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8560 Option	Product
25	8560L01

This manual supports a software module that is compatible with:

TNIX Version 1 (8560)

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8560
MULTI-USER SOFTWARE DEVELOPMENT UNIT

DIGITAL DESIGN LAB

SYSTEM USERS MANUAL

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

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Product Group 61

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ABOUT THIS MANUAL

This manual tells you how to use the Digital Design Lab (DDL) software with the following TEKTRONIX products:

- 8560 Multi-User Software Development Unit
- 8540 Integration Unit with emulator and Trigger Trace Analyzer (TTA)
- DAS 9100 Digital Analysis System (DAS) with State Stamp Probe and optional Personality Module (PM) and Personality Module Adapter (PMA)

This manual is organized as follows:

Section 1, Learning Guide. Introduces the basic concepts, features, and functions of DDL; describes the individual components, and shows how to configure them; gives instructions for installing the DDL software; introduces the GUIDE menus, and shows you how these menus allow the new or casual user to perform DDL functions with minimal effort.

Section 2, Typical DDL Session. Presents an example DDL session that illustrates many of the functions of the DDL system.

Section 3, Command Dictionary. Describes each DDL command. Each description shows command syntax, defines command parameters, and gives examples of correct usage.

Section 4, Technical Notes. Provides miscellaneous technical information, including discussions of the time-correlation algorithm, the DDL disassembly feature, and the DDL system diagnostics.

Section 5, File Formats. Describes the formats of files that DDL creates and uses.

Section 6, Tables. Contains tables relating to the DDL software, including a one-page summary of DDL commands.

Section 7, Error Messages. Lists each DDL error message and describes probable causes and possible solutions.

Section 8, Glossary. Defines terms that are unique to the DDL system.

Section 9, Index. Contains an alphabetized list of major terms and concepts, giving the section and page number where they are discussed.

This manual assumes that you are familiar with the operation of each DDL system component. You may need to refer to the following manuals for details on specific components of the DDL system:

8560 System Users Manual. Describes the 8560 and its TNIX operating system.

8560 Installation Guide. Shows you how to install your 8560.

8540 System Users Manual. Describes the 8540 and its OS/40 operating system.

DAS 9100 Series Operators Manual. Shows you how to set up and use the DAS.

DAS 9100 Series DDL State Stamp Probe Instructions. Describes the electrical characteristics and operating principles of the State Stamp Probe.

8500 Modular MDL Series Trigger Trace Analyzer Users Manual. Shows you how to set up and use the TTA.

PMA 100 Operators Manual. Shows you how to use the PMA with the DAS.

PMA 100 Disassembly Tape Instructions. Shows you how to use the various mnemonics tapes with the DAS.

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ILLUSTRATIONS

Section 1

LEARNING GUIDE

INTRODUCTION

This Learning Guide gives you an overview of the concepts, features, and functions of the Digital Design Lab (DDL) system. This section also shows you how to install the DDL software and how to use the GUIDE menus to perform DDL functions.

This Learning Guide discusses the following topics:

- **Overview of the DDL System.** Describes the "time-correlation" problem and the DDL solution; introduces the DDL system features and functions; briefly discusses each component of a typical DDL system.
- **Configuring the DDL System.** Shows you how to connect and set up the DDL system components; describes the DDL system requirements and restrictions.
- **Installing the DDL Software.** Tells you how to install the DDL software on your 8560.
- **Using the 8560 GUIDE.** Shows how the GUIDE menus allow the new or casual user to perform DDL functions with a minimum of effort.
- **For Continued Learning.** Helps you decide where to go next to accomplish your own tasks.

After reading this Learning Guide, you should have a good understanding of the basic principles of the DDL system, its components, and its uses. Subsequent sections of this manual discuss specific DDL topics in detail.

This manual assumes that you are familiar with the operation of each DDL system component. Refer to the appropriate manuals for details on specific components.

Figure 1-1 shows the components that comprise a typical DDL system configuration. Figure 1-1(a) shows the system without the optional Personality Module (PM) and Personality Module Adapter (PMA). Figure 1-1(b) shows the system with the optional PM and PMA. Note that when you use the optional PM and PMA, the DAS can acquire data only from the PM/PMA.

