

Capturing Menus from a Stand-alone Logic Analyzer

To capture a menu from a stand-alone logic analyzer, perform the following steps:

1. Use the Print Screen Setup overlay to specify the output destination of the image and the format of the image (if necessary, refer to *Print Screen Setup Overlay* beginning on page 3–47).

   If you intend to save the image to a local file, specify a local file name.

   If you intend to send the image to a local printer, verify that the printer is correctly connected to the Auxiliary Port and is ready to receive data.

   If you intend to save the image to a remote network file, specify the file name, internet address or the name of the remote host, user name, and the remote path name (if any).

   If you intend to send the image to a remote printer, specify the internet address of the printer, user name, and the printer name.
2. Save the changes to the overlay by selecting function key F8: EXIT & SAVE.
3. Display the menu that you want to capture.
4. Start the Print Screen tool by selecting Print Screen → Start Screen Capture from the pull-down Workspace menu.
5. Point the mouse anywhere within the menu you want to capture.

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6. Wait until the cursor changes to a cross-hatch cursor (+).
7. To capture the entire menu, press and release any of the mouse buttons being careful not to move the mouse. The terminal bell sounds once as the capture process starts and twice when the process is done.
8. To capture a portion of the menu, hold the mouse button down while dragging the cursor diagonally across the area you want to capture and then release the mouse. The terminal bell sounds once as the capture process starts and twice when the process is done.

The image will be sent to the output destination specified in the Print Screen Setup overlay.

To abort a print job before the data is sent to the print spooler, use the Workspace menu to select Print Screen → Abort Screen Capture.

Capturing Menus from a Networked Logic Analyzer

To start a screen capture of a menu from a networked logic analyzer perform steps 1 though 8 of the previous procedure except in place of step 4 execute the following command in one of the shell windows:

```
rsh <logic analyzer name> doprint -X <host display>:0
```

where <logic analyzer name> is the name of the logic analyzer and <host display> is the name of the remote display. For example if your logic analyzer is named TLA1 and your remote display (workstation) is named huey, you would execute the following command:

```
rsh TLA1 doprint -X huey:0
```

Aborting Screen Captures on a Networked Logic Analyzer

To abort a screen capture before the data is sent to the print spooler you can send the following command from a networked logic analyzer:

```
rsh <logic analyzer name> doprint -k
```

where <logic analyzer name> is the name of the logic analyzer.

Deleting Print Jobs

You can delete a print job using the Workspace menu selections as shown in Figure 3–30. To delete all print jobs sent to the local RS-232C Auxiliary port, select Print Screen → Delete Print Jobs → Local Aux Port Jobs. Use the other selections to delete screen print or menu print jobs sent to a remote network printer.

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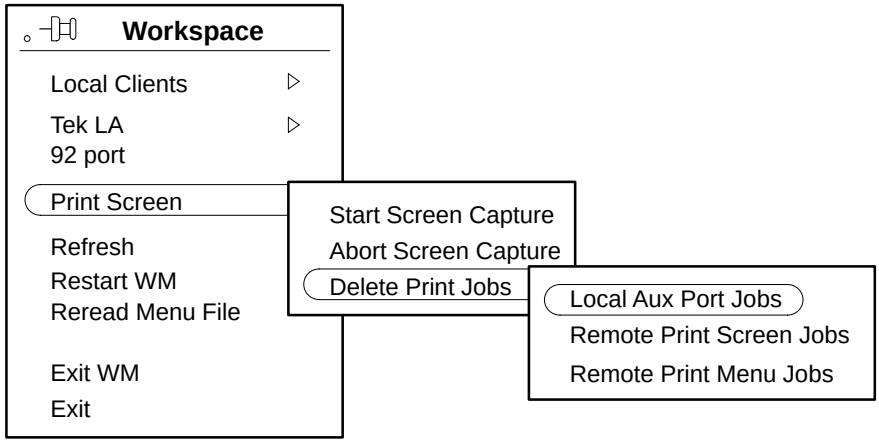


Figure 3–30: Print Screen Tool of the Workspace Menu

You can also delete print jobs from a networked workstation using the rsh lprm command. For example, to delete a print job from the local RS-232C Auxiliary port send the following command (substituting the name of your system for <logic analyzer name>):

```
rsh <logic analyzer name> lprm -
```

To delete remote print screen jobs, use the following command (substituting the name of your system for <logic analyzer name>):

```
rsh <logic analyzer name> lprm -Plp_wd -
```

To delete remote print menu jobs, use the following command (substituting the name of your system for <logic analyzer name>):

```
rsh <logic analyzer name> lprm -Plp_menu -
```


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Appendix A: Specifications

This appendix describes the electrical, mechanical, and environmental characteristics of the TLA 510 and 520 system unit excluding the acquisition or pattern generation modules. For information on the specifications for the acquisition or pattern generation modules, refer to the module user manuals.

Table A–1: TLA 510 and 520 Environmental and Safety

Characteristic	Supplemental Information
Atmospherics	
Temperature	As per Tektronix Standard 062-2847-00
Operating	+10° C to +40° C (+50° F to +104° F)
	±20° C/hr (±36° F/hr) maximum gradient
Nonoperating	–40° C to +60° C (–40° F to +140° F)
	±30° C/hr (±54° F/hr) maximum gradient
Relative Humidity	As per Tektronix Standard 062-2847-00 (noncondensing). Some discoloration of internal mechanical parts may occur.
Operating	20% – 80%, 30° C (86° F) maximum wet bulb
Nonoperating	10% – 90%, 40° C (104° F) maximum wet bulb
Altitude	As per Tektronix Standard 062-2847-00
Operating	3 Km (10,000 ft) maximum, limited by hard disk drive
Nonoperating	12 Km (40,000 ft) maximum, limited by hard disk drive
Dynamics	
Vibration	As per Tektronix Standard 062-2858-00, Rev. B, Class 6
Operating	Limited by hard and floppy disk drives
Random Vibration	0.24 G RMS, 5 – 500 Hz
5 – 350 Hz	0.000125 G^2/Hz APSD
350 – 500 Hz	–3 dB/octave slope
500 Hz	0.0000876 G^2/Hz APSD
Nonoperating	Limited by hard and floppy disk drives
Random Vibration	1.43 G_{RMS}, 10 – 300 Hz
	Limited by power supply
10 – 50 Hz	0.029 G^2/Hz APSD
50 – 300 Hz	–8 dB/octave slope

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Table A–1: TLA 510 and 520 Environmental and Safety (Cont.)

Characteristic	Supplemental Information
Shock	As per Tektronix Standard 062-2858-00, Rev. B
Operating	10 G, 11 ms, 1/2 sine; limited by hard disk drive[1]
Nonoperating	20 G, 11 ms, 1/2 sine; limited by power supply
Bench Handling	As per Tektronix Standard 062-2858-00, Rev. B
Operating/Nonoperating	2 inches on bottom, along all four edges, limited by hard disk and floppy disk drive
Packaged Product	As per Tektronix Standard 062-2858-00, Rev. B
Manual Handling	Assurance Level 1
Warehouse Stacking	Assurance Level 2
Safety	The system unit complies with the requirements of UL 3111-1, IEC 1010, EN61010-1, and CSA C22.2 No. 1010.1-92. The terminal is listed by a nationally recognized testing laboratory (NRTL) and is CSA certified.
Safety Certification Compliance	Safety Class 1
	Installation Category II
	Pollution Degree 2
Installation Requirements (System Unit)	
Power Consumption	700 Watts maximum (@ 75% efficiency)
Heat Dissipation	2400 BTU/Hour maximum
Surge Current	40 A maximum at 127 VAC, 0.5 cycle
	75 A maximum at 250 VAC, 0.5 cycle
Cooling Clearance	8 Inches on all sides
Fan Noise	50 dB (A) maximum

1 **During floppy disk drive read and write operations, shock is limited to 5 G, 11 ms, 1/2 sine.**

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Table A–2: TLA 510 and 520 (System Unit) Mechanical

Characteristic	Description
Weight	38 lbs (17 Kg) with no instrument modules 44 lbs (20 Kg) fully loaded
Physical Dimensions	
Height	6.25 in (15.87 cm)
Width	19.13 in (48.58 cm)
Depth	23.50 in (59.69 cm)
Finish	
Top	Smoke Tan
Base	Slate Gray

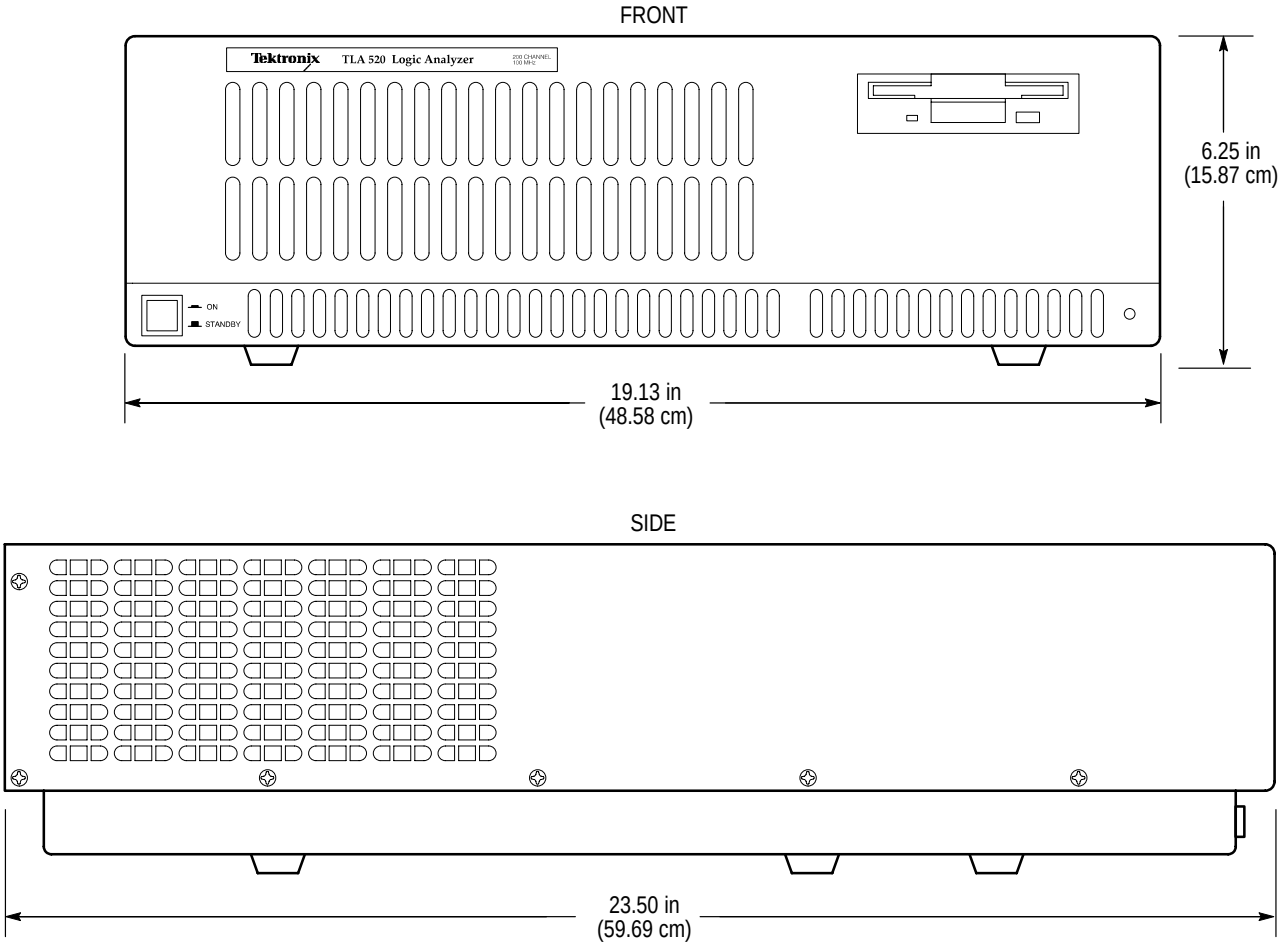


Figure A–1: System Unit Dimensions

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Table A–3: Terminal Physical Dimensions

Terminal	Weight	Height	Width	Depth
9203/05XT				
Logic Unit	9 lbs (4.05 kg)	2.5 in (6.4 cm)	14.3 in (36.3 cm)	13.5 in (34.3 cm)
Monitor	42.2 lbs (19.2 kg)	16.3 in (41.5 cm)	16.3 in (41.5 cm)	17.4 in (44.2 cm)
9206XT				
Logic Unit	4 lbs (1.8 kg)	2.17 in (5.53 cm)	11.0 in (27.9 cm)	12.25 in (31.12 cm)
15-inch Monitor	28.6 lbs (13.0 kg)	15.0 in (38.0 cm)	14.6 in (37.2 cm)	16.2 in (41.2 cm)
17-inch Monitor	38.9 lb (17.7 kg)	16.6 in (42.2 cm)	16.1 in (41.0 cm)	17.2 in (43.8 cm)

Table A–4: Terminal Keyboard Physical Dimensions

Characteristic	Specification
Weight	2.6 lbs (1.1 kg)
Height	Flat 1.7 in (4.3 cm); to Key 1.0 in (2.54 cm); Tilted 2.4 in (6.07 cm)
Width	18.5 in (46.9 cm)
Length	7.3 in (18.5 cm)

Table A–5: TLA 510 and 520 Electrical

Characteristic	Performance Requirement	Supplemental Information
Serial Communication Interface		
Operational Modes		Full Duplex, Half Duplex, Data Only
Baud Rates		
Terminal Port		38400 (default), 19200, 9600, 4800, 2400, 1200, 600, 300, 110 (± 0.05%)
Host Port		38400, 19200, 9600 (default), 4800, 2400, 1200, 600, 300, 110 (± 0.05%)
Auxiliary Port		38400, 19200, 9600 (default), 4800, 2400, 1200, 600, 300, 110 (± 0.05%)
Ethernet LAN Interface		
Supports TCP/IP with IEEE 802.3 10Base5 and 10Base2 (Supports largest Ethernet packets of 1500 data bytes.)	Transfer a file from a host to the TLA 510 and 520 Logic Analyzer and back using FTP with either 10Base5 or 10Base2	For 10Base2 specification, capacitive loading is 5 pF, (plus 9-inch coaxial cable, equivalent capacitive loading is 12 pF).
Supports Internet Control Message Protocol (ICMP)		Type 0: echo reply message Type 8: echo message

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Table A–5: TLA 510 and 520 Electrical (Cont.)

Characteristic	Performance Requirement	Supplemental Information
Supports Address Resolution Protocol (ARP)		
Supports File Transfer Protocol (FTP)		Server only
Supports Trivial File Transfer Protocol (TFTP)		Server only
System Unit Power		
Primary Power Input		The system unit, with appropriate power cord, can operate over either voltage range, requires a fuse change (external access).
With Standard Power Cord 115 VAC, single phase	90 VAC – 127 VAC, < 8 A	8 Amp. Slow-blow fuse (3AG)
With Option A1 – A5 230 VAC,single phase	180 VAC – 250 VAC, < 4 A	5 Amp. Slow-blow fuse (5 x 20 mm)
Primary Line Frequency		47 Hz – 63 Hz Operation over 63 Hz may exceed protective ground conductor leakage current limit of 3.5 mA.
Primary Ground Resistance		Routine test to check ground continuity between chassis and protective earth ground. Power plug ground to chassis resistance is $< 0.1\ \Omega$.
Primary Circuit Dielectric Withstand Voltage		1500 V rms, 50 Hz – 60 Hz for 10 seconds without breakdown.
Ride Through (cycle drop out)		Under full load and low line voltage, all DC voltages remain in regulation when AC power is removed for 20 ms or less. Otherwise, the system shuts down.
Switching Frequency		140 KHz, typical
Over Temperature Shutdown		75 °C, ±5 °C

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Table A–6: Standard Electrical Interfaces

Characteristic	Description
RS-232 Interface	The interface is defined as a Data Communications Equipment (DCE) pinpoint.
Operational Modes	Full Duplex, Half Duplex, Flagging
Data Type	Asynchronous
Control Lines	DCD, CTS, DSR
Bits per Character	7-bit ASCII, 8-bit Binary
Parity	None, Odd, Even
Stop Bits	1
Protocols	Kermit, Xmodem (DAS 9200 PCL)
Flow Control	XON/XOFF, DTR/CTS (receive & transmit)
Baud Rates	
Terminal	38400 (default), 19200, 9600, 4800, 2400, 1200, 600, 300, 110
Host	38400, 19200, 9600 (default), 4800, 2400, 1200, 600, 300, 110
Auxiliary	38400, 19200, 9600 (default), 4800, 2400, 1200, 600, 300, 110
Ethernet LAN Interface	The interface conforms to the ANSI/IEEE 802.3, 3rd Edition, 1992; also known as ISO/IEC 8802-3, 1992 except that “Control Out” functionality is not supported. Refer to the standard for details about this interface.

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Table A–7: Discrete I/O Signals

Characteristic	Description
Output Signals SO–1:8	Outputs can be momentary or latching (Signal pins 2 – 9 with respective ground pins 21 – 28).
Drive (typical)	Driven from standard 74ALS996 with 10 Ω series resistors and protection diodes
Negative-going pulse width (typical)	2 ms, or greater, under momentary operation
Recommended maximum load	1 standard STTL load with up to 250 pF capacitance for edge integrity
Read Strobe (pin 10) Write Strobe (pin 1)	With respective ground pin 29 With respective ground pin 20
Drive (typical)	Driven from standard 74F14
Negative-going pulse width (typical)	With active positive edge
Read Strobe	225 ns
Write Strobe	150 ns
Recommended maximum load	1 standard STTL load with up to 60 pF capacitance for edge integrity
+5 V (pin 19)	Fused at 0.75 A
Ground (pins 20 – 37)	Fused at 1.5 A
Input Signals SI–1:8	Inputs are level only (Signal pins 11 – 18 with respective ground pins 30 – 37).
Load (typical)	1 standard FTTL load with 4.7 KΩ pull-up resistor and approximately 60 pF capacitive load, also includes 10 Ω series resistors and protection diodes.

Table A–8: Recorded Data Interface

Characteristic	Supplemental Information
Floppy Disk Format	Standard floppy disk drive is 3.5-inch, high density, 135 TPI-1.44 Mbyte (low-level PC format compatible), type 2HD
Low-Level PC Disk Format	Low-Level format for personal computers is supported, but the DOS operating system file structure is not supported. Use the DASdisk utility to read or write user files on a PC.
SunOS Operation	Sun workstations, running SunOS, can directly read and write user files using the tar command. A special utility program is not needed.
Bad Sector Mapping	Bad sector mapping is not supported. Floppy disks are unusable if an error (bad sector) is found.

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Appendix B: Accessories

Table B–1 lists the standard accessories available for the TLA 510 Logic Analyzer.

Table B–1: TLA 510 Standard Accessories

Accessory	Quantity	Part Number
TLA 510 & 520 Logic Analyzer User Manual	1	070-8977-XX
System Software Release Notes	1	
Backup System Software	1	
Power Cord, 115V/12A, 8 ft	1	161-0066-XX
92A96 & 92C96 Module User Manual	1	070-9185-XX
Ground Strap, 6 ft	1	196-3353-XX
Probe Cable, 5 ft	4	174-2117-XX
8-Channel Data Probe, 12 in	6	012-1424-XX
Lead Set, 3.0 L	12	196-3347-XX
KlipChips	72	206-0364-XX
Probe Set, 100 Podlets	1	010-0492-XX
Coaxial Terminator	2	011-0168-XX
Coaxial Cable T-Connector	2	103-0030-XX
Coaxial Cable, 10 ft (Terminal to System Unit)	1	012-0205-XX
9-pin RS-232 Cable, 10 ft (Terminal to System Unit)	1	012-1445-XX
Passive Probe, used as Sync Out cable, SMB-to BNC	1	P6041

Table B–2 lists the standard accessories available for the TLA 520 Logic Analyzer.

Table B–2: TLA 520 Standard Accessories

Accessory	Quantity	Part Number
TLA 510 & 520 Logic Analyzer User Manual	1	070-8977-XX
System Software Release Notes	1	
Backup System Software	1	
Power Cord, 115V/12A, 8 ft	1	161-0066-XX
92A96 & 92C96 Module User Manual	1	070-9185-XX

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Table B–2: TLA 520 Standard Accessories (Cont.)

Accessory	Quantity	Part Number
Ground Strap, 6 ft	1	196-3353-XX
Probe Cables, 5 ft	8	174-2117-XX
8-Channel Data Probe, 12 in	12	012-1424-XX
Lead Set, 3.0 L	24	196-3347-XX
KlipChips	144	206-0364-XX
Probe Set, 100 Podlets	2	010-0492-XX
Coaxial Terminator	2	011-0168-XX
Coaxial Cable T-Connector	2	103-0030-XX
Coaxial Cable, 10 ft (Terminal to System Unit)	1	012-0205-XX
9-pin RS-232 Cable, 10 ft (Terminal to System Unit)	1	012-1445-XX
Passive Probe, used as Sync Out cable, SMB-to BNC	1	P6041

Table B–3 lists the optional accessories for the TLA 510 and TLA 520 Logic Analyzers.

Table B–3: Optional Accessories

Accessory	Part Number
TLA 510 & 520 Logic Analyzer Service Manual	070-8976-XX
Single-Channel Data Lead Set, 5 in (Pkg of 12)	020-1888-XX
Dual Lead SMT KlipChip Adapters (Pkg of 12)	020-1386-XX
K-420 Instrument Cart	
Probe Set (100 Podlets)	010-0492-10
8-Channel Lead Sets, Package of Six	020-2107-XX
Six 8-Channel Lead Sets, 12 Y-Cables, 72 KlipChip Adapters	020-2108-XX
50 Channel Probe Set with Lead Sets, KlipChip Adapters, Y-Cables, Ribbon Cables	020-2109-XX
90-Channel Microprocessor Interface	010-0508-XX
Controlled Width Probe with Instructions	020-1392-01
Probe Retainers, Package of Four	020-1484-01
Coaxial Cables, Set of Four	198-5761-XX
25-Channel Probe Set	020-1890-XX
92A96 Probe Ribbon Cables Antistatic Application Kit	020-1939-XX

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Appendix C: Error Messages

This appendix lists some of the error messages that you may encounter with this product. All error messages are listed in alphabetical order.

Table C–1: Error Messages

Error Message	Explanation
A “Seq Flow” instruction cannot be programmed at [n].	A sequence flow instruction cannot be placed on the first sequence of an IRQ routine.
Active clocks cannot be used as qualifiers.	A 92A96 clock channel cannot be used both as a clock edge and as a qualifier through the entire clock equation.
ADD key is only valid in a sequence line. Key ignored.	Move the cursor to the sequence line area and select the function key again.
ADD key is only valid in the conversion table. Key ignored.	Move the cursor to the conversion table area and select the function key again.
All added clock lines are deleted.	You cannot delete the only line in a clock equation.
All clock lines are being used.	You cannot assign any more clock lines.
All groups have been deleted.	You cannot delete a group; there are no groups left to delete.
Asterisks (*) are not allowed in label fields.	Entries in label fields cannot contain asterisks. Enter a label name using alphanumeric characters.
Binary input radix; use 0, 1 or X.	Input radix is binary; enter a value using 0, 1, or X.
Building the display, please stand by.	Data is being processed to create the display.
Can’t add; maximum number of Library Items already defined.	The maximum allowable number of Library Items has already been defined. The function key is ignored.
Can’t delete Tek-defined Library Items.	You cannot delete or modify any of the pre-defined Library Items; you can only delete or modify user-defined Library Items.
Can’t delete the only remaining Action in a Clause.	A Clause must contain at least one Action.
Can’t delete the only remaining Action in a Macro.	A Macro must contain at least one Action.
Can’t delete the only remaining Clause in a State.	A State must contain at least one Clause.
Can’t delete the only remaining Event in a Clause.	A Clause must contain at least one Event.
Can’t delete the only remaining Event in a Macro.	A Macro must contain at least one Event.
Can’t delete the only remaining State.	The Trigger menu must contain at least one State.
Can’t filter an Event containing a Counter or Timer Event.	Event filters conflict with the operation of counter/timers.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
Can't find selected symbol table file.	Symbol table file does not exist on the hard disk; verify you are using correct file name or install the symbol table file.
Can't save to Tek-defined Library Items.	You cannot save to any of the predefined Library Items; you can only save to Library Items that you have defined.
Cannot delete first line of clock equation.	You cannot delete the first line; you may add or delete a second line.
Cannot deskew if the module is running or hardware is otherwise busy.	Deskew requires that the module not be busy with other activities. Wait until the module is available.
Cannot use external components with High-Speed signals.	You cannot use high-speed signals for external input or output. Only normal signals can be used.
Caution: Signal [signal name]:High Speed Signal line cannot be allocated.	Line cannot be allocated; an empty slot exists between the modules or they do not support high-speed signals.
Channel [channel number] already being used in the group [group name].	The selected channel number is already being used in another group.
Channel names must be unique.	No two channel names can be the same. The old channel name will be restored.
Characters-per-line value too large for PostScript, set to maximum.	PostScript allows a maximum of 80 characters-per-line.
Choose another name; Default is reserved.	Enter a name other than Default.
Clock edge is never active.	The 92A96 clock qualifiers have been logically ANDed together such that the clock edge is never active.
Clock edge is always active.	The 92A96 clock qualifiers have been logically ORed together such that the clock edge is always active.
Cluster: [cluster name] will be destroyed. Press Return to confirm, Esc to abort.	You have assigned a module to more than one cluster. If you press the Return key, the specified cluster will be destroyed.
Clusters must contain at least one module. No changes will be saved. Press Return to confirm, Esc to abort.	You've defined a cluster with no modules; this cluster definition cannot be saved. If you press the Return key, the cluster definition will be deleted.
Compound Event cannot contain 2 Counters or Timers.	A Compound Event can contain only one counter or timer.
Conflict with Event in last State.	The "Store Event" and "Combination" selections in the storage field are not valid if the third clause in the last (fourth) State is currently in use.
Conversion destination is not wide enough.	The width of the conversion destination must be equal to or greater than the source width.
Counter not available, 2 Timers in use.	Only two counter/timer resources are available.
Counter or Timer unavailable, 2 Counters and/or Timers maximum.	Only two counter/timer resources are available.
Current clock equation fully expanded.	You can have a maximum of four lines in a 92A96 clock equation.
Cursor must be in an Action Macro.	Position cursor on the Action Macro you want to change and press the function key again.
Cursor must be in an Event Macro.	Position cursor on the Event Macro you want to change and press the function key again.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
Cursor must be in the State to be deleted.	In order to delete a State, position the cursor on the State and press the function key.
Decimal fields cannot be partially don't cared.	Decimal-to-binary conversion will not work if one or more decimal digits is a "don't care."
Decimal input radix; use 0-9 or X.	Input radix is decimal; enter a value using 0-9 or X.
Delay cannot exceed memory depth, use 0-2047.	The delay value you entered is larger than memory. Enter a new value between 0 and 2047.
Delay cannot exceed memory depth, use 0-4093.	The delay value you entered is larger than memory. Enter a new value between 0 and 4093.
DELETE key is only valid in a sequence line. Key ignored.	Move the cursor to the sequence line area and press the function key again.
DELETE key is only valid in the conversion table. Key ignored.	Move the cursor to the conversion table area and press the function key again.
Destination label not specified in sequence(s): [n]	All flow control commands must have a value entered in the corresponding label field.
Destination State is currently undefined.	The State specified in the "Go To" Action does not exist. You must add it.
Disk failed to return block size.	When formatting or booting the hard disk, the disk failed to return the SCSI disk mode information. The disk probably is defective and should be replaced.
Disk HARD ERROR (n-m).	A fatal hard disk operation occurred. The SCSI hard disk returned a Sense Key (n) and extended sense value (m) in hexadecimal describing the failure. The disk probably is defective and should be replaced.
Disk rezero failed.	An attempt was made to rezero the hard disk. The disk probably is defective and should be replaced.
Duplicate channel name encountered.	Channel name must be unique; enter a unique name.
Duplicate entry: [n]	Entries in this field must be unique; enter a unique value.
Duplicate label: [n]	Each label must be unique; enter a unique name.
Duplicate Macro names are invalid.	Each Macro must have a unique name. Rename the Macro.
Duplicate State names are invalid.	Each State must have a unique name. Rename the State.
Embedded spaces are invalid.	Entry cannot contain blank spaces; use alpha-numeric characters only.
Embedded spaces not allowed in this field.	Entry cannot contain any blank spaces. Use alphanumeric characters only.
Enter a binary number (0-1), Z, X, Return, or Esc.	Only binary numbers are valid entries in this field. You can also enter Z or X, or press the Return key or the Esc key.
Enter a decimal number (0-9), Z, X, Return, or Esc.	Only decimal numbers are valid entries in this field. You can also enter Z or X, or press the Return key or the Esc key.
Enter a hexadecimal number (0-F), Z, X, Return, or Esc.	Only hexadecimal numbers are valid entries in this field. You can also enter Z or X, or press the Return key or the Esc key.
Enter a unique channel name.	Channel name already exists; rename channel using unique name.
Enter a unique group name.	Group name already exists; rename group using unique name.
Enter a unique pattern range name.	Pattern range name already exists; rename pattern range using unique name.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
Enter a value from [n] to [n].	Entries in this field must fall in the range of [n] to [n].
Enter an octal number (0-7), Z, X, Return, or Esc.	Only octal numbers are valid entries in this field. You can also enter Z or X, or press the Return key or the Esc key.
ENTER INSTR key is only valid in 92S16 sequence lines. Key ignored.	This function key is only valid when the cursor is positioned on a 92S16 sequence line. Otherwise, it is ignored.
Expression can be simplified.	The expression in the clock equation is redundant.
Enter the number without commas.	Commas are not valid numeric entries.
Event Filter or Compound Event conflict.	That specific combination of events and/or event filters is not supported.
F[n] is not active.	That function key is not active in the current context.
FAIL or FAIL XXXX	The logic analyzer does not contain optional software required for the current configuration or the power up diagnostics detect a problem with a module. The XXXX is a hexadecimal value that corresponds to a specific problem. Sometimes, reseating the module cures the problem.
Fan Failure	The last system shutdown occurred as a result of either a mainframe fan failure, a power supply fan failure, or an over-temperature condition. The disk file system is not corrupted.
Field accepts alphanumerics, +, -, or . only.	The only valid entries in this field are alphabetic characters, numerals, (+), (-), and (.).
Field maximum exceeded; field set to maximum legal value.	Entry is larger than maximum allowable value for this field; the field is set to the maximum value.
Field requires at least one valid character.	Enter an alphanumeric value in this field.
File already exists.	You must use a unique name for the file you are trying to add.
Fill in value; press Close to accept value, Esc to cancel operation.	Use the keyboard to type in a value; once you've completed your entry, press the Open/Close key to verify your choice.
Formatting graph; please wait.	The logic analyzer is processing data to create the graph display.
Formatting the display; please stand by.	The logic analyzer is processing data to create the display.
Formatting timing; please stand by.	The logic analyzer is processing data to create the timing display.
Go To State Actions may have been modified.	A State in the Trigger menu was deleted. Any "Go To State" Actions may have been modified.
Group names must be unique.	No two group names can be the same. The old group name will be restored.
Hex input radix; use 0-F or X.	The input radix for this field is hexadecimal; enter 0-F or X.
High-speed signals must have 1 input and 1 output.	High-speed signals must have one input and one output. Specify the missing input/output signal.
Incompatible channel width detected. Restored the previous setup.	The 92A96 software support package requires a wider or narrower module than is presently available. Verify that the required channel width for your support package and set up the module using the System Configuration menu.
Inconsistency with Channel menu forced a Trigger Spec change.	If you change the Channel menu after setting up the Trigger menu, the Trigger menu will be altered to reflect those changes.
Inconsistency with Clock menu forced a Trigger Spec change.	If you change the Clock menu after setting up the Trigger menu, the Trigger menu will be altered to reflect those changes.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
Inconsistency with Cluster Setup menu forced a Trigger Spec change.	If you change the Cluster Setup menu after setting up the Trigger menu, the Trigger menu will be altered to reflect those changes.
Inconsistency with Config menu forced a Trigger Spec change.	If you change the Config menu after setting up the Trigger menu, the Trigger menu will be altered to reflect those changes.
Invalid combination of Compound Events for State.	That specific combination of Compound Events is not supported.
Insufficient channels assigned to this group, use 0-3.	You entered a value in a word recognizer field that is legal for the group radix, but which cannot be used because there aren't enough bits associated with that digit to handle the value entered. Enter the value again using 0-3.
Insufficient channels assigned to this group, use 0-7.	You entered a value in a word recognizer field that is legal for the group radix, but which cannot be used because there aren't enough bits associated with that digit to handle the value entered. Enter the value again using 0-7.
Insufficient channels assigned to this group, use 0 or 1.	You entered a value in a word recognizer field that is legal for the group radix, but which cannot be used because there aren't enough bits associated with that digit to handle the value entered. Enter the value again using 0 or 1.
Illegal disk block size (N).	When formatting or booting the hard disk, the returned block size information (N) indicates that the hard disk is incompatible with the system software. Contact your local Tektronix service center for information and recommended action.
Leading character in this field cannot be + or –.	Entries in this field may not begin with + or –. Begin entry with an alphanumeric character.
Lines-per-page value too large for PostScript, set to maximum.	PostScript allows a maximum of 60 lines per page.
Maximum legal value is 4,999,995 ns.	Entry exceeds maximum allowable value for this field. Enter a value between 0 and 4,999,995 ns.
Maximum legal value is 320 ns.	Entry exceeds maximum allowable value for this field. Enter a value between 0 and 320 ns.
Maximum legal value is 64.	Entry exceeds maximum allowable value for this field. Enter a value between 0 and 64.
Maximum legal value is 999,999.	Entry exceeds maximum allowable value for this field. Enter a value between 0 and 999,999.
Maximum number of Action Macros already defined.	You must delete an Action Macro in order to define another.
Maximum number of Event Macros already defined.	You must delete an Event Macro in order to define another.
Maximum of [n] groups allowed.	You cannot add any more groups without deleting currently existing ones.
Maximum of 1 Action per Counter/Timer per Clause.	You cannot assign more than one Action to a counter/timer.
Maximum of 1 Action per Signal in a Clause.	A Signal can only perform one Action at a time.
Maximum of 1 Event Filter per State.	A State cannot contain more than one Event Filter.
Maximum of 1 "Go To State" Action per Clause.	A Clause cannot contain more than one "Go To State" Action.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
Maximum of 2 Simple Events per Clause.	A Clause cannot contain more than two Simple Events.
Maximum of 4 States.	The Trigger Program already contains the maximum allowable number of States.
Maximum of 8 pods per group.	A group cannot contain more than eight pods.
Maximum of 8 Simple Actions per Clause.	A Clause cannot contain more than eight Simple Actions.
Maximum of 10 replacement traces; restore some before saving another.	You can only replace ten original timing traces before an original must be restored.
Maximum of 32 channels per group.	You cannot add more than 32 channels per group. This message appears if you attempt to add to a channel group already containing 32 channels.
Maximum of 32 channels per group, channels truncated.	You cannot add more than 32 channels per group. This message appears if you attempt to add more than the maximum channels to a group; the channels are truncated to fit a maximum of 32 channels to a group.
Maximum of 32 sections per group.	You cannot add any more sections without deleting currently existing ones.
Minimum legal value is 10 ns.	Entry is smaller than the allowable minimum value for this field. Enter a value of 10 ns or larger.
Minimum legal value is 2.	Entry is smaller than the allowable minimum value for this field. Enter a value of 2 or larger.
Missing IRQ Call label.	The IRQ Call label has not been defined in the Program menu.
Module [module name]: Fast Clock.	The memory storage rate is greater than the maximum clock rate of the module.
Module [module name]: Slow Clock.	The module has not detected a clock from the system under test.
Module/Cluster currently running. System configuration cannot change.	Once you've started a module or cluster, you cannot alter the configuration until the module/cluster stops.
Module name already exists.	Rename module; use a unique name.
Move cursor to a clock equation.	To add or delete items, position the cursor on the equation you want to change and press the function key.
Move cursor to desired menu.	In order to select a menu, position the cursor on the menu name and press the corresponding function key.
Move cursor to second line of a clock equation.	Position the cursor on the second line of the clock equation and press the function key again.
Name already exists. Cluster names must be unique.	Rename cluster; use a unique name.
No active fields present.	The menu displayed contains no active fields that allow you to make selections.
No assertable or unassertable signals available.	You have not defined any assertable/unassertable intermodule signals in the Signal Definition overlay to the Cluster Setup menu.
No channels in any group; press Select Menu key.	No channels are assigned to any group. No data can be displayed.
No data acquired for active window; press Select Menu key.	You entered a display menu before an acquisition was performed.
No deskewed channels.	The setup and hold values selected may not be valid because the channels have not been deskewed.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
No embedded spaces allowed in this field.	Entries in this field cannot contain spaces. Enter a value with no spaces.
No field operation to cancel.	There are no selections to cancel. To select a menu, position the cursor on the menu name and press the corresponding function key.
No Input Signals defined.	You selected a Signal Event, but there are no input signals currently defined in the Signal Definition overlay to the Cluster Setup menu.
No match -- last valid choice will be restored if field is closed.	Your entry does not match an available selection.
No more entries to delete. Key ignored.	There are no more items to delete. The function key is ignored.
No more groups to delete.	There are no more groups to delete. The function key is ignored.
No more pods to delete in this group.	There are no more pods to delete. The function key is ignored.
No more than [n] sequences may be entered. Key ignored.	The maximum number of sequences has already been entered. The function key is ignored.
No more than 256 conversion rules may be entered. Key ignored.	The maximum number of conversion rules has already been entered. The function key is ignored.
No more than 8 fields may be entered in a sequence. Key ignored.	The maximum number of fields has already been entered in this sequence. The function key is ignored.
No Power Up restore. System config does not match.	The system hardware configuration does not match the configuration in the Power Up Setup file. The logic analyzer powered on to its default settings.
No Power Up restore. Last shutdown was abnormal.	The previous shut down was not normal. The logic analyzer powered on to its default settings.
No S/W	The logic analyzer does not contain optional software required for the module listed with this error.
Normal	The last system shutdown occurred as a result of pushing the front-panel power switch to the OFF position. This is the correct way to power off the logic analyzer. All open files and inter-process communication channels will be closed.
No Start - System resources cannot be allocated.	The maximum number of clusters or modules are running.
Not converted.	The width of the conversion destination must be equal to or greater than the source width.
Not found.	Search operation failed.
No valid acquisition data.	The module was started, but the current acquisition was in valid. This condition can occur after you reconfigure the module.
No valid runtime or acquisition data.	No valid data has been acquired. The module never started.
No valid signal available in current context.	The requested Signal Action (pulse, assert, or unassert) cannot be accepted because of conflicts with other existing Signal Actions.
Octal input radix; use 0-7 or X.	Input radix for this field is octal; enter value using 0-7 or X.
Only one Signal can be asserted or unasserted.	Only one of the possible output signals can be asserted or unasserted. All others can only be pulsed.
Partial Install: Unable to locate all custom clock files.	One or more (but not all) of the custom clock files are missing from custom clocking application. Verify you have properly installed all of the application files.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
Perform match-choice; press Close to accept value, Esc to cancel operation.	Type in the selection until the system displays match; press the Open/Close key to verify choice.
Please enter a channel number (0-7), RETURN, or ESC.	Enter a legal channel number, press the Return key, or press the Esc key.
Please enter a unique digit.	You cannot enter the same digit more than once in the same field.
Pod 12A-7-0 Ch 76543210 removed from Group Pg12-1.	Confirms that specified channels were removed by a delete channel operation.
Pod already assigned to group [n]. Press Return to accept, Esc to cancel, or a select key to continue.	This pod has been assigned; press the Return key to remove pod from previous location and add it to a new location.
Power Failure	The last system shutdown occurred due to loss of ac power (such as when the power cord is disconnected from the power source). Files are left open resulting in a loss of disk space.
Press function keys for Key Notes, Esc to erase, or any other key to continue.	To display a Key Note, press Notes key and then immediately press a function key. Press the Esc key to erase a note; press any other key to continue.
Press Return to confirm, Esc to abort.	You must confirm your choice; if you press the Esc key, selections will be cancelled.
Press Return to delete all empty groups and pods, or press Esc to cancel.	You must confirm your choice; if you press the Return key, all empty groups or pods will be deleted.
Press Return to remove “If IRQ Jump”, “Call”, and/or “Return” instruction(s), or press Esc to cancel.	Press the Return key to verify that you want to remove the instruction; press the Esc key to cancel operation.
Press Return to remove “If Full Jump”, “If End Jump”, “Reload” and/or “Incr Page” instruction(s), or press Esc to cancel.	Press the Return key to verify that you want to remove the instruction; press the Esc key to cancel operation.
Press Return to remove “Return” instruction or press Esc to cancel.	Press the Return key to verify that you want to remove the instruction; press the Esc key to cancel operation.
Press Return to restore default channel groups or press Esc to cancel.	You must confirm your choice; if you press the Return key, all default channel groups will be restored.
Press Return to restore default channel names or press Esc to cancel.	You must confirm your choice; if you press the Return key, all default channel names will be restored.
Press Return to restore default channels or press Esc to cancel.	You must confirm your choice; if you press the Return key, all default channels will be restored.
Press Return to restore default group ordering or press Esc to cancel.	You must confirm your choice; if you press the Return key, all default group ordering will be restored.
Press Return to restore default inhibit masks or press Esc to cancel.	You must confirm your choice; if you press the Return key, all default inhibit masks will be restored.
Print unable to open prolog file.	The PostScript prolog output file is missing from the system. To recover the file, you must reinstall the Base System Software.
Print unable to read prolog file.	The PostScript prolog output file has been corrupted. To recover the file, you must reinstall the Base System Software.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
Probe disconnect forces default deskew values.	Whenever you change probes (or disconnect, then reconnect, a probe) default deskew values are assigned to that probe.
Rubout invalid in this field, use backspace.	The rubout key is invalid when the cursor is on a group value field of a word recognizer. Use the backspace key.
Sample rate will be changed to 10 ns when screen is exited.	When you select to store glitches, you cannot use a 5 ns clock rate.
Sample rates faster than 5 ns invalid when glitches enabled.	You cannot use sample rates faster than 5 ns when glitches are enabled.
Select item; press Close to accept value, Esc to cancel operation.	Position cursor on the item you want to select; press the Enter key to verify your choice.
Signal cannot be asserted or unasserted (pulse only).	This signal cannot be asserted and left asserted; it must be pulsed or not used.
Similar field in other counter event(s) also modified.	Only one counter event resource is available; if you change it, it will be changed wherever it appears.
Similar field in other timer event(s) also modified.	Only one timer resource is available; if you change it, it will be changed wherever it appears.
Similar field in other word event(s) also modified.	Only one word resource is available; if you change it, it will be changed wherever it appears.
Software	The last system shutdown occurred as a result of depleted system resources, such as hard disk space or memory. This type of power off may corrupt the hard-disk file system but it is usually fixed at the next power up.
Specify a breakpoint label.	Enter the name of the label contained in the sequence line where you want the breakpoint to occur.
Specify a start label.	Enter the name of the label contained in the sequence line where you want the pattern generator to start.
Specify an IRQ call label.	Enter the name of the label contained in the first sequence line of the interrupt request subroutine.
State already contains maximum number of Clauses.	This State already contains the maximum allowable number of clauses. The function key is ignored.
Subset restored, file narrower than current module.	The file you have restored was saved to a module with more channels than your current module.
Subset restored, file wider than current module.	The file you have restored was saved to a module with fewer channels than your current module.
Symbol value too large for group.	You entered a symbol value that is too large for the current group. Enter a smaller value.
That key has no function.	The key you pressed has no function in the current context; no action taken.
The filename must have at least one character.	Enter a minimum of one alphanumeric character as a file name.
The first character in this field cannot be a dollar sign.	Use any alphanumeric character as the first character in this field except the dollar sign.