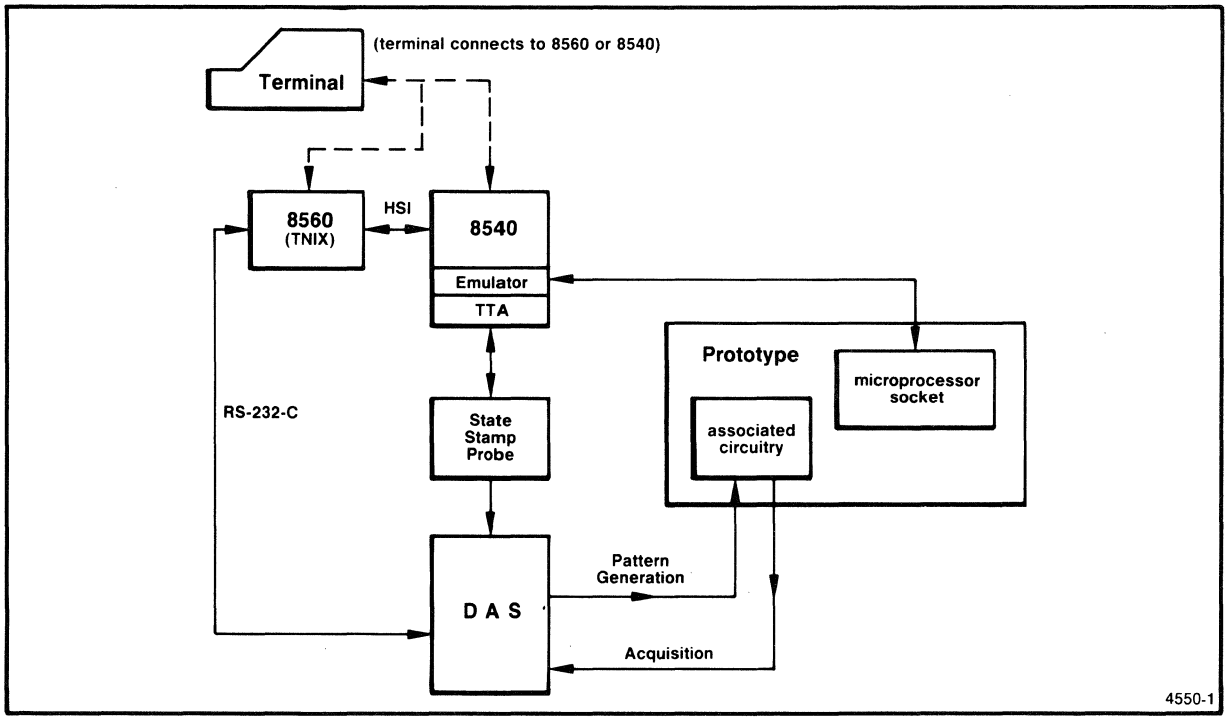

Fig. 1-1(a). DDL system configuration (without PM and PMA).