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Table C–1: Error Messages (Cont.)

Error Message	Explanation
There are no fields to be deleted. Key ignored.	There are no fields to delete. The function key is ignored.
There are no groups.	No groups are present in this menu.
This Event already contains a Not.	The existing “Not” applies to the entire Simple or Compound Event.
This Event already contains an Event Filter.	The Event Filter applies to the entire Simple or Compound Event.
This Event does not contain a Not.	There is no “Not” to delete.
This Event does not contain an Event Filter.	The only valid entries in this field are alphabetic characters (except blanks and double quotes), numerals, plus (+), minus (–), and period (.).
This field cannot be blank. Previous value restored.	You must enter a value in this field; the previous value will be restored.
This field cannot be modified.	The Item ID fields along the left edge of the menu cannot be modified.
This field has no selection list. Fill in a value with the ASCII keyboard.	This is a fill-in field; type in your selection.
This is a decimal field; use 0-9.	Only decimal values can be entered in this field. Enter a number between 0 and 9.
Timer not available; 2 Counters in use.	Only two counter/timer resources are available. You must remove one counter if you want to use a timer.
Unable to invoke selected SW Support. Restored the previous setup.	The installation of the selected software support has failed; one or more support files are missing.
Unable to start 9202XT.	The 9202XT server is not running or the network connection is missing. The X server address specified in the Configuration utility may be different from the Internet address sent in the 9202XT terminal display.
Undefined breakpoint label: [n]	A jump label is specified, but a label has not actually been entered in the label field for a sequence.
Undefined IRQ call label: [n]	A jump label is specified, but a label has not actually been entered in the label field for a sequence.
Undefined label: [n]	A jump label is specified, but a label has not actually been entered in the label field for a sequence.
Undefined start label: [n]	A jump label is specified, but a label has not actually been entered in the label field for a sequence.
Unexpected	The last system shutdown occurred from unknown causes. This type of power off may corrupt the disk file system but it is usually fixed at the next power up.
Use of Word and/or Channel Events makes this selection invalid.	All Word and Channel Event recognizers have been allocated. The selected Word or Channel Event cannot be accommodated.
Value changed; it must be a multiple of 5 ns.	This clock operates in 5 ns increments.
Waiting for Stop.	Trigger conditions have been satisfied and memory is full; however, the manual stop mode is selected in the Cluster Setup menu. This message also appears if other cards in the module have not stopped running.
Waiting for Stop-Store.	The Trigger word has been found, but memory has not yet been filled.
Waiting for Trigger.	Trigger conditions have not been satisfied.

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Appendix D: Loading System Software

System software is loaded onto the hard disk at the factory. It is only necessary to load the system software using the supplied floppy disks under the following conditions:

- When you upgrade the software version
- When a major system software failure damages one or more system files
- When you replace the hard disk

You can load the system software onto the hard disk using a series of steps described in this section. These steps differ from those used to make copies of floppy disks and to load application software using the Disk Services menus.

The System Software consists of the following floppy disks:

- The SYSTEM UTILITIES disk (FORMAT & MAKE). This disk contains the SCSI Hard Disk Format utility and the file system Make utility. Use the SCSI Hard Disk Format utility to format the hard disk or modify the swap partition size, and the file system Make utility to create a new file system on a newly formatted hard disk. The Make utility also includes the file system Check procedure to check or repair the file system.
- The SYSTEM UTILITIES disk (INSTALL). This disk contains the Install Utility. Use the Install utility to install and verify the Base System Software, the optional system software, and the application software. You can also use the Install utility to remove the optional system software and application software. The file system Verify function is an option to the Install utility.
- Base System Software (volume 1 through volume n). These disks contain the essential software for the logic analyzer. You must install all the files from these floppy disks.
- Optional System Software. These disks contain module specific portions of the system software that are not required for all configurations of the logic analyzer.
- Applications Software. These disks contain special purpose software that is not available with the base system software or the optional system software disks.

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SCSI Hard Disk Format Utility

You need to reformat your hard disk under the following conditions:

- When you replace the hard disk with an unformatted hard disk
- When a serious system failure corrupts the hard disk format
- When the system reports that it cannot read block 0 of the hard disk



CAUTION. *Reformatting the hard disk or running the file system Make utility destroys all files on the hard disk. Use one of the methods described below to save files from the hard disk.*

Formatting prepares the hard disk for data storage; all previous stored data is destroyed. Before formatting the hard disk, use one of the following methods to save files from the hard disk:

- Copy the files to floppy disks using the Backup/Restore utility supplied in the Disk Services Menu.
- Transfer the files to a host computer using ftp or Kermit.

Running the SCSI Hard Disk Format Utility

To access the main menu of the SCSI Hard Disk Format Utility, follow these steps:

1. Power off the logic analyzer. Face the rear of the system unit and locate the DIP switches mounted on the Controller board (as shown in Figure D–1).
2. Place DIP switch 1 (the leftmost DIP switch) in the closed (down) position. Place DIP switch 2 in the open (up) position. Leave all other DIP switches in their original positions.
3. Power on the terminal. Power on the system unit, wait for the prompt BOOT?>, and then insert the System Utilities disk labeled FORMAT, MAKE.
4. In response to the BOOT?> prompt, type f:/format and press the Return key.

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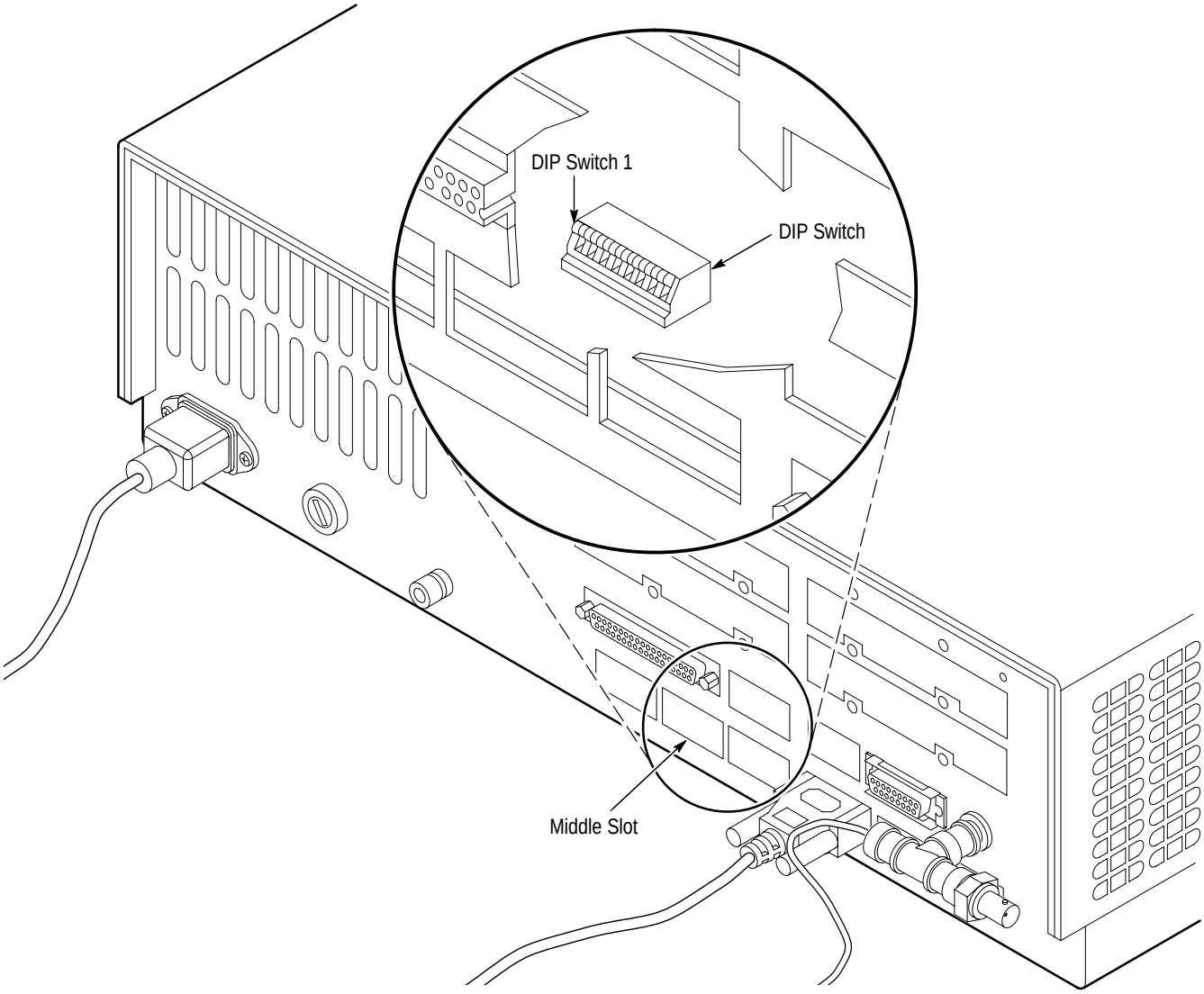


Figure D–1: DIP Switch Location

The following paragraphs briefly discuss the menus and submenus in the SCSI Hard Disk Format Utility.

SCSI Hard Disk Utility Main Menu

The main menu displays general information about the hard disk and how it is partitioned. If the hard disk has not been formatted, the main menu will indicate that the hard disk has no valid partition information. Figure D–2 shows an example of the main menu for the SCSI Hard Disk Format Utility.

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```
Main Menu - SCSI HARD DISK FORMATTER

Disk Description : /xxx/xxxx
  Capacity       :  416575 (512 byte logical block size)
  Compatibility  :  SCSI-1
  Manufacture ID :  xxxxxxxxxxxx
  Product ID     :  xxxxxxxxxxx
  Revision NO    :  xxx

Disk Partition List:

NUMBER  NAME  PURPOSE LOCATION BLOCKS (kbytes)
X       /xxx/xxx ROOT    xxxxx    xxxx   (xxxxxxxxxxxx)
X       /xxx/xxx SWAP    xxxxx    xxxx   (xxxxxxxxxxxx)
X       /xxx/xxx MAP     xxxxx    xxxx   (xxxxxxxxxxxx)
X       /xxx/xxx ALL     xxxxx    xxxx   (xxxxxxxxxxxx)

Selections Available:
 a. Format Setup Menu
 b. Change Swap Size Menu
 c. Show Bad Block List
 d. Exit

 Enter choice [default = d]
```

Figure D–2: SCSI Hard Disk Format Utility Main Menu

Select the submenu or information you want to enter. To format the hard disk select Option a; the Format Setup Menu will display. To change the swap partition space size of a previously formatted hard disk drive, select Option b. To display a list of bad blocks, select Option c.

To make a selection, enter the letter preceding the selection description. If you only press the Return key, the default action inside the square brackets will be selected.

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Format Setup Menu

This menu initiates the formatting of your hard disk; it also lets you specify the swap space size value. This value will be used the next time you request a swap space size change in the Change Swap Size submenu or Initiate Format in this menu.

```
FORMAT SETUP MENU

Current Active Options:

   Swap Size - 6 Meg (Recommended)

Selections Available:
 a. Initiate Format
 b. Use "Recommended" Settings
 c. Defects-Manufacturers and Grown (Recommended)
 d. Defects-Manufacturers Only
 e. Swap Size - 6 Meg (Recommended)
 f. Swap Size - 8 Meg
 g. Go to Main Menu

Enter choice [default = g]:
```

The selections in the Format Setup menu let you format the hard disk, change the swap size option, or return to the main menu. Option c maps out the manufacturer's bad block list and any bad blocks that may have been detected by earlier format operations. Option d maps out the manufacturer's bad block list only. To make a selection, enter the letter preceding the selection description. If you only press the Return key, the default action inside the square brackets will be selected.

If you select Initiate Format, the SCSI hard disk internal disk format command will be initiated. The current active swap size option will be used during the format operation. The following warning message and prompt will be displayed.

```
!!!WARNING: About to format hard disk. This will destroy
        any data currently stored on the disk!!!!!!!!

Swap size - 6 Meg (Recommended)

Are you sure you want to continue (y/n) [default = n]...
```


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CAUTION. *Reformatting the hard disk or running the file system Make utility destroys all files on the hard disk. Before running one of these utilities, use one of the methods described on page D–2 to save the user files from the hard disk.*

At this point, if you want to continue, press y. If you do not want to format your hard disk, press n or press the Return key (default is n – do not continue).

After formatting the hard disk, the utility verifies that all blocks on the hard disk can be read. During the verification process, a series of periods (.) and plus sign (+) characters are printed on the screen to show the progress of the disk verification. If any errors are found, the utility stops and displays the errors.

The bad block handling is done automatically by the SCSI formatting process. After successfully formatting the hard disk, the partitioning information will be written to the hard disk.

If you select options b or c in the Format Setup menu, the swap space size option will be changed accordingly; for more information on changing the swap space size, refer to the discussion under *Change Swap Size Menu*.

Change Swap Size Menu

Use the Change Swap Size menu to change the swap space size of a previously formatted hard disk. You can also change the swap space size option; this option will be used the next time you request the swap space size via the Make Change selection in this menu or the next time that you use the Initiate Format option in the Format Setup menu.

NOTE. *Changing the size of the swap partition space on your hard disk does not require reformatting the hard disk (unless the disk has never been formatted), but does require you to rebuild the file system using the Make utility. Running the Make utility will destroy the data saved on the disk. Be sure to save all of the user files using one of the methods described earlier in this section.*

Swap space is the area reserved on the hard disk for temporarily storing program information during operation. The swap space is only used when there is not enough memory available on the system. The swap partition space is normally used when very large symbol table files are used.

When the logic analyzer runs out of swap partition space, normal operation cannot continue and an error message will be displayed. If this happens, you should use the Change Swap Size option to increase the size of the swap partition. However, increasing the size of the swap partition also decreases the amount of hard disk space available for storing other files such as reference memories, setups, and autorun definitions.

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```
CHANGE SWAP SIZE MENU

Current Active Options:

   Swap Size - 6 Meg (Recommended)

Selections Available:
 a. Make change
 b. Swap Size - 6 Meg (Recommended)
 c. Swap Size - 8 Meg
 d. Go to Main Menu

Enter choice [default = d]:
```

The four selections in the Change Swap Size menu let you initiate the change for the swap size for the hard disk, change the swap size option to 6 megabytes, change the swap size option to 8 megabytes, or return to the main menu. To make a selection, enter the letter preceding the selection description. If you press Return only, the default action inside the square brackets will be selected.

If you select options b or c, the swap space size option will change accordingly. Although selecting these options will not change the hard disk, the option that you select will be used when you select Make Change in this menu or when you select Initiate Format in the Format Setup menu.

If you select option a, the SCSI hard disk swap space size will change. The current active swap size option will be used. The following warning message will be displayed:

```
!!!WARNING: About to change swap space size for hard disk.
        This will destroy any data currently stored on
         the disk!!!!!!!!

Swap size - 6 Meg (Recommended)

Are you sure you want to continue (y/n) [default = n]...
```



CAUTION. *Reformatting the hard disk or running the file system Make utility destroys all files on the hard disk. Use one of the methods described on page D–2 to save files from the hard disk.*

At this point, if you want to continue, press y. If you do not want to change the swap space size of your hard disk, press n or press the Return key (default is n do not continue).

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If you try to change the swap space size of an unformatted hard disk, an error message will be displayed and the change request will be cancelled.

If the hard disk has never been formatted, you must format it before changing the swap space size. A swap partition is created after the hard disk is formatted or reformatted. The default size of the swap partition is 6 megabytes; you can change it to 8 megabytes.

After the change swap space size operation completes, you should return to the BOOT?> prompt by leaving the SCSI Hard Disk Format Utility (select the Exit option in the Main Menu). You must then run the Make Utility (described on page D–9) to build the file system and the Install Utility (described on page D–15) to reload the system software after changing the size of swap partition. If you do not run these two utilities, the logic analyzer will not function properly.

Bad Block List Display

The SCSI Hard Disk Format Utility lets you view the bad block list (a bad block is an area on the hard disk that contains unusable bytes).

The Bad Block List display shows all known Manufacturer's defects and Grown defects (defects developed on the hard disk after it was shipped from the factory). The bad blocks will be listed by head, cylinder, and sector. The partition or file system block the defects are associated with is not given. It is not necessary (nor possible) to add blocks to these lists.

```
BAD BLOCK LIST DISPLAY

    LIST NAME (defect count) = head:cyl:sector, ...

    Manufacturer Defects (3) =  X:X:X, X:X:X, X:X:X

    Grown defects (0) = None


    Press any key to return to the Main Menu:
```

If the system software detects bad blocks while the logic analyzer is running, the blocks are automatically added to the bad block list by the SCSI hard disk drive.

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File System Make Utility

The file system Make utility either creates a new, empty, file system and destroys all previously stored files on the hard disk, or it checks and repairs the existing file system. The utility prompts you to select one of the two options. Use the file system Check option to repair file system damage which can result from an abnormal shutdown of the logic analyzer. Before running the Make procedure of this utility use the system software Disk Services menu to save all user created files on floppy disks.

***NOTE**. If the hard disk drive has been seriously corrupted, it may not be possible to save files on floppy disks. It is a good idea to perform regular backups of your user-generated files.*

Running the File System Make Utility

If the BOOT?> prompt is displayed, proceed to step 4. If not, follow steps 1, 2, and 3 before continuing with step 4.

1. Power off the logic analyzer. Face the rear of the system unit and locate the DIP switches mounted on the Controller board (refer to Figure D–1).
2. Place DIP switch 1 (the leftmost DIP switch) in the closed (down) position. Place DIP switch 2 in the open (up) position. Leave all other DIP switches in their original positions.
3. Power on the terminal. Power on the system unit, wait for the prompt BOOT?>, and then insert the floppy disk labeled FORMAT, MAKE.
4. In response to the BOOT?> prompt, type f:/make and press the Return key. The following menu is displayed:

```
Press "m" to run the file system Make procedure.
Press "c" to run the file system Check Procedure -->
```

5. Type m to create a new file system. This operation destroys all files on the hard disk. A warning message and prompt will be displayed; type y to continue with the Make utility.

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File System Check Procedure

If you type c in step 5, the file system Check procedure repairs the damaged file system after a system failure occurs. An unexpected loss of power or certain software or hardware failures can corrupt the file system and cause the logic analyzer to shut down in an uncontrolled fashion. When this happens, recent file system changes may not be completely written to the hard disk and the file system on the hard disk may be inconsistent.

NOTE. *If you run the File System Check procedure from the floppy disks, the logic analyzer will ignore the settings in the Boot Option overlay.*

The logic analyzer normally performs the file system Check procedure at power on unless you change the parameters in the Boot Option overlay to the Diagnostics menu (refer to *Boot Option Overlay* on page 3–54). Under certain conditions, the logic analyzer may ask you to perform the file system Check procedure manually. (In this case you would perform this procedure.) The file system Check procedure may not be able to completely recover from all types of damage to the file system. If system software files are either corrupted or cleared, you must rebuild the file system using the file system Install utility.

NOTE. *You must run the file system Check procedure when (at power on) a message indicates that the file system has been damaged and cannot be automatically repaired. The logic analyzer will not operate with a damaged file system that it cannot repair.*

There are six phases of the file system Check procedure (described later in detail). During these phases, software attempts to reconstruct the file system by deleting unreferenced files, rebuilding the free block list, and fixing any inconsistencies. It may take multiple attempts to complete the repair process. You should run the file system Check procedure until you no longer get errors or queries (normally no more than five times).

Once you have started the file system Check procedure, it proceeds automatically. The check procedure goes through several phases. Tables list typical messages, which are described beginning on page D–11, that can be displayed during each phase of the file system Check procedure and give an explanation of each message. The tables also contain recommended responses to the error messages.

NOTE. *Where a message in these tables is followed by a word in parentheses, the word indicates the actual prompt message you will see on the screen.*

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When the file system Check procedure finds an inconsistency in the file system, it prompts you to take corrective action. There are several approaches to correcting file system problems, depending on the situation. Usually, answering y to a CLEAR? prompt or n to a RECONNECT? prompt corrects the problem without damaging any files on the hard disk. If a file has a size of 0, it can always be cleared. After clearing any files, you should run the Verify option of the Install utility to make sure that no system files were deleted. If the message EXCESSIVE BAD BLOCKS. CONTINUE? appears, you should enter y to continue. (A file system bad block is not the same as a bad block on the hard disk.)

NOTE. *If you receive the Excessive Bad Blocks message, you must repeat the file system Check procedure until you get through it with no errors reported.*

All problems may not be fixed on the first pass through the file system Check procedure; you may have to rerun the procedure several times. If all checks are successfully completed, the number of files, blocks, and the amount of free space are printed and the following prompt is displayed:

```
Do you want to rerun the File System Check Procedure
(y/n)[n]:
```

Enter y to the prompt only if all checks did not complete successfully. If you enter n, the BOOT?> prompt is displayed.

Phase 1: Check Blocks and Sizes. This phase checks the inode section of the file system; errors uncovered here usually indicate serious corruption of the file system. Table D–1 summarizes the error messages that can be generated during Phase 1 testing. In the table, a word in parentheses following an error message indicates the actual prompt message that appears on the screen.

Table D–1: Phase 1 File System Check Error Messages

Message	Explanation
UNKNOWN FILE TYPE I=I (CLEAR?)	This message indicates that the procedure found an unknown type of file. Type y in response to this message.
LINK COUNT TABLE OVERFLOW (CONTINUE?)	An internal error has been found. Repeat the steps for the file system Check procedure after completing the current pass. Type y in response to this message. May require several y responses.
B BAD I=I	The procedure detected an illegal block number B in inode I.
EXCESSIVE BAD BLOCKS I=I (CONTINUE?)	The procedure detected 10 or more bad block numbers. Type y in response to this message. Run the file system Check procedure again after completion.

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Table D–1: Phase 1 File System Check Error Messages (Cont.)

Message	Explanation
B DUP I=I	The procedure identified a duplicate block B in inode I.
EXCESSIVE DUP BLKS I=I (CONTINUE?)	The procedure detected too many duplicate blocks in inode I. Type y to continue; when finished, run the file system Check procedure again.
DUP TABLE OVERFLOW (CONTINUE?)	There has been an internal table overflow. Type y to continue; when finished, run the file system Check procedure again.
POSSIBLE FILE SIZE ERROR I=I	A possible error in file size has been detected. After completing the file system Check procedure, run the system software Install utility, Verify option, to ensure that no files are corrupted.
DIRECTORY MISALIGNED I=I	A possible directory error has been detected. After completing the file system Check routine, run the system software Install utility, Verify option, to ensure that no files are corrupted.
PARTIALLY ALLOCATED INODE I=I (CLEAR?)	A partially allocated inode has been detected. Respond with y. After completing the file system Check procedure, run the system software Install utility, Verify option, to ensure that no files are corrupted.
PHASE 1B: RESCAN FOR MORE DUPS	This message may be displayed if the procedure is rescanning for additional duplicate block entries in the inode structures.

Phase 2: Check Path Names. This phase removes files with corrupted inodes detected in the Phase 1 check. Table D–2 summarizes the error messages that can be generated during Phase 2 testing.

Table D–2: Phase 2 File System Check Error Messages

Message	Action
ROOT INODE UNALLOCATED. TERMINAT-ING	You must rebuild the file system. First, run the file system Make procedure. Then, use the file system Install utility to reload the system software.
ROOT INODE NOT DIRECTORY (FIX?)	Try typing y in response to this message. If this generates a large number of errors, you will have to rebuild the system. Do this by running the file system Make procedure followed by the file system Install utility to reload the system software.
DUPS/BAD IN ROOT INODE (CONTINUE?)	Try typing y in response. If this generates a large number of errors, you will have to rebuild the system. Do this by running the file system Make procedure followed by the file system Install utility to reload the system software.
I OUT OF RANGE I=I NAME=F (REMOVE?)	The procedure detected a directory entry with an out-of-range inode number I; type y in response. Run the file system Install utility, Verify option, to ensure that no files are corrupted.
UNALLOCATED I=I OWNER=O MODE=M SIZE=S MTIME=T NAME=F (REMOVE?)	The procedure detected a directory entry with no allocation bits set; type y in response. Run the system file system Install utility, Verify option, to ensure that no system files have been deleted.
DUP/BAD I=I OWNER=O MODE=M SIZE=S MTIME=T DIR=F (REMOVE?)	The procedure detected duplicate or bad block numbers associated with this file; type y in response. Run the file system Install utility, Verify option, to ensure that no system files have been deleted.

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Phase 3: Check Connectivity. This phase checks for unreferenced directories. Table D–3 summarizes the error messages that can be generated during Phase 3 testing.

Table D–3: Phase 3 File System Check Error Messages

Message	Explanation
UNREF DIR I=I OWNER=O MODE=M SIZE=S MTIME=T (RECONNECT?)	The procedure detected an unreferenced directory; you have no recourse but to clear it. Type n in response to the RECONNECT? prompt. The procedure prompts you to clear the inode. Type y in response to the CLEAR? prompt. Run the file system Install utility, Verify option, to ensure that no system files have been deleted.
SORRY. NO lost+found DIRECTORY	When this message displays, you must rebuild your system. First, run the file system Make procedure, then use the file system Install utility to reload the system software.
SORRY. NO SPACE IN lost+found DIRECTORY	When this message displays, you must rebuild your file system. First, run the file system Make procedure. Then use the file system Install utility to reload the system software.

Phase 4: Check Reference Counts. This phase checks link count information in the file system. You will almost always see some type of error here. As a general rule, if a file with a SIZE of 0 is unreferenced, you should clear it (do not reconnect it). Table D–4 summarizes the error messages that can be generated during Phase 4 testing.

Table D–4: Phase 4 File System Check Error Messages

Message	Explanation
UNREF FILE I=I OWNER = 0 MODE=M SIZE=S MTIME=T (RECONNECT?)	An unreferenced file has been detected; always type n in response. Note the file size; if the file has a size greater than 0, run the file system Install utility, Verify option, to ensure that no system files have been deleted. Most files that show up here are temporary files. Deletion of these files is harmless since the files would not be usable if you were to try to reconnect them.
(CLEAR?)	If you type n at a RECONNECT prompt, another prompt appears telling you to clear the file. You should then type y in response.
LINK COUNT FILE I=I OWNER=O MODE=M SIZE=S MTIME=M COUNT=X SHOULD BE Y (ADJUST?)	An incorrect link count has been detected; type y in response.
LINK COUNT DIR I=I OWNER=O MODE=M SIZE=S MTIME=M COUNT=X SHOULD BE Y (ADJUST?)	An incorrect link count has been detected; type y in response.
LINK COUNT F I=I OWNER=0 MODE=M SIZE=S MTIME=M COUNT=X SHOULD BE Y (ADJUST?)	An incorrect link count has been detected; type y in response.
UNREF FILE I=I OWNER=O MODE=M SIZE=S MTIME=M (CLEAR?)	An unreferenced file has been detected; type y in response. If the file has a size greater than 0, run the file system Install utility, Verify option, to ensure that no system files have been deleted.

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Table D–4: Phase 4 File System Check Error Messages (Cont.)

Message	Explanation
UNREF DIR I=I OWNER=O MODE=M SIZE=S MTIME=M (CLEAR?)	An unreferenced directory has been detected; type y in response. If the file has a size greater than 0, run the file system Install utility, Verify option, to ensure that no system files have been deleted.
BAD/DUP FILE I=I OWNER=O MODE=M SIZE=S MTIME=M (CLEAR?)	A file inode containing bad blocks of duplicate blocks has been detected; type y in response. If the file has a size greater than 0, run the file system Install utility, Verify option, to ensure that no system files have been deleted.
BAD/DUP DIR I=I OWNER=O MODE=M SIZE=S MTIME=M (CLEAR?)	A directory inode containing bad blocks or duplicate blocks has been detected; type y in response. If the directory has a size greater than 0, run the file system Install utility, Verify option, to ensure that no system files have been deleted.
FREE INODE COUNT WRONG IN SUPERBLK (FIX?)	An inconsistency in the free inode count has been detected. The actual number of free inodes does not match the number stored in the superblock. Type y in response.

Phase 5: Check Free List. This phase checks for errors in the free block list. Table D–5 summarizes the error messages that can be generated during Phase 5 testing.

Table D–5: Phase 5 File System Check Error Messages

Message	Explanation
EXCESSIVE BAD BLKS IN FREE LIST (CONTINUE?)	More than 10 bad block numbers in the free block list have been detected; type y in response.
EXCESSIVE DUP BLKS IN FREE LIST (CONTINUE?)	More than 10 duplicate block numbers in the free block list have been detected; type y in response.
BAD FREEBLK COUNT	This message indicates that the free block count is incorrect. No action is required.
X BAD BLKS IN FREE LIST	This message indicates that there are X bad blocks in the free list. No action is required.
X DUP BLKS IN FREE LIST	This message indicates that there are X duplicate blocks in the free list. No action is required.
X BLK(S) MISSING	This message indicates that there were X blocks unused by the file system that were not in the free list. No action is required.
FREE BLK COUNT WRONG IN SUPERBLOCK (FIX?)	An inconsistency in the free block count has been detected. The free block count in the superblock is incorrect; type y in response.
BAD FREE LIST (SALVAGE?)	The free block list must be repaired; type y in response.

Phase 6: Salvage Free List. This phase rebuilds the file system free block list. There are no error messages generated in this phase of the file system Check procedure.

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File System Install Utility

Use the file system Install utility to install and verify the Base System Software, the optional system software, and application software. You can also use the Install utility to remove the optional system software and application software.

You must install the Base System Software after you run the file system Make utility, when you upgrade to a new version of system software, or to repair any damage to the system software from an abnormal shutdown of the logic analyzer. You can also install the optional system software and the application software at this time. However, you can also install the application software using the Disk Services menu at a later time.

In all cases, you will need to install some portion of the optional system software together with the Base System Software. You can use the Install utility at a later time to install or remove any optional system software. However, you cannot use the Install utility to remove the Base System Software.

The file system Install utility has three functions. Its main function is to install the software including the Base System Software, the optional system software, and application software. You can use it to remove optional system software or application software. You can also use it to verify that the installed software is both complete and correct.

Installing Base System Software

The Base System Software contains the essential software for the logic analyzer. Use this program to add or replace Tektronix supplied files. The program will not disturb user generated files (such as reference memories and system setups).

If the BOOT?> prompt is already displayed, proceed to step 4. If not, begin with step 1.

1. Power off the logic analyzer. Face the rear of the system unit and locate the DIP switches mounted on the Controller board (refer to Figure D–1 on page D–3).
2. Place DIP switch 1 (the left-most DIP switch) in the closed (down) position. Place DIP switch 2 in the open (up) position. Leave all other DIP switches in their original positions.
3. Power on the terminal. Power on the system unit, wait for the prompt BOOT?>, and then insert the INSTALL floppy disk.