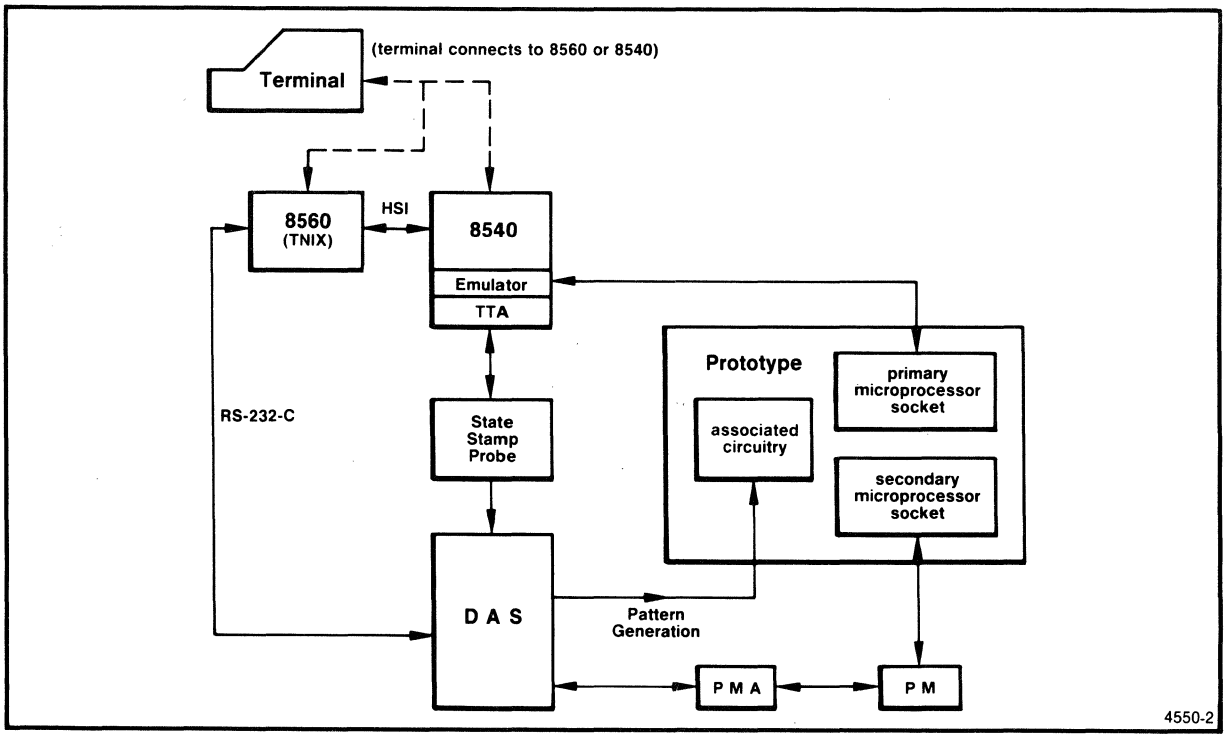

Fig. 1-1(b). DDL system configuration (with PM and PMA).

DDL SYSTEM OVERVIEW

A typical prototype integration and debugging station includes an "emulation system" (such as the 8540 with an emulator and Trigger Trace Analyzer) and a logic analyzer (such as the DAS 9100 Digital Analysis System). The emulation system monitors and controls the software running in the prototype microprocessor, and the logic analyzer monitors associated circuitry (areas of the prototype hardware that are electrically isolated from the microprocessor).

The Time-Correlation Problem

One of the problems that an engineer encounters while debugging a hardware/software prototype is that data obtained with the emulator is generally not correlated in time with data obtained from the logic analyzer. That is, it is often not clear which 8540/emulator/TTA events correspond to which DAS events; the data is not "time-correlated".

The DDL Solution

The DDL system overcomes the time-correlation problem by providing a time reference that the DAS reads with each data acquisition. The DDL software, which runs on the 8560, uses this time reference to time-correlate the DAS and TTA data. The resulting display shows the software events (from the 8540/emulator/TTA data) that correspond in time to specific hardware events (from the DAS acquisition data).

In addition to time-correlation, the DDL software allows you to upload information from the DAS (setup descriptions, acquisition data, mnemonics information, etc.) and store the information in files on the 8560. You can then analyze the uploaded acquisition data using DDL tools (such as **ddisp** and **showaf**), TNIX tools (such as **grep**), or your own tools (which you can develop with the optional 8560 Native Programming Package). You can also download the stored DAS setup packets, simplifying future DAS setups.

The DDL software also allows you to control the DAS from the 8560 keyboard. You can display specific state tables and timing diagrams on the DAS screen and scroll through the display. You can also send other commands to the DAS from your 8560 terminal.

In summary, the DDL software performs the following functions:

- time-correlates the DAS and TTA acquisition data
- transfers files between the DAS and 8560
- controls the DAS from the 8560 keyboard

There are some limitations and restrictions on setting up and configuring the DDL system. These considerations are described later in this section in the discussion "DDL System Requirements and Restrictions".

DDL SYSTEM COMPONENTS

A complete DDL system consists of the following components:

- Terminal
- 8560 Multi-User Software Development Unit
- 8540 Integration Unit with an emulator
- Trigger Trace Analyzer (TTA)
- State Stamp Probe
- RS-232-C cable (8560-to-DAS interconnection)
- DAS 9100 Digital Analysis System (DAS)
- Optional Personality Module (PM), Personality Module Adapter (PMA), and DAS MNEMONICS/ACQSETUP tapes
- Digital Design Lab (DDL) software
- Prototype hardware and software

The DDL system requires that these components be configured as shown in either Fig. 1-1(a) or Fig. 1-1(b), and as described later in this section in the discussion "Configuring the DDL System". The following paragraphs briefly describe each component of the DDL system.

Terminal

You communicate with the DDL system through the system terminal. You enter DDL commands on the terminal keyboard, and observe the results of those commands on the terminal screen.

You can use any standard ASCII terminal with the DDL system.

8560 Multi-User Software Development Unit

The 8560 is the central component in the DDL system. The 8560's TNIX operating system has a number of tools that enhance prototype software development. These tools include compilers, assemblers, symbolic debuggers, file management utilities, inter-user communication utilities, and text editing and formatting utilities.

The 8560 System Users Manual describes the operation of the 8560 in detail.

8540 Integration Unit and Emulator

The 8540 allows you to integrate your prototype's hardware and software in an orderly, efficient manner. The 8540 accepts emulator modules that support many popular 8-bit and 16-bit microprocessors.