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4. In response to the BOOT?> prompt, type f:/install and press the Return key. The following menu is displayed:

```
Press "i" to install Base System Software, Optional
 System Software, or Application Software.
Press "r" to remove Optional System Software or
 Application Software.
Press "v" to verify currently installed software.

Selection:
```

5. Type i to start the system software installation procedure. The following menu will appear immediately:

```
File System Installation Procedure:
When the BOOT?> prompt appears, type /install to
continue with the installation process, or type /config
to adjust the LAN, or Operating mode parameters or save
an image of the current system software.
```

If you need to adjust the network parameters, type /config and refer to the *Configuration Utility.* Otherwise, continue with the next step.

NOTE. *Do NOT remove the INSTALL disk yet. The program transfers several files from the floppy disk to the hard disk. The BOOT?> prompt will appear.*

---

6. Type /install in response to the BOOT?> prompt and press the Return key. The system will access the hard disk and after a few seconds will display the following message:

```
File System Installation Procedure:
XXXXX Kbytes disk space remaining.
Insert next DAS system floppy disk and press Return.
(When installation is complete press "c") -->
```

7. Remove the INSTALL disk, insert the Base System Software (Vol. 1 of n) disk, and press the Return key. When the prompt returns, insert the next disk in the sequence and press the Return key. Continue loading Base System Software disks in sequence until you have installed all of them.

8. After you have installed all of the Base System Software disks, install the optional system software disks that you require for your application.

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9. When you have installed all of the optional system software disks, you can install any other application Software disks. However, you can wait and install the application software disks using the Disk Services menu.

10. After you have installed the last disk, type c to complete the software installation procedure; the system will then power off.

11. After the logic analyzer has completed the power-off sequence, place DIP switch #1 in the open (up) position and power on the system unit.

Installing Optional System Software

Use this part of the File System Install utility to add or replace Tektronix supplied files only. The program will not disturb user generated files (such as reference memories and system setups).

If the BOOT?> prompt is already displayed, proceed to step 4. If not, begin with step 1.

1. Power off the logic analyzer. Face the rear of the system unit and locate the DIP switches mounted on the Controller board (refer to Figure D–1 on page D–3).

2. Place DIP switch 1 (the left-most DIP switch) in the closed (down) position. Place DIP switch 2 in the open (up) position. Leave all other DIP switches in their original positions.

3. Power on the terminal. Power on the system unit, wait for the prompt BOOT?>, and then insert the INSTALL floppy disk.

4. In response to the BOOT?> prompt, type f:/install and press the Return key. The following menu is displayed:

```
File System Installation Procedure:

Insert next DAS system floppy disk and press Return.
(When rebuild is complete press "c") -->
```

5. When the prompt appears, insert the first optional system software disk that you require for your application. Continue installing the disks at each prompt until you have installed all required disks.

6. After you have installed the last disk, type c to complete the software installation procedure; the logic analyzer will then power down.

7. Place DIP switch #1 in the open (up) position and power on the system unit.

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Installing Application Software

You can install application software using the same procedure given for installing optional system software. However, it may be easier to install the application software disks using the Disk Services menu.

Removing Optional System Software or Application Software

You can remove the optional system software and application software using the Install utility on disk. Removing software in this manner provides additional free space on the hard disk drive. You can also remove application software using the Disk Services Menu (but not the optional system software).

If the BOOT?> prompt is already displayed, proceed to step 4. If not, begin with step 1.

1. Power off the logic analyzer. Face the rear of the system unit and locate the DIP switches mounted on the Controller board (refer to Figure D–1 on page D–3).
2. Place DIP switch 1 (the left-most DIP switch) in the closed (down) position. Place DIP switch 2 in the open (up) position. Leave all other DIP switches in their original positions.
3. Power on the terminal. Power on the system unit, wait for the prompt BOOT?>, and then insert the INSTALL floppy disk.
4. In response to the BOOT?> prompt, type f:/install and press the Return key. The following menu is displayed:

```
Press "i" to install Base System Software, Optional
 System Software, or Application Software.
Press "r" to remove Optional System Software or
 Application Software.
Press "v" to verify currently installed software.

Selection:
```


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5. Type r to start the system software installation procedure. A menu similar to the following will appear immediately:

```
DAS Software Removal Procedure:
XXXXX Kbytes space remaining.
The following Optional System Software and/or
Application Software is currently installed

1) .92C96
2) .92S16

To remove a software package, type in the number on the
same line as the name of the package and press Return.
To exit, type in "0" and press Return, or simply press
Return with no number specified.

Which Optional System Software or Application Software
package would you like to remove.
```

After you enter your selection, the Install procedure removes the selected package and displays the remaining list of software packages. You are then prompted for another selection.

If there are no optional system software or application software packages, the procedure displays an appropriate message and then displays the BOOT?> prompt.

Verifying Base, Optional, and Application Software

Use the verify function of the Install utility to verify that all Tektronix supplied software for the logic analyzer, including the Base System Software, the optional system software, and the application software, is completely and correctly installed and has not been corrupted.

Use the verify function of the Install utility after executing the file system Check procedure of the Make utility. Each base, optional, and application software package is individually verified as you install it. Therefore, it is not necessary to use the verify function of the Install utility after installing software.

You can also verify all Tektronix supplied software through the Version menu.

If the BOOT?> prompt is already displayed, proceed to step 4. If not, begin with step 1.

1. Power off the logic analyzer. Face the rear of the system unit and locate the DIP switches mounted on the Controller board (refer to Figure D–1 on page D–3).

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2. Place DIP switch 1 (the left-most DIP switch) in the closed (down) position. Place DIP switch 2 in the open (up) position. Leave all other DIP switches in their original positions.

3. Power on the terminal. Power on the system unit, wait for the prompt BOOT?>, and then insert the INSTALL floppy disk.

4. In response to the BOOT?> prompt, type f:/install and press the Return key. The following menu is displayed:

```
Press "i" to install Base System Software, Optional
 System Software, or Application Software.
Press "r" to remove Optional System Software or
 Application Software.
Press "v" to verify currently installed software.

Selection:
```

5. Type v to start the software verification procedure.

Each Base System Software, optional system software, and application software disk has a separate checksum list corresponding to the name of the floppy disk containing the files. Each list contains the name and the expected checksum value for each file on the associated disk. The verification program displays the name of each checksum list as it verifies the checksums for the files. This process takes several minutes to complete.

If any files in a checksum list do not exist, or do not match the expected checksum, an error message displays the name of the disk and the faulty file. After the checksums for all disks have been tested, one of two messages will be printed. If no failures are found, the program displays:

```
Verify Procedure Complete, NO ERRORS
```

However, if one or more failures occur, the program displays:

```
Verify Procedure Complete, ERRORS OCCURRED
```

In this case, identify the disks where the errors occurred, reinstall the disks, and repeat the verify procedure.

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Optional System Software

Optional system software disks contain parts of the system software which are not required for all operations. This software is optional so that you can free up additional space on your hard disk by installing or retaining software that is required for your logic analyzer. Each optional software disk label tells the approximate size consumed by the software to help you decide which optional software to install. Note that it is possible for this number to be larger than the capacity of the floppy disks.

The Base System Software and all optional system software are already installed on all instruments shipped from the factory. You can remove unnecessary optional system software or application software by using the remove option of the Install utility. You can install or exclude optional system software and application software at your discretion when you upgrade your logic analyzer to new software versions. Be sure to remove any optional system software that you do not intend to replace with a newer version when you upgrade the Operating System Software version; if you are unsure, run the Verify function to be sure that all of the software on the hard disk is the current version.

There are different optional software packages for the logic analyzer. Two of these packages relate directly to the module families presently available. The optional software packages are briefly described below:

- 92A96 Support. This package provides the necessary software to operate the 92C96 Data Acquisition Modules.
- 92S16 Support. This package provides the necessary software to operate the pattern generation modules. You can remove or exclude this software if your logic analyzer does not contain pattern generation modules.
- Remote Operation Support. This package provides the necessary software to operate the logic analyzer remotely using the Programmatic Command Language (PCL). You can remove or exclude this software in logic analyzers that you will not operate remotely with 92LANP.
- 9204XT Support, XP100 and XP200 Supplement. This package provides the necessary software to update the Flash ROM in the 9204XT, 9205XT, and 9206XT terminals. It also provides additional software to service the terminal.

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Application Software

Application software disks contain special purpose software that provides additional capability not present in the Base System Software or optional system software. Application software (available as separate products) includes microprocessor support, performance analysis, and device verification packages.

You can install or remove application software using the Disk Services menu. However, for convenience, you can install or remove the application software using the Install utility when you install the Base System Software or optional system software.

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Appendix E: Configuration Utility

Use the Configuration utility to check or set the various parameters for operating the logic analyzer. In most cases, you will use this tool to check or set the network addresses used to enable communications between the instrument and the host or X terminal. Use the utility to set the operating mode and to save, restore, or delete system software images. You can also use the utility to check the results of the power-on diagnostics.

The utility loads onto the hard disk when you initially install the system software. To start the utility, power on the instrument with DIP switch #1 in the down position and type /config at the BOOT?> prompt.

User Interface

The Configuration utility is mainly intended for use with network systems or with systems with X terminals. However, a console terminal is required to display status or error messages while using the utility. You can also use the Serial window of an X terminal for this purpose if you do not have an external console terminal.

The utility does not make use of any special characteristics of any terminal. The utility assumes that the terminal can display 80 characters per line and at least 24 lines per screen. No special character positioning or highlighting is used.

The Configuration utility is required under the following conditions:

- When you change networking parameters
- When you change the operating mode
- When you need to update the X terminal Flash ROM
- When you need to check the results of the power-on diagnostics and configuration (if the logic analyzer menus do not display)

The basic utility consists of a main menu and several submenus. Each menu has a list of selections to choose from and lists the current values of the parameters. A Help selection is also available for each menu item.

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Main Menu

The Main menu displays as soon as you start the utility. Figure E–1 shows an example of the main menu. To select an item in the main menu, enter the character enclosed in parenthesis following the line number of the item you are interested in, and press the Return key. You can also enter the line number, and press the Return key. For example, to view the diagnostic results, enter a “1” or “c” and press the Return key.

Values of previously defined parameters will appear in the menu. Undefined parameters will be blank.

Configuration Utility:

```
  1. (C) Display Hardware [C]onfiguration and Diagnostic Results.
  2. (S) [S]ave image of current system software. Available: 9202XT
  3. (R) [R]estore saved image of system software. Available: None
  4. (D) [D]elete saved image of system software.
  5. (T) Show Fac(t)ory Default Network Configuration.
  6. (O) Set [O]perating Mode.                    Current: 9202XT
  7. (N) Set DAS Network [N]ame.                  Current: alpha
  8. (A) Set DAS Internet [A]ddress.              Current: 123.123.125.2
  9. (M) Set Network Subnet [M]ask.               Current: 255.255.255.0
 10. (G) Set [G]ateway Internet Address.          Current: 123.123.125.14
 11. (F) Set De[f]ault X-server Name.             Current: eldar:0.0
 12. (X) Set Default [X]-server Internet Address.  Current: 123.21.1.0
 13. (L) Set [L]ANPCL Port Number.                Current: 10999
 14. (P) Set GPIB [P]ort Number.                  Current: 2
 15. (E) Save changes and [E]xit to BOOT? prompt.
 16. (U) [U]pdate 9202XT Flash ROM and Exit to BOOT? prompt.
 17. (Q) Discard changes and [Q]uit to BOOT? prompt.
 18. (H) [H]elp.
```

Please make a selection:

Figure E–1: Configuration Utility, Main Menu

Display Hardware Configuration and Diagnostic Results

The Configuration utility allows you to check the results of the power-on diagnostics for each module installed in the instrument. It also lets you view the contents of each slot and the configurations of the modules in the instrument. The configuration and diagnostic information is listed when you select item C in the main menu.

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Figure E–2 shows an example of the configuration display listing. The listing looks similar to the Diagnostic menu. For each installed card or module, the diagnostic results are displayed. If a diagnostic failure exists, the resulting error code displays. The diagnostic results are those that were recorded as of the last normal power on. A value of No S/W indicates that the corresponding hardware could not be tested because the Optional System Software for that hardware was not installed.

```
                              CURRENT CONFIGURATION

System Software Release 3 Version 1.40
Previous Shutdown: Normal

Slot                                Card                                Diagnostic
  0     Controller/92LANSE Network Controller                             PASS
  1                                                                       ----
  2     92S16       18 Channels/20ns Pattern Generation                   PASS
  3     92C96XD     96 Channels/10 ns Acquisition, 128K Deep              PASS
```

Figure E–2: Configuration Utility, Hardware Configuration and Diagnostic Results

Save Image of Current System Software

Selecting item S from the main menu lets you save a nonexecutable image of the current system software in a different location on the hard disk. This operation is useful when you plan to change the operating mode of the system. You can save an image of the system software for the current mode of operation before installing new software. If you later decide to return to the original mode of operation, you can restore the previously saved image from the hard disk. If you plan to switch modes often, you can alternate between saved images rather than reloading software from the floppy disks.

You must have an image saved on the hard disk before you attempt to restore an image; if not, the current image will be lost. Once you save an image, you cannot use the image. You have to restore an image before you can use it.

User-created files, such as saved setups, reference memories, and trigger libraries remain in place when you save or restore an image. The files do not become part of the saved image and are not replaced when you restore an image. Therefore, when you convert a system from one mode of operation to another by saving then restoring or installing new system software, existing user files that were present in the original mode will still be present in the new mode. It is not necessary to save the user files separately when switching modes, (although doing a backup before such a major change is always a good idea). Likewise, saving a system software image does not make a copy of the user files and is not a substitute for a backup.

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Be aware that saving an image of the current system software causes the software to be removed. Therefore, you must install new software following a Save operation before returning to normal operation. You can install new software either from the floppy disks or by restoring a previously saved image.

Saved images of system software vary in size according to the amount of optional system software and application software installed. The minimum size is approximately 14 Mbytes. If there is insufficient room on the hard disk to save the complete image, the save operation will abort, leaving the current system software intact. Saving an image takes approximately three minutes.

The Available: field at the right end of the save entry in the Main menu shows the type of system software that is currently installed and available for saving, if any. The value None signifies that the system software has not been installed or has been removed as the result of either a save or operating mode change.

You will be prompted to verify your actions before the save operation occurs. If the save operation cannot be carried out, you will be returned to the Main menu.

Restore Image of Saved System Software

Selecting item R from the Main menu lets you restore a previously saved image of system software. This operation is useful when you plan to change the operating mode of the system. You can save an image of the system software supporting the current mode of operation before installing new software. If you later decide to return to the original mode of operation, all that is necessary is to restore the image from the hard disk. If you will be switching modes often, you can alternate between saved images rather than reload software from the floppy disks.

***NOTE**. You must have an image saved on the hard disk before you attempt to restore an image; if not, the current image will be lost.*

User-created files, such as saved setups, reference memories, and trigger libraries remain in place when you save or restore an image. The files do not become part of the saved image and are not replaced when you restore an image. Therfore, when you convert a system from one mode of operation to another by saving then restoring or installing new system software, existing user files that were present in the original mode will still be present in the new mode. It is not necessary to save the user files separately when switching modes, (although doing a backup before such a major change is always a good idea). Likewise, saving a system software image does not make a copy of the user files and is not a substitute for a backup.

Be aware that a saved image of system software can only be restored once. After it is restored, the saved image no longer exists. Therefore, if you alternate between different versions of system software, you must resave the current system software before each restore operation. Restoring an image takes about two minutes.

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The Available: field at the right of the Restore entry in the Main menu shows the type of system software that is currently saved and available to restore, if any. The value None signifies that there are no saved images present on the hard disk.

You will be prompted to verify your actions before the restore operation occurs. If the restore operation cannot be carried out, you will be returned to the Main menu.

Delete Saved Image of System Software

Selecting item D deletes saved images of the system software that you no longer need. The Available: field at the right of the Restore entry in the Main menu shows which saved images are present on the hard disk. Each image occupies approximately 14 Mbytes of hard disk space.

You will be prompted to verify your actions before the delete operation occurs. If the delete operation cannot be carried out, you will be returned to the Main menu.

Show Factory Default Network Configuration

Selecting item T lets you see or change the factory default network configuration in a single step. The proper network settings guarantee the proper configuration for stand-alone operation when no other network devices are attached to the network cable that connects the instrument and the terminal.

A menu similar to Figure E–3 will be displayed. Items in the Current column are the current settings shown in the Main menu. Items listed in the Factory column show the settings that allow the instrument to operate in the stand alone mode.

If you want to use the default factory settings, enter Yes or Y at the prompt. The utility will load the default settings. If you do not want to use the default settings, enter No or N at the prompt, and you will be returned to the main menu.

```
                Factory Default network configuration:

NETWORK OPTIONS              Current         Factory
---------------              -------         -------
DAS Network Name.           das1            Tek_La
DAS Internet Address.       123.123.125.2   10.0.0.1
Network Subnet Mask.        255.255.255.0   255.0.0.0
Gateway Internet Address.   123.123.123.14  0.0.0.0
X Server Name.              eldar:0.0       TEK_DISPLAY:0.0
X Server Internet Address.  123.21.1.0      10.0.0.2

Do you want to use the Factory settings? Yes/[No]:
```

Figure E–3: Configuration Utility, Factory Default Network Configuration

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Set Operating Mode

Select item O to set the operating (start-up) mode for the system software.

There are different operating modes: 9202XT mode, 92XTerm Manual mode, and 92XTerm Automatic mode. The available operating modes depend on the system software. As the names imply, the 9202XT mode is for the stand-alone X terminal, while the two 92XTerm modes are for work station X server displays.

Table E–1 lists the software versions and the operating modes they support.

Table E–1: System Software vs Operating Modes

Operating Mode	DAS/XP System Software	DAS/NT System Software
9202XT	X	X
92XTerm Manual		X
92XTerm Autostart		X

Enter an X for the 9202XT operating mode, an M to select the 92XTerm Manual operating mode, or an A to enter the 92XTerm Autostart operating mode. To retain the current operating mode, press the Return key without entering any characters.

Set DAS Network Name

Selecting item N from the Main menu lets you set the system (network) name for your system. Some applications refer to network devices by a name. The Internet address and name of the system must be entered in the appropriate tables on your host so that the system name of the system can be converted to the correct Internet address. The name can be up to eight alphanumeric characters long.

To set or change the name, enter a new name and press the Return key. To retain the current name, press the Return key without entering any other characters. You will be returned to the Main menu.

Set DAS Internet Address

Selecting item A from the Main menu lets you set the Internet address for your system. The Internet address is the IEEE802 network address for your system (the Internet address is not the same thing as the Ethernet address, which is set at the factory). This Internet address must be set to an address other than 0.0.0.0 to permit communication between the DAS system and other network devices. The Internet address is normally assigned by your system administrator.

Enter the new value in the format XXX.XXX.XXX.XXX (where each XXX represents a decimal number in the range of 0 to 255), and press the Return key. To retain the current address, press the Return key without entering any numbers.

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Set Network Subnet Mask

Selecting item M from the Main menu lets you set the subnet mask for your system. The subnet mask specifies the portion of an Internet address that is common to all node addresses on a particular subnet. The subnet mask determines which other network devices the instrument may address directly and which ones it must access through a gateway. A value of 0.0.0.0 turns off subnet support. The subnet mask is normally assigned by your system administrator.

Enter the new value in the format XXX.XXX.XXX.XXX (where each XXX represents a decimal number in the range of 0 to 255), and press the Return key. To retain the current value, press the Return key without entering any numbers.

Set Gateway Internet Address

Selecting item G from the Main menu lets you set the gateway Internet address. This is the IEEE802 gateway address for the local network. The value must be set to an address other than 0.0.0.0 to permit communication between the instrument and other devices not on the same subnet. This number is normally assigned by your system administrator.

Enter the new value in the format XXX.XXX.XXX.XXX (where each XXX represents a decimal number in the range of 0 to 255), and press the Return key. To retain the current value, press the Return key without entering any numbers.

Set Default X Server Name

Selecting item F from the Main menu lets you specify the system name of the X server that will display the window in the 9202XT or 92XTerm Autostart operating mode. In this mode, the instrument automatically initiates an X window display on the Default X Server when the instrument is powered on. Most X servers have only one display and one screen, so server_name:0.0 is the most common entry.

Enter the new value in the format server_name:d.s, where server_name is the system name of the X server device, d is the single digit number of the display on that device, and s is the single digit number of the screen on that display. The display number is required; however, the screen value will default to .0 if not specified. To retain the current name, press the Return key without entering any numbers.

This name is only for informational purposes, unless the default X server address parameter is set to Use Name. In this case, there must be an entry in the instrument's /etc/hosts table that associates this name with an X server address.

If the operating mode is set to something other than 9202XT or 92XTerm Autostart, this parameter has no affect. Your system administrator should provide you with the correct name for your default X server.

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Set Default X Server Address

Selecting item X from the Main menu lets you specify the default X server address. The default X server address specifies the Internet address of the X server that displays the window in the 9202XT or 92XTerm Autostart operating modes. In this mode, the instrument automatically initiates an X window display on the default X server when the instrument is powered on. If this parameter is set to the special value of Use Name, then the default X server name is used instead of the address. In this case, the default X server name and address must be entered in the /etc/hosts file.

If the operating mode is set to something other than 92XTerm Autostart or 9202XT, this parameter has no affect. Your system administrator should provide you with the correct Internet address for your default X Server.

Enter the new value in the format XXX.XXX.XXX.XXX (where each XXX represents a decimal number in the range of 0 to 255), or enter –1 to select the Use Name option, and press the Return key. To retain the current address, press the Return key without entering any numbers.

Set LANPCL Port Number

Selecting item L from the Main menu lets you set the service number assigned to the DAS LAN PCL (LANP) service. This number is used by host software requesting LAN PCL services from the instrument. The legal range of values for this entry is 1025 to 65535. Host software provided by Tektronix assumes that this service is assigned the value 10999. If you specify a different value, you must also change the host-based software.

Enter a new value in the range of 1025 to 65535, or press the Return key without entering number to retain the current value.

Set GPIB Port Number

The TLA 510 and 520 Logic Analyzers do not use GPIB; this selection is not available.

Update Terminal Flash ROM

If you have a Tektronix X terminal, you can use the Configuration utility to update the terminals internal Flash ROM. Updating the Flash ROM is only necessary when the terminal's software or fonts require updating with a new version. You may also need to update the Flash ROM as a result of any service work done to the terminal. If you desire to update the Flash ROM, you first must set the network configuration parameters for the instrument using the Configuration utility.

***NOTE**. You do not need to update the Flash ROM in the terminal to change the Internet address. Use the other selections in the Configuration Utility Main menu to update the internet information for the instrument. Update the terminal internet information in the Boot Monitor. Internet addresses and other networking parameters are normally assigned by your system administrator.*

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After setting the parameters, select item U to begin the Flash ROM update process. You are asked to confirm your actions before starting the operation. Enter y to confirm your actions.

A series of messages are displayed. When the operation is ready to load the X terminal software, information appears on the screen. Follow the steps listed below and the displayed instructions to update the Flash ROM. The following steps assume that you have a 9204XT terminal; the procedure is similar for other TekXpress X terminals.

Read the entire Flash ROM procedure on the terminal screen before continuing. To return to the start of the procedure on the screen, press the Return key.

1. Information about Step 1 of the Flash ROM procedure is displayed. Read the information carefully before proceeding.

2. The configuration parameters that you specified for the instrument are displayed on the terminal. Write these parameters down; you need to enter the parameters in the Boot Monitor (the parameters are not visible after you reset the terminal). Do not continue with the instructions on the terminal screen until you have completed steps 3 through 14 of the following instructions.

   The boot path information is case sensitive (upper or lower case). Be sure to copy the boot path exactly as displayed. The terminal will not boot properly if the boot path is wrong.

3. Reset the terminal by pressing the Control, Alt, and Delete keys simultaneously. When the Boot Monitor appears on the screen, press the space bar to stop the boot process. This prevents the terminal from completing the boot process before the parameters are set.

NOTE. *Some NVRAM parameters cannot be set at the Boot Monitor. If you experience problems with the Flash procedure, try restoring the factory settings by issuing the NVFACTORY command of the terminal and then returning to this procedure.*

---

4. Enter the Internet address for the terminal. For example:

   ```
   IADDR 123.21.1.0
   ```

5. Enter the Internet address for the instrument. For example:

   ```
   IHOST 123.123.125.2
   ```

6. Enter the Network Subnet Mask. For example:

   ```
   IMASK 255.255.255.0
   ```


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7. Enter the Gateway Internet address (if required). For example:

   ```
   IGATE 123.123.125.14
   ```

8. Enter the boot path name of the boot file. For example:

   ```
   BPATH /XP300/os
   ```

9. Enter the boot method parameter that the X terminal will use after the Flash ROM update is complete by typing:

   ```
   BMETHOD ROM
   ```

10. Save the entries in the terminal's nonvolatile memory by typing:

    ```
    NVSAVE
    ```

11. Enter the BOOT command to use for the Flash ROM update process by typing:

    ```
    BOOT TFTP
    ```

NOTE. *Do not continue with the following steps until the terminal has rebooted. The boot process is complete when the Serial window appears (the word "Connected" is displayed in the window).*

---

12. After the Serial window appears, press the Return key. Disregard the following messages that appear on the screen, and continue to step 13.

    ```
    Answering NO to this question will return you to STEP 1.

    Terminate the Flash procedure and return to the DAS boot
    prompt? Yes/[No].
    ```

13. Press the Return key until the following text appears:

    ```
    Are you ready to continue to STEP #2?
    ```

14. Enter y in response to the prompt. The text for Step 2 will appear on the screen.

    When you start the Flash Update process, the X terminal will write the parameters to the Flash ROM. The process will take approximately 10 minutes. When the terminal boots, the Flash ROM monitor displays the following message: FLASH UPDATE IN PROGRESS. If the message does not appear, the Flash Update process failed. Follow the suggestions displayed on the screen to identify any problems.

15. When you are ready to start the Flash Update process, enter y in response to the prompt on the screen. Verify that the Flash Update in Progress message is displayed.

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CAUTION. *Disturbing the terminal or the instrument can cause the Flash ROM Update process to fail. Do not move the terminal or the mainframe or press any keys unless instructed to do so. If the screen blanks out or goes dark, you can move the mouse or press one of the Shift keys to reactivate the display without disturbing the update process.*

16. If the Flash Operation Completed message is displayed, enter y in response to the next prompt on the screen. The text to Step 3 of the Flash Update procedure is displayed; carefully read this information. Entering n at the prompt returns you to Step 1 of the Flash Update procedure to restart the entire process.
17. Press the Control, Alt, and Delete keys simultaneously to reset (boot) the terminal from the Flash ROM. Verify that the Serial window appears after the boot process is complete.
18. If the Serial window does not appear, restart the Flash Update procedure again from the Configuration Utility Main menu.
19. If the Serial window appears, boot the instrument normally, and verify that the window displays on the terminal.

Typing the final command will exit the Configuration utility and you will be returned to the BOOT?> prompt.

Leave the Utility

There are two ways to leave the Configuration utility: by saving the changes or by discarding the changes. Either way, you will be returned to the BOOT?> prompt.

Select item E to save any changes and exit to the BOOT?> prompt. This is the normal way to leave the utility. All changes are saved and in effect when the instrument returns to normal operation.

Select item Q to discard the parameter modifications (except the operating mode changes). Major operating mode changes remain in effect. System changes resulting from the save, restore, or delete options also remain. If you performed the restore operation, you should use the Exit option to save the current parameter values in place of the values that were part of the restored image.

After quitting the Configuration utility, you will return to the BOOT?> prompt, from which you can execute the Install utility install new software, return to normal operation.

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Appendix F: User Service

This appendix describes user service procedures, self-test diagnostic procedures, brief fault isolation procedures and a list of instrument options.

The user service information is limited to fuse replacement and preventative maintenance. No user-serviceable parts are available inside the system unit. Replacement of internal components should be left to qualified service personnel. For service assistance, contact your local Tektronix service center.

Initial Inspection

The logic analyzer is inspected both mechanically and electrically before shipment. It should be free of mars or scratches and should meet or exceed all electrical specifications. To confirm this, inspect the system unit and terminal for physical damage incurred during transit. Always retain the product packaging in case shipment for repair is necessary. If there is damage or deficiency, contact your Tektronix representative.

Electrical performance verification procedures are available in the optional *TLA 510 and 520 Service Manual*.

Repacking for Shipment

If the logic analyzer is to be shipped to a Tektronix field service center for repair, attach a tag to the instrument showing the owner's name and address, the serial number, the software version number (displayed in the Diagnostics menu), and a description of the problem(s) encountered and/or service required. Always return any probes and cabling with the system unit so that the entire system can be tested.

When packing the instrument for shipment, use the original packaging. If it is unavailable or not fit for use, contact your local Tektronix representative to obtain new packaging.

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Preventive Maintenance

The electrical performance should be checked approximately once a year. Do this by running the power-on diagnostics and by performing any other performance checks and adjustment procedures as described in the *TLA 510 and 520 Service Manual*.

Preventive maintenance consists of periodic cleaning. Periodic cleaning reduces instrument breakdown and increases reliability. You should clean the system unit and terminal as needed, based on the operating environment.

Exterior System Unit

Clean the exterior surfaces of the system unit with a dry, lint-free cloth or a soft-bristle brush. If dirt remains, use a cloth or swab dampened with a 75% isopropyl alcohol solution. A swab is useful for cleaning in narrow spaces around the controls and connectors. Do not use abrasive compounds on any part of the instrument.



CAUTION. *Avoid getting water inside the system unit during external cleaning; use only enough water to dampen the cloth or swab.*

Do not wash the front-panel DC switch. Cover the switch while washing the system unit.

Use only deionized water when cleaning. Use a 75% isopropyl alcohol solution as a cleanser and rinse with deionized water.

Do not use chemical cleaning agents; they may damage the instrument. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

Floppy Disk Drive

The floppy disk drive requires routine maintenance to operate at maximum efficiency. The disks can be damaged if dirt and dust accumulate on the recording surfaces. To prevent damage, the disks should be properly stored in their protective containers where they will not be exposed to dust or dirt. In addition the head should be cleaned periodically.

You will need a 3.5-inch floppy disk head-cleaning kit for routine maintenance. Perform the routine maintenance as follows:

- Clean the face of the floppy disk drive monthly with a mild detergent dampened cloth.



CAUTION. *Do not allow detergent to enter the disk drive. When power is applied, the internal components may be damaged.*

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- Clean the head monthly. Follow the instructions provided with the head-cleaning kit.

Terminal

Clean the exterior surfaces of the terminal, keyboard, and mouse with a dry, lint-free cloth or a soft-bristle brush. A swab is useful for cleaning in narrow spaces around the controls and connectors. Do not use abrasive compounds.



CAUTION. *Avoid getting moisture inside the terminal during external cleaning: use only enough solution to dampen the cloth or swab.*

Use only deionized water when cleaning. Use a 75% isopropyl alcohol solution as a cleanser and rinse with deionized water.

Do not use chemical cleaning agents; they may damage the instrument. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

Clean the face of the display screen using a soft dampened cloth. Use a soft artist's brush to remove any dust or foreign matter between the keys on the keyboard.

Replacing the Line Fuse

The following procedure describes how to change the line fuse for the system unit. The system unit, with the appropriate power cord, can operate over the 115 VAC range and the 230 VAC range. The 115 VAC operation requires a 8 A, slow-blow fuse; the 230 VAC operation requires a 5 A, slow-blow fuse. The 230 VAC operation has a different fuse cap than the 115 VAC operation.

To change either fuse, perform the following steps:

1. Power off the system unit.
2. Wait 60 seconds and disconnect the power cord from the system unit. This allows time for the power-down sequence to complete.
3. Remove the line fuse and replace it with the appropriate fuse. Table F–1 lists the fuses and the Tektronix part number.

Table F–1: System Unit Fuse Replacement

Line Operation	Fuse	Tektronix Part Number
115 VAC	8 A, slow blow (3AG)	159-0046-00
230 VAC	5 A, slow blow (5 x 20 mm)	159-0353-00

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Power-On Diagnostics

Normally the system unit and the terminal run their respective diagnostics at power on. These tests provide basic checks to verify the operating status. Since the terminal provides the user interface, you should normally power on the terminal before powering on the system unit.

System Unit Diagnostics

The system unit runs diagnostics to check the internal components and operating software. When the diagnostics are successfully completed, most instrument functions are verified.

NOTE. *Diagnostics normally run at power on unless you specify Execute Custom in the Diagnostics field in the Boot Option overlay. In this case the diagnostics will execute on the next power on cycle after meeting the conditions in the overlay. Refer to* Boot Options Overlay *on page 3–54 for more information.*

Diagnostics take approximately 10 seconds for each instrument card installed in the system unit. If any error occur, you can display the error indication in the Diagnostics menu. The menu reports the diagnostic results with a PASS or FAIL indication. If a diagnostic error is found, the logic analyzer displays a four-digit error code adjacent to the faulty instrument card in the Diagnostics menu. In the event a failure occurs, record all displayed error information and contact your local Tektronix service center.

Terminal Diagnostics

The terminal is tested by a Kernel Self-Test and an Extended Self-Test. The Kernel Self-Test performs the minimum hardware tests to ensure that the terminal will boot. The test is executed at power on and takes approximately 10 seconds. The Extended Self-Test is intended for use by Tektronix service personnel. For more information on both tests, contact your local Tektronix service center.

Fault Isolation

The following fault isolation suggestions are provided to isolate problems to either the terminal, system unit, faulty probes, or operator setups. You should read through these procedures to help isolate a problem to a specific part of the instrument before contacting a Tektronix service center.

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Color Terminal Problems

The following sections provide information on problems that you may experience with the color terminal.

Baud Rate Problems. If the terminal serial window displays unusual characters, check the baud rate of the mainframe to ensure it is set at 38400 baud. Check the setting of the DIP switches on the controller board. Refer to Chapter 1 of this manual for information on setting the DIP switches.

Communication Parameter Problems. If the window does not appear on the color terminal, there may be problems with communication parameters on the terminal or the mainframe. Refer to *Appendix E: Configuration Utility* to check and set (if necessary) the mainframe network parameters or operating mode.

The terminal network parameters should match those listed in Table F–2. If not, perform the following steps to reload the terminal's default parameters.

Table F–2: Terminal Default Boot Parameters

Parameter	Default Value	Parameter	Default Value
IADDR	10.0.0.2	DNODE	0.0
IHOST	10.0.0.1	BMETHOD	ROM
IMASK	255.0.0.0	BDISPLAY	DISABLED
IGATE	0.0.0.0	BAFROM	NVRAM
BPATH	/XP300/os		

1. Reset the terminal by simultaneously pressing the Control, Alt, and Delete keys.
2. When the Boot Monitor displays on the screen, press the Space Bar to stop the boot process. This is necessary to prevent the terminal from booting before the parameters are set.
3. Enter the terminal's Internet parameters from the table; for example:

   ```
   IADDR 10.0.0.2
   ```

4. Enter the Internet address for the logic analyzer from the table; for example:

   ```
   IHOST 10.0.0.1
   ```

5. Enter the Network Subnet Mask from the table; for example:

   ```
   IMASK 255.0.0.0
   ```


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6. Enter the Gateway Internet address from the table; for example:

   ```
   IGATE 0.0.0.0
   ```

7. Enter the boot path name for the boot file from the table; for example:

   ```
   BPATH /XP300/os
   ```

8. Enter the boot method parameter that the terminal will use after the Flash ROM update is complete by typing:

   ```
   BMETHOD ROM
   ```

9. Save the entries in the terminal's nonvolatile ROM by typing:

   ```
   NVSAVE
   ```

Incorrect Data Acquired

The following steps are intended to help isolate problems if the logic analyzer acquires incorrect data.

- Verify that there is a good electrical connection between the system-under-test and the logic analyzer.
- Try acquiring the data with a different probe and see if the data is still incorrect.
- If you have a TLA 520 Logic Analyzer, try acquiring the data with a different acquisition module.
- Verify that your Setup menus are set up properly (for example, check the clock settings, channel assignments, and trigger settings).

No Data Acquired

The following steps are intended to help isolate problems if the logic analyzer does not acquire any data.

- Verify that your Setup menus are set up properly (for example, check the clock settings, channel assignments, and trigger settings).
- Verify that your probes are properly connected to the system-under-test and to the logic analyzer.
- Verify that your system-under-test is powered and running.

No Data from Pattern Generator

The following steps are intended to help isolate problems if the system does not output any data.

- Verify that your probes are powered.
- Check the pattern generator Monitor menu to verify that the single-step operation is not turned on (Trace=On).

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No Data Printed To Printer Connected to Auxiliary Port

The Print Screen Setup overlay indicates that data is not being sent to the local printer (the value of the Print job bytes does not decrease).

- Verify that the printer is on line and has paper.
- Verify that flow control and baud rate settings of the printer match the settings for the Auxiliary port in the Communication menu.

The Print Screen Setup overlay shows data being sent to the printer, but the printer does not print.

- Verify that the printer is on line and has paper.
- Verify that the output format specified in the overlay is compatible with the output format of the printer.
- Check the connections between the printer and the logic analyzer.
- Verify that flow control and baud rate settings of the printer match the settings for the Auxiliary port in the Communication menu.

No Data Sent to a Network File

No output file is sent to the remote host. The logic analyzer displays the following error message at the top of the menu: rcp: Failed to send file.

- Verify that your host and network are TCP/IP compatible.
- Verify that your host supports the UNIX rcp (remote copy) service.
- Verify that the host name, internet address, and user name are correctly specified in the Print Screen Setup overlay.
- Verify that your user account on the host allows remote access by the logic analyzer; if necessary, add the internet name of the logic analyzer to your .rhost file.
- Verify the Remote Path field in the Print Screen Setup overlay has a valid path. You can use either an absolute path name (for example, /user/david/print_output) or a relative path name (for example, print_output/). You must create the path name before executing the print operation.

No Data Printed to Network Printer

The Network Print Queue information in the Print Screen Setup overlay shows that data has been sent to the printer, but no output appears at the printer.

- Verify that the printer is on line and has paper.
- Verify that the output format specified in the overlay is compatible with the output format of the printer.

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An output image is generated and placed in the Network Print Queue (one or more print jobs are in the queue). However, the Status line in the Print Screen Setup overlay indicates that the logic analyzer cannot communicate with the host.

- Verify that the printer is on line and has paper.
- Verify that other hosts on the network can communicate with the printer.
- Verify that the network printer has a TCP/IP-compatible interface with lpr support.
- Verify that the internet address and printer name settings in the overlay are correct for the remote printer.
- Check the network connections between the logic analyzer and the printer (try executing the /etc/ping command from the terminal or workstation to the printer).

Instrument Options

The TLA 510 and 520 Logic Analyzers come standard with 8K record lengths but can be purchased with the options listed in Table F–3.

Table F–3: TLA 510 and 520 Options

Option	Description
01	Increase Record Length to 32K
02	Increase Record Length to 128K
03	Increase Record Length to 512K
04	Software Performance Analysis Tool
06	Increase Record Length to 2M
30 (TLA 510 only)	Add 16 Channels, 50 MHz Algorithmic Pattern Generation. Includes two P6463A probes.
1D (TLA 520 only)	Delete 48 acquisition and two clock probes, lead sets and KlipChip adapters
1X	Substitute 92XTERM Networked System Software

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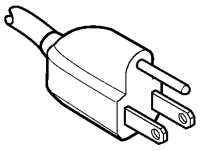
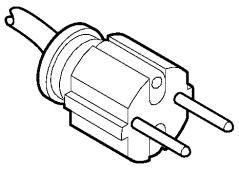
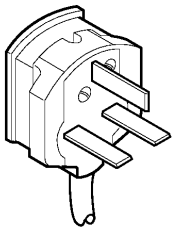
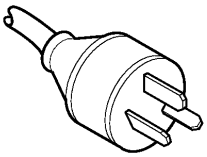
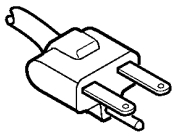
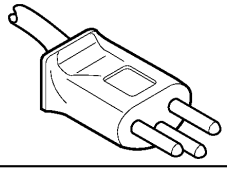
Table F–3: TLA 510 and 520 Options (Cont.)

Option	Description
4X	Substitute 17-inch terminal for 15-inch terminal
1P	Add six 8-channel lead sets, 72 KlipChips, 12 1-channel lead sets
5C	Thicknet (AUI)
8S	Replace standard 92A96 or 92C96 ribbon cables with high-performance coaxial cables

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Table F–4 lists the standard power cord options for the logic analyzer.

Table F–4: Power Cord Identification

Plug Configuration	Normal Usage	Option Number
	North America 115 V	Standard
	Europe 230 V	A1
	United Kingdom 230 V	A2
	Australia 230 V	A3
	North America 230 V	A4
	Switzerland 230 V	A5

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Appendix G: DASdisk Utility

The DASdisk utility program allows you to transfer files between the logic analyzer and a PC. Using a PC, you can then exit and analyze files, print files, and transfer files via modem or local area network.

These instructions describe the system requirements necessary to use DASdisk, how to install DASdisk on your PC, and how to use DASdisk.

PC System Requirements

The DASdisk program runs on IBM PC, XT, and AT compatible computers using DOS Version 3.0 or higher. DASdisk requires at least 640 Kbytes of memory and either two floppy disk drives (one 3.5-inch and one 5.25-inch floppy disk drive), or one 3.5-inch floppy disk and a hard disk. A hard disk is highly recommended.

The floppy disk density used on the PC must match that of the logic analyzer on which the disk is to be used.

The DASdisk program reads floppy disks that were created using the Disk Services menu of the logic analyzer or by the DASdisk program on a PC with a compatible disk drive.

NOTE. *You cannot read floppy disks used with the Backup User Files operation in the Disk Services menu.*

Installing DASdisk

To install DASdisk on the hard disk of the PC, create a directory named *dasdisk* at the root level of your disk. For example, if your hard disk is drive C, make a directory *C:\dasdisk*. Then copy the files from the DASdisk installation floppy disk to the new directory using the following command:

```
copy a:\*.* c:\dasdisk
```

The directory *dasdisk* should contain the following files:

- dasdisk.exe–the DASdisk executable program
- dasdisk.doc–DASdisk documentation
- ftinit–initialization data file

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The executable program is *dasdisk.exe*. You may want to add *\dasdisk* to your path variable in your *autoexec.bat* file to make this program executable from any directory. You could also place *dasdisk.exe* in another directory of executables.

If you do not have a hard disk, you should make a working copy of the DASdisk floppy disk and store the original in a safe place.

Using DASdisk

Type dasdisk and press the Return key to begin the program. If *\dasdisk* is not the working directory or you have not declared it as part of your path variable, you need to specify the path (and drive, if necessary). The Start-up menu displays.

When you execute DASdisk, it expects to find the initialization data file *ftinit* in the directory containing *dasdisk.exe*. If DASdisk fails to find this file, it displays an error message and ends the program. To override the default location of *ftinit*, follow the instructions described in *Optional Command-Line Switches*.

Insert the floppy disk that you intend to use to transfer data between the logic analyzer and the PC into one of the PC drives. The Start-up menu prompts you to enter the name of the disk drive holding the floppy disk. After entering the letter of the drive and pressing the Return key, the Main menu appears. Enter the number of the desired operation and press the Return key. You can also type the name of the operation or enough letters to uniquely identify the operation and then press the Return key.

File Sets

A file set consists of a number of files that have been combined. The system automatically creates file sets for certain DASdisk file types. Any file type that exists on the hard disk as a directory of files, rather than just one file, becomes a file set when it is copied to the floppy disk. Currently, the DASdisk file types that are file sets include the Trigger, Compare Mask, Reference Memory, and Setup file types.

DASdisk provides two operations for handling file sets: the Unpack and Pack operations. The Unpack operation lets you separate a file set into its individual files; the Pack operation lets you combine a group of files into a file set. You must perform the Pack operation on files that the system expects to be file sets (if they have been updated) before writing those files onto a floppy disk. See *The Unpack Operation* on page G–3 and *The Pack Operation* on page G–4.

***NOTE**. Most files on the logic analyzer are binary files.*

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Change Operation

When the DASdisk program executes, the first prompt asks you for the drive that contains the floppy disk. You can use the Change Operation to redesignate the floppy disk drive whenever desired. To redesignate the drive, select the Change Operation in the Main menu, enter the letter of the desired drive, and press the Return key. After the operation is completed, press any key to return to the Main menu.

Init Operation

You must initialize a formatted floppy disk before DASdisk can perform operations on the disk unless it has been formatted on the logic analyzer. The Init operation erases any information on the disk and initializes it. The disk must already be formatted. To initialize a disk, select the Init operation and confirm the operation. When the initialization operation is complete, press any key to return to the Main menu.

List Operation

The List Operation displays the contents of the floppy disk installed in the drive you specified. DASdisk groups the files into file types that are sorted in alphabetical order. The files within each file type are also displayed in alphabetical order. DASdisk displays the file name, size (in bytes), and date of creation. If the list is longer than one screen, the message MORE appears on the bottom of the screen. Press any key to display the next page of the list.

Dir Operation

The Dir operation lets you list the contents of a PC directory. To list the contents of a directory, select the Dir operation in the Main menu, specify the name of desired directory with either a full or relative path, and press the Return key. Pressing the Return key without specifying the directory in the PC Directory Name field displays the current working directory. If the specified directory does not exist, DASdisk aborts the operation. To return to the Main menu after the operation is complete, press any key.

You can use either / or \ in the pathnames. You can't use the wildcard character * to specify pathnames, but you can use it to specify which files should be listed. For example, if you enter *c:/dasfiles* or *c/dasfiles/**, DASdisk lists all files in the directory dasfiles. If you enter *c:/dasfiles/abc**, DASdisk lists all files in the dasfiles directory that begin with abc. DASdisk lists directories with their files in columns and sorted alphabetically. Subdirectories have / attached as a suffix.

Unpack Operation

The Unpack operation lets you unpack file set that exists as a single file on a PC. The Unpack operation separates a file set into individual files. DASdisk also creates a new file named *mapfile* that contains a list of the files in the original file set and both the logic analyzer and PC file names for each file. Because this file is required to repack a file set, be careful not to delete *mapfile* if there is a possibility that you will ever repack the file set.

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To unpack a file set, select the Unpack operation from the Main menu and perform the following steps:

1. In the PC Fileset Name field, enter the name of the file set to be unpacked; press the Return key. Pressing the Return key without specifying a file set aborts the operation.
2. In the Destination Directory Name field, enter the name of directory in which to place the unpacked files of the file set. DASdisk automatically creates this directory. If you press the Return key without specifying the directory, DASdisk assigns the specified file set name to the destination directory. If the name for the destination directory and the file set are identical, when the operation is complete, the original file set will no longer exist; if they differ, the original file set is unaffected.
3. Enter Y to confirm the operation.
4. After the operation is complete, press any key to return to the Main menu.

Pack Operation

The Pack operation lets you create a file set from files in a PC directory. You can also repack a directory that was unpacked. You perform the Pack operation on file types that the logic analyzer expects to be file sets. See *File Sets* on page G–2 for a list of file types.

If you repack a directory, the directory will contain a file called *mapfile* which contains a list of the original files in the file set. This file must be present in the source directory to successfully pack the file set. DASdisk will only pack files in the directory that were in the original file set.

To pack a file set, select the Pack operation in the Main menu, and perform the following steps:

1. In the PC Directory Name field, enter the name of the directory that contains the files to be packed; press the Return key. Pressing the Return key without specifying a directory aborts the operation.
2. In the Destination Directory Name field, enter the name of the packed file set. If the destination file set exists already, its contents will be overwritten. If you press the Return key without specifying a file set name, DASdisk names the file set with the name of the directory to be packed. If the file set name and the directory name are identical, when the operation is complete, the directory will no longer exist; if they differ, the source directory is unaffected.
3. Enter Y to confirm the operation.
4. After the operation is completed, press any key to return to the Main menu.

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Add Operation

The DASdisk program only works with file types that are in its File Type List. The Add Operation adds new types to the list. To add a file type to the list, select the Add operation in the Main menu, and perform the following steps:

1. In the New File Type Name field, enter the name of the file type that you want to add; press the Return key. Pressing the Return key without entering a file name aborts the Add operation.
2. In response to the prompt, enter a Y to confirm that the file is an ASCII file. Enter N if the file is a binary file.
3. Enter Y to confirm the operation. DASdisk displays an updated list of file types showing the new file type. DASdisk aborts the operation if the new file type already existed on the list of file types.
4. Press any key to return to the Main menu.

NOTE. *Be sure that the file type you specify is a valid File Type. If an invalid File Type name is used, floppy disk files of the invalid type will show on the screen but they cannot be copied to the hard disk. Use the Remove operation to delete invalid File Types.*

Remove Operation

The Remove Operation lets you remove a file type. You may want to use this operation to remove a file type that was added by mistake. You can also use the Remove operation to delete file types you never intend to use. You can use the Add operation to add file types that you remove and later need.

The Remove menu that appears when you select the Remove operation from the Main menu. To remove a file type, enter the number of the file type to remove and press Y to confirm the operation. Press the Return key to return to the Main menu.

Read Operation

To read a file or a file set from a floppy disk to the PC, select the Read operation in the Main menu, and perform the following steps:

1. Enter the name of the file in the File Name field; press the Return key. Pressing the Return key without entering a file name aborts the Read operation.
2. Enter the PC file name in the PC File Name field; press the Return key; DASdisk displays a list of file types. If no name is entered, the disk file name is used.
3. In the File Type Number field, enter the correct file type number from the list of file types. If the correct file type is not on the list, you must add the file type to the list by using the Add operation.

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4. Enter Y to confirm the operation. DASdisk searches the floppy disk directory for a file that matches the Disk File Name of the specified file type. If there is a match, the file will be copied to the PC. If you do not confirm the operation or there is no matching file, the Read operation aborts.

5. Press any key to return to the Main menu.

If you enter * or *.* in the Disk File Name field and confirm the operation, DASdisk reads and copies all the files on the disk. DASdisk displays both the original file name and the new file name. If the file name is not a valid PC file name, DASdisk will construct a new file name based on the original. To insure that two similar file names are not converted to the same PC file name, make sure that the first eight characters of the file name are unique and valid.

If the file you are reading is a multiple-volume file, each time a new floppy disk is needed, DASdisk prompts you to continue with the Read operation.

If the file is an ASCII file (as opposed to a binary file), a file conversion operation is performed on the PC after the transfer. This conversion requires that there be enough free space on the destination drive before the transfer begins to temporarily hold two copies of the file.

Write Operation

The Write operation lets you copy a file or file set from the PC to the floppy disk. To write a file, select the Write operation, and perform the following steps:

1. In the PC File Name field, enter the name of the PC file you want to copy. Pressing the Return key without entering a file name aborts the Write operation.

2. In the Disk File Name field, enter the file name that you want to use for the name of the file on the floppy disk. Press the Return key; DASdisk displays a list of file types. If no name is entered, the PC file name is used.

3. In the File Type Number field, enter the correct file type number. If the correct file type is not listed, add a file type using the Add operation.

4. Enter Y to confirm the operation.

5. Press any key to return to the Main menu.

If the named file already exists on the floppy disk, an error message is displayed and the operation is not performed. You will have to delete the file from the floppy disk (using the Delete operation), before the write can be performed.

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File names longer than 14 characters are truncated to 14 characters; no warning message is displayed. All alphanumeric characters and the following special characters are valid:

```
.       $       #       &
@       !       %       -
(       )       {       }
'       ^       _
```

You can only use one period in a file name, and it cannot be the first character.

NOTE. *Make sure that you specify the correct file type when writing a PC file to the floppy disk. For example, putting a setup file on the floppy disk but identifying it as a reference memory file type may cause the logic analyzer to malfunction when it tries to use the file.*

The DASdisk program informs you if a file to be copied in this operation will not fit on a single floppy disk. It also tells you how many blank floppy disks will be required. You are then asked if you want to continue with the operation. If so, the floppy disk will be written to until filled and you will be prompted to insert the next blank floppy disk. A multiple-volume floppy disk set can contain only one file.

Delete Operation

The Delete operation lets you erase a file on a floppy disk. To delete a file, select the Delete operation in the Main menu, and perform the following steps:

1. In the Disk File Name field, enter the name of the file to delete; press the Return key. DASdisk displays a list of file types. Pressing the Return key without entering a file name, aborts the Delete operation.
2. In the File Type Number field, enter the correct file type number.
3. Enter Y to confirm the operation. DASdisk searches the floppy disk directory for a file that matches the Disk File Name. If a match exists, the file is deleted from the floppy disk. If no match exists or you do not confirm the operation, the operation aborts.
4. Press any key to return to the Main menu.

Quit Operation

Selecting this operation from the Main menu causes an orderly return to DOS and restores the default PC screen colors. If you leave DASdisk using Ctrl-C (holding down the control key while typing the character C), the PC screen colors will remain as they were in the DASdisk menus.

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Optional Command-Line Switches

You can use four optional command-line switches in the program execution command line. The switch character can be either a - or a /. The switch parameter must immediately follow the switch character (no space is allowed between the switch character and the parameter).

The following two examples show how to use the DASdisk command-line switches:

```
dasdisk [/d<drive>][/h<home>][/c<color>][/b<batch>]
```

```
dasdisk [-d<drive>][-h<home>][-c<color>][-b<batch>]
```

The /d switch lets you specify which drive has the floppy disk. The character immediately following the /d is taken as the drive name. For example, /da specifies drive A. If you do not specify the /d switch, the program asks you which drive to use. Uppercase and lowercase characters work identically.

The /h switch lets you specify the DASdisk home directory. This is the directory in which the DASdisk program looks for the necessary *ftinit* file. The DASdisk program uses the default home directory if you do not specify the /h switch. The default home directory is the directory containing the dasdisk.exe file.

The /c switch lets you select the PC screen text and background colors. The /c switch has no effect if your PC does not have a color display. This switch can be used in two forms: /cword or /cTB.

In the /cword form, you select a contrasting pair of colors from the colors shown in Table G–1. For example, if you specify /cblue, your text would be white and the background would be blue. You can use either uppercase or lowercase letters.

Table G–1: Screen Colors vs Switch Word

word	text	background
blue	white	blue
gray	white	gray
red	white	red
yellow	yellow	gray
cyan	white	cyan
magenta	white	magenta
brown	white	brown
green	yellow	green

In the /cTB form, you specify two different colors for the text and background by entering two characters from the list below. For example, if you specify /cWB, your text would be white and the background would be blue. The /cTB switch is case sensitive.

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Table G–2 lists valid color characters.

Table G–2: Valid Color Characters for DASdisk

Character	Color	Character	Color
k	black	K	gray (light black)
b	blue	B	light blue
g	green	G	light green
c	cyan	C	light cyan
r	red	R	light red
m	magenta	M	light magenta
y	brown (dark yellow)	Y	light yellow
w	white	W	bright white

You may also use the characters P or p (purple) to specify magenta, and T or t (turquoise) to specify cyan.

If you specify the same color for text and background, your input is ignored. The /c switch is only valid while running DASdisk. When you exit DASdisk using the Quit function, default DOS colors are restored.

The /b switch tells the program to run in batch mode rather than in the default interactive mode. Here is an example of a command to run dasdisk in batch mode:

```
dasdisk -b <infile >outfile
```

In this example, *infile* contains whatever would be typed to perform the desired operations when running interactively. *Outfile* will contain whatever would normally be written to the screen. Comments are allowed within a batch file. They should have the following format:

```
# Comment text
```


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Table G–3 shows examples of some DASdisk commands:

Table G–3: Examples of DASdisk Commands

Command	Action
dasdisk -db	Runs DASdisk from drive B.
dasdisk /DA	Runs DASdisk from drive A.
dasdisk -h\usr\sharon	Makes \usr\sharon the home directory.
dasdisk /Hc:\DAS9200\files	Makes \DAS9200\files on drive C the home directory.
dasdisk -cblue	Selects the blue color scheme.
dasdisk /cgray	Selects the gray color scheme.
dasdisk -cCC	The command is ignored because the same color is specified for text and background.
dasdisk -cP	Sets the text to magenta; leaves the background unchanged.
dasdisk -da -h\das -ccyan	Selects drive A as the active disk drive; makes \das on the current drive the home directory and selects the cyan color scheme.
dasdisk -b <infile >outfile	Runs DASdisk in batch mode taking input from infile and writing output to outfile.

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Glossary

9204XT
An early version of the 14-inch color X terminal.

9205XT
An early version of the optional 17-inch color X terminal.

9206XT
A color X terminal. The standard terminal is a 15-inch terminal; you can also order an optional 17-inch terminal.

92C96D
The 96-channel, 32 k memory, 100 MHz data acquisition module. It is used for software performance analysis, microprocessor support, and high-speed timing analysis (up to 400 megasample asynchronous acquisition).

92C96XD
The 96-channel, 128 k memory, 100 MHz data acquisition module. It is used for software performance analysis, microprocessor support, and high-speed timing analysis (up to 400 megasample asynchronous acquisition).

92C96SD
The 96-channel, 512 k memory, 100 MHz data acquisition module. It is used for software performance analysis, microprocessor support, and high-speed timing analysis (up to 400 megasample asynchronous acquisition).

92A96UD
The 96-channel, 2 M memory, 100 MHz data acquisition module. It is used for software performance analysis, microprocessor support, and high-speed timing analysis (up to 400 megasample asynchronous acquisition).

92LANSE
The Local Area Network module that allows you to connect the mainframe to a local area network for LAN operations. The 92LANSE Module is standard with each mainframe.

92S16
The 16-channel, 50 MHz algorithmic pattern generator module. The 92S16 can be used as a stand-alone stimulation source or linked with a data acquisition module to provide a test system for debugging and verifying components, boards, and systems. (See also *Algorithmic Pattern Generator.*)

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Acquisition
The capturing of data from a system under test by a logic analyzer. Data is conditionally stored in acquisition memory in preparation for formatting by the user. (Data may be clocked into the logic analyzer, yet qualified out before it can be stored in acquisition memory.) Use the trigger menu of the appropriate acquisition module to specify whether or not data is stored.

Acquisition Clock
The clock, internal to the logic analyzer, that loads acquired data into the acquisition memory. This clock can be derived from an internal source (asynchronous to the system under test) or from an external source (synchronous to the system under test).

Acquisition Cycle
A complete data acquisition sequence including start, search, capture, and stop phases.

Acquisition Memory
The RAM located on each acquisition card where data from an acquisition is stored.

Acquisition Memory Sequence
A single sample of acquired data to which a unique identification number is assigned. As data is acquired, each sample is assigned a consecutive sequence number.

Address
A number or expression that designates a specific location in a storage or memory device.

Algorithmic Pattern Generator
A programmable pattern generator (like the 92S16) that provides storage for data vectors and control flow instructions. Algorithmic pattern generators can be programmed to branch, loop, and perform subroutine calls. By using internal registers and control flow instructions, algorithmic pattern generators can use a relatively small vector memory and still provide an unlimited number of vectors. The 92S16 algorithmic pattern generator can also perform conditional branches based on signals received from the circuit under test. (See also *92S16*.)

Aliasing
The condition that occurs when data from a system under test is sampled at a rate that is slower than the rate at which data changes. Aliasing results in meaningless data because the logic analyzer will miss data changes between the sample points. Data pulses that fall between sample clocks meet the technical definition of a glitch and will be stored and displayed as such. (See also *Aysnchronous Acquisition*.)

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Application Bus
Provides high speed communication (250 MHz) within modules and between adjacent module slots.

Application Software
Software packages designed specifically to aid in certain tasks. The application software resides on the hard disk as part of system software and can be loaded from floppy disks.

ASCII
Abbreviation for American Standard Code for Information Interchange, an eight–bit code representing characters and control functions.

Assert
To cause a signal or line to change from its logic false state to its logic true state.

Asynchronous Acquisition
An acquisition made using a periodic clock signal generated internally by the logic analyzer. The clock signal is, therefore, asynchronous to the user's circuit and should be considerably faster than the user's data rate to avoid aliasing. (See also *Aliasing*.)

Autorun
A mode of operation in which a logic analyzer automatically performs continuous acquisition cycles comparing the acquisition against a reference memory until a predefined condition is met.

Card
An individual circuit board which occupies a single slot in the logic analyzer mainframe. An individual card may or may not constitute a module; some modules consist of multiple-card sets. (See also *Module*.)

Clause
A trigger specification term. The combination of an Event and an Action. When the Event is satisfied, the Action is performed. (See also *Compound Action*, *Compound Event*, *Simple Action*, and *Simple Event*.)

Clock Cycle
A clock sequence that includes both high- and low-going transitions.

Clock Equation
The Boolean combination of events needed to generate a storage clock. You can define a variety of clock inputs and link them using Boolean operators. Data will only be sampled and stored in memory when this clock equation is true.

Clock Qualification
The process of filtering out irrelevant data by combining an acquisition clock with one or more bus signals.

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Clock Qualifier
An external signal that acts as a gate for the acquisition clock. When the external signal is false, the acquisition clock is not allowed to load acquired data into the acquisition memory. (See also *Acquisition Memory.*)

Cluster
A group of modules, started and stopped as a unit, collected to perform a specific function. Clusters are defined by the user in the System Configuration menu. Only clustered modules can be time correlated or pass signals between modules. Two clusters can run simultaneously, but cannot interact. (See also *Module*.)

Compound Action
Two or more *Simple Actions* executed simultaneously.

Compound Event
A Boolean combination of two or more *Simple Events*.

Control Bus
Provides buffered address, data, and control lines to support the transfer of setup, status, and data information between the Controller board and the modules.

Controller Board
A circuit board permanently resident in the mainframe. The Controller board provides all computing resources.

Correlation
The tracking of independent events captured by different acquisition modules and indicating how they relate to each other in time. Specifically, the chronological interleaving of data from different acquisition modules into a single display. Correlation shows real-time interactions between independently clocked circuits.

Correlation Bus
Passes signals for time correlation between acquisition modules.

Counter
A circuit or device that records occurrences of some specified input.

Cursor
A marker representing a specific location on the terminal screen. There are two types of cursors: a *Data Cursor* and a *Field Cursor.*

DAS
Digital Analysis System. A family of configurable logic analysis systems.

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Data Cursor
A cursor used to temporarily mark a data sequence location. The data cursor becomes active once a data window (for instance, a state display or timing diagram) is opened.

Delta Mark
A user-placed mark (appears as a triangular delta symbol) on a timing diagram display that can be used as either the start point or end point of a delta time measurement.

Delta Time
The time difference between two points in memory. For example, the difference between a trigger point and the data cursor in a timing diagram display.

Demultiplex
To identify and separate multiplexed signals (for instance, some signals from a microprocessor). To separate different signals sharing the same line and organize those signals into useful information.

Deskew
Removing or minimizing time delay between signals with respect to each other.

Display Menu
A general class of menus that allows you to view data that you have acquired. Examples of display menus include State and Timing menus.

DNRZ
Delayed Non-Return to Zero data format. This format lets you specify a delay value for the leading edge of a signal. The signal will remain asserted until it is forced low by the next data value.

Don’t Care
A symbol (X) used in place of a numeric character to indicate that the value of a channel or character is not to be considered.

Edge
A signal transition from low to high or high to low.

Edge Positioning
The process of or ability to choose the relative position of the output channel transitions of the pattern generator.

Edge-sensitive
A trigger specification term. An event recognizer is said to be edge-sensitive when the event is only true in an acquisition cycle in which a transition occurs on the selected channels. (See also *Level-sensitive*.)

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Edge Triggering
A technique that uses a logic-level transition rather than a logic state as a trigger condition. The logic analyzer would trigger on the transition to a defined state. (See also *Trigger.*)

Event
See *Simple Event* and *Compound Event*.

Event Bus
Provides a means for modules to communicate low-speed events (≥ 40 ns) to each other in real time.

Event Filter
A trigger specification feature that lets you specify the amount of time an event must be present in order to be considered true.

External Clock
A clock external to the logic analyzer and usually synchronous with the system under test. (See also *Acquisition Clock* and *Internal Clock*.)

External Clocking
A clock mode in which the sampling of input logic signals is synchronized with the activity of the system under test. The representation of the signals is stored in memory by what is commonly called the external (or synchronous) clock (that is, a signal supplied externally to the logic analyzer).

Field
A display region containing a value (or values) that can be selected or modified.

Field Cursor
A screen marker used to move from field to field.

Field Note
A brief, on-line description of the field in which the cursor currently resides. Part of the *Notes System*.

Fill-in Field
A display field that has no list of choices. Instead, you enter a value by typing a string of characters into the field.

Flag
A bit that can be set as a marker. A flag can be used as either an event or an action in a trigger specification program. When used as an event, a flag is tested for true/false value like any other event; when used as an action, a flag can simply be set or cleared as the result of a condition being satisfied.

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Glitch
A signal that makes a transition through the threshold voltage two or more times between successive sample clocks. Signals that are faster than the sampling rate, such as noise spikes or pulse ringing, can be captured by a logic analyzer as glitches. Glitches are only appropriate to asynchronous acquisitions.

Hold Time
The length of time a signal must remain stable after the acquisition clock has occurred in order to be considered valid.

Interactive Triggering
The use of trigger setups to allow two modules to work together. Interactive triggering might involve such applications as the passing of trigger signals from one module to another, the arming of one module by another, and intermodule handshake capability.

Internal Clock
A clock mode in which the sampling of input logic signals occurs asynchronously to the activity of the system under test. The representation of the signals is stored in memory by what is commonly called the internal (or asynchronous) clock.

Joydisk
An octagonal button on the display that is used for scrolling data.

Key Note
A brief on-line description of any active function key. Part of the *Notes System*.

Level-sensitive
A trigger specification term. An event recognizer is said to be level-sensitive when the event is only true in an acquisition cycle in which the selected channels are true for a specified amount of time. (See also *edge-sensitive* and *event filter*.)

Menu Selection Overlay
An overlay that lists the installed modules (or clusters) in your mainframe and the available menus.

Microprocessor Support
Optional microprocessor support software that allows the logic analyzer to disassemble data acquired from microprocessors.

Mnemonic Disassembly
A display format for data acquired from a microprocessor or a data bus (for example, GPIB). A logic analyzer decodes bus activity and displays it as cycle types, instruction names, interrupt levels, etc. Advanced forms of mnemonic disassembly can detect queue flushes and provide a display that resembles the original assembly language source code listing.

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Module
A functioning acquisition or pattern generation unit. A module may consist of one or more cards. You can use the System Configuration menu to combine cards of the same type to create variable-width modules.

Notes System
On-line documentation provided with the software. This information is provided in the form of brief, quick-access notes. Two types of notes are available: *Field Notes* and *Key Notes*.

Overlay
A temporary display that partially covers the currently displayed menu; usually opened by selecting a function key.

P6463A Probe
A pattern generation probe used with the 92S16 Pattern Generation Module.

P6465 Probe
A pattern generation probe used with the 92S16 Pattern Generation Module.

Paged Memory
Acquisition memory can be divided into pages, with each page containing a given number of samples. Allows you to make multiple acquisitions around the trigger within a single acquisition memory.

Pattern Generator
An instrument module that outputs binary data at specified time intervals. (See also *92S16*)

Pipeline
The several stages of latches that acquired data must be clocked through to reach acquisition memory.

Pod
A fixed group of pattern generator data channels. (See also *Pod Connector.*)

Pod Clock
Each P6464 and P6465 pattern generator probe provides nine data channels and one pod clock line. The pod clock is asserted for each pattern generator clock cycle. The leading edge of the pod clock signal can be delayed ±5 ns relative to the master clock signal; the pulse width is approximately 8 ns.

Pod Connector
A multipin connector that receives data acquisition and pattern generation probes. Pod connectors form the physical connection between the logic analyzer and each probe.

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Pod ID
A number that identifies the location of each probe (slot number plus pod letter; for example: 2B). Each probe contains a button that, when pushed, causes the Pod ID for that probe to appear on the screen.

Podlet
A circuit contained in a flex lead and attached to a probe that provides square-pin connections to the circuit under test for one data acquisition channel (or one pattern generation channel) and a ground pin.

Post-fill
A requirement that a logic analyzer continue to acquire data after the trigger until a predetermined number of samples has been taken. When the trigger position is programmed to occur in the center of memory, a logic analyzer will take enough data samples after the trigger to fill one half of the acquisition memory. (See also *Trigger Position*.)

Post-processing
Any type of acquisition (or reference) memory analysis that occurs after, rather than during, the acquisition.

Power Supply Bus
Distributes power to all instrument slots.

Pre-fill
A requirement that a logic analyzer fill a predetermined number of acquisition memory sequences with new data before accepting a trigger. With the trigger programmed to occur in the center of memory, one half of the memory must be filled before the trigger. (See also *Trigger Position*.)

Probe
An input (acquisition) or output (pattern generation) device constructed as a separate unit. As an input device it transmits the input signal from the circuit under test to the logic analyzer. As an output device it transmits the output signal from the logic analyzer to the circuit under test.

Probe Adapter
A microprocessor-specific lead set that connects the acquisition module's Probe to a system under test. For example, the 80286 Probe Adapter.

Program-Controlled Function Key
Each program-controlled function key (there are eight, F1-F8) accesses a series of specially-assigned functions. These functions are display-dependent; in other words, they vary from menu to menu.

Program Flow Control
The process of branching or jumping to/from subroutines or other sections of code.

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Programmatic Command Language
The entire set of DAS programmatic commands is called the Programmatic Command Language, or PCL. The command language can be ordered with the 92LANP application software product.

R1
Return to One data format. A channel selected to be an R1 channel always returns a logic 1 after a specified delay and pulse width. R1 and RZ data formats are complements. (See also *RZ* and *DNRZ*.)

Refmem
An abbreviation for *Reference Memory.*

Reference Memory
Acquired data that has been stored in a file for use as a reference base (for instance, to compare with future acquisitions).

Resolution
The minimum detectable interval between data transitions on a single acquisition channel or between data transitions on any two acquisition channels.

RZ
Return to Zero data format. A channel selected to be an RZ channel always returns a logic 0 after a specified delay and pulse width. RZ and R1 data formats are complements. (See also *R1* and *DNRZ*.)

Sample Clock
A timing signal that establishes the rate of data sampling.

Sampling Rate
The frequency at which data is logged into the logic analyzer.

Scrolling
A method of positioning a portion of a data display too lengthy to be contained on the screen in its entirety.

Select Field
A screen field that allows you to make a selection from a predefined set of choices.

Self-Contained Network
An Ethernet network consisting of a logic analyzer, X terminal, and printer. This network does not include a host computer.

Setup File
A file stored on the logic analyzer's hard disk containing setups for acquisition or pattern generation modules. These setup files can be used to restore setups from the hard disk drive.

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Setup Menu
A general class of menus concerned with pre-acquisition details. Available setup menus depend on the modules in your logic analyzer.

Setup Time
Length of time an input signal must be present (before being clocked) to be considered stable and valid.

Signal Event
When a trigger menu includes a signal from another module in an event clause, that signal is called a signal event. (See also *Simple Event*.)

Simple Action
A trigger specification term. Any action that can be performed by an acquisition module running in real time. (See also *Compound Action*).

Simple Event
Any of several conditions (events) that can be detected by a running acquisition module. Examples of simple events include: word recognizers, timer/counters, external triggers, and signals passed from other modules. Simple events can be combined with Boolean operators to create *Compound Events*.

Skew
The relative time difference between input channels, specified in terms of one edge relative to another. The misrepresentation of data caused by parallel channels with different propagation delays.

Split-screen
A feature available in some display menus that lets you divide the screen display area into two data windows (split either horizontally or vertically). Each window has its own cursor and can display its own source of data and its own display type.

Stand-alone
A self-contained logic analysis system, rather than a remote host configuration in which the logic analyzer acts as a peripheral to a host computer.

State
A trigger specification term. Only one state (or step) in a trigger specification program is active at any one time. Usually expressed in the form of an *if...then* construction. (See also *Trigger Specification Program*.)

State Display
Tabular representation of logic states of input data channels.

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Step Mode
A feature of the 92S16/32 Pattern Generation Module's Monitor menu that causes the pattern generator to single-step through its program one sequence line at a time. Allows you to see each instruction and vector as it interacts with the system under test.

Storage Qualification
The process of filtering out data that has been acquired but which you do not want to store in acquisition memory. This allows you to avoid filling up your module's acquisition memory with irrelevant data samples. (See also *Clock Qualification.*)

Symbolic Radix
A format that allows you to substitute mnemonics (names) for radix numbers when using menus. You enter your own mnemonics into the Symbol Table menu. The logic analyzer will replace radixes throughout the menu structure with these assigned values.

Synchronous Acquisition
An acquisition made using a clock external to the logic analyzer. Such a clock is usually generated by the user's circuitry and is therefore synchronous to it. This external clock may or may not be periodic.

System Software
System-level software stored on a hard disk and loaded into system memory at power on. All logic analyzer operations require this software.

System Unit
A mechanical cabinet providing power, cooling, and backplane resources. The system unit also houses, acquisition and pattern generation instrument modules, I/O connectors, and drives for both hard and floppy disks.

Threshold
A voltage to which input signals are compared.

Time Base
Source of the acquisition clock. The timebase can be selected to be an internal source, a single external source, or a Boolean combination of several external signals. (See also *Acquisition Clock*, *External Clock*, and *Internal Clock*.)

Time Base Bus
Provides four programmatic timebases useable by any modules for asynchronous acquisition and timestamp operations. (See also *Timestamp*.)

Timer
A device that lets you make time measurements during a data acquisition.

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Timestamp
A separate clock value stored with each acquisition cycle. Provides performance analysis features and time correlation for multiple acquisition memories and timing measurements.

Timing Display
Graphic representation of data states and timing relationships as digital (two-state) waveforms.

TLA 510
The 100-channel Tektronix Logic Analyzer. The TLA 510 Logic Analyzer comes with a color terminal and can be ordered with an optional pattern generation module.

TLA 520
The 200-channel Tektronix Logic Analyzer.

Trace Mode
A feature of the 92S16/32 Pattern Generation Module's Monitor menu that causes the pattern generator to run at a clock rate slow enough to allow you to spot developing trends and to detect program flow changes due to test and branch instructions.

Trigger
An event or condition that leads to the end of the acquisition cycle. When started, a logic analyzer continuously acquires data from a system under test until the trigger occurs. After triggering, the logic analyzer continues to load data until the post-fill requirement is met. (See *Pre-fill* and *Post-fill*.)

Trigger Event
The last (or only) event in the sequence of events that causes a data acquisition module to trigger.

Trigger Position
Where the trigger resides in acquisition memory. Electing to place the trigger in the center of memory means that half of the acquisition consists of data that occurred after the trigger.

Trigger Specification Program
The highest level of triggering control. A trigger specification program is composed of one or more *States*.

Unassert
To cause a signal or line to change from its logic true state to its false state.

Utility Menu
A general class of menus that serve as system-level tools. These menus are accessible from anywhere in the menu structure. The list of available utilities remains constant, regardless of installed module(s).

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Word Recognition

The matching of a specific data word with the presence or absence of that word in signals acquired by the logic analyzer.

Z

A character that, when entered in place of a numeric value in the 92S16/32 Program menu, specifies the internal inhibit bit for the pattern generators.

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