The 8540's operating system allows you to load object code from the 8560 directly into program or prototype memory, communicate directly with the 8560, and control the emulation and debugging process. In addition, the 8540's three emulation modes allow you to gradually introduce the prototype software into the prototype hardware.

The 8540 System Users Manual describes the operation of the 8540 in detail.

Trigger Trace Analyzer (TTA)

The TTA is an 8540 option that allows you to monitor the buses and selected control signals in the prototype hardware while your program executes at normal speed. The TTA can capture and store up to 255 bus transactions and logic signals from various points on the prototype. These signals can be used to set a breakpoint that stops the prototype software. When the prototype stops, you can examine the TTA's acquisition memory, which contains the bus activity surrounding the breakpoint event.

The 8500 Modular MDL Series Trigger Trace Analyzer Users Manual describes the operation of the TTA in detail.

State Stamp Probe

The DAS 9100 Series DDL State Stamp Probe connects to both the TTA and the DAS, and provides the information that the DDL software needs to time-correlate the TTA and DAS data. Without the State Stamp Probe, you can use only the DAS/8560 communication features of the DDL software; the time-correlation features cannot be implemented.

The State Stamp Probe receives a trigger pulse from the TTA, stretches the pulse, and sends it to the DAS and back to the TTA. The State Stamp Probe also contains a counter that is incremented by another signal from the TTA. The DAS reads and records the value of this counter each time the DAS performs a data acquisition. The DDL software uses the stretched pulse and counter to time-correlate the TTA and DAS acquisition data.

The State Stamp Probe Instruction Sheet describes the electrical characteristics and operating principles of the probe. This DDL System Users Manual shows you how to use the State Stamp Probe in the DDL system.

RS-232-C Cable (8560-to-DAS Interconnection)

A standard RS-232-C cable provides the connection between the 8560 and the DAS. This cable is included with the DDL package.

DAS 9100 Series Digital Analysis System

The DAS is an advanced logic analyzer and pattern generator that allows you to stimulate and analyze digital circuitry. The DAS's modular design allows you to configure the DAS to suit your particular needs. You can fill the DAS's six plug-in card slots with a variety of data-acquisition and pattern-generation modules. In addition, the DAS menus make it easy to set up and run the DAS without sacrificing versatility.

The DAS 9100 Series Operators Manual describes the operation of the DAS in detail.

Optional Personality Module (PM) and Personality Module Adapter (PMA)

The optional Personality Module (PM) and Personality Module Adapter (PMA) make it possible for the DAS to monitor a second microprocessor of a multi-processor prototype, while the 8540 monitors and controls the primary microprocessor. The PM, PMA, and an appropriate mnemonics tape enable the DAS to disassemble code for a specific microprocessor. Note that when you use the optional PM and PMA, the DAS can acquire data only from the PM/PMA (see Figs. 1-1(a) and 1-1(b)).

The PM probe connects the prototype's second microprocessor to the PMA, which connects to the DAS. The PM acquires data from the prototype and sends it to the PMA. The PMA reformats the data and sends it on to the DAS. Once the data reaches the DAS, it is stored in DAS acquisition memory, and can be disassembled (using the information on the mnemonics tape) and displayed on the DAS screen. The DDL software allows you to transfer the DAS data and mnemonics information to the 8560 and display the disassembled output at the 8560 terminal.

Digital Design Lab (DDL) Software

The DDL software runs on the 8560. The DDL software uses the counter information that was initiated by the TTA, generated by the State Stamp Probe, and recorded by the DAS, to time-correlate the TTA and DAS data. In addition to performing time-correlation, the DDL software allows you to control the DAS from the 8560 and to transfer data between the DAS and 8560.

This manual shows you how to use the DDL software. The Technical Notes section of this manual contains a discussion of the time-correlation algorithm.

Prototype Hardware and Software

Probes from the emulator and DAS connect to the prototype hardware, allowing you to use the DDL system to integrate and debug the prototype hardware and software.

CONFIGURING THE DDL SYSTEM

The individual components of the DDL system must be connected and set up correctly before the DDL system will function properly. In addition, the DDL system imposes some restrictions on the operation of some of the components.

This subsection discusses the following topics:

- connecting the DDL system components
- setting up specific DDL system components
- DDL system requirements and restrictions

The following paragraphs describe the typical DDL system configuration shown in Figs. 1-1(a) and 1-1(b).

CONNECTING THE DDL SYSTEM COMPONENTS

Although you can connect the components of the DDL system in any order, this discussion shows you how to connect them as follows:

1. Connect the terminal to the 8560 or 8540.
2. Connect the 8560 to the 8540, emulator, and TTA.
3. Connect the State Stamp Probe between the TTA and the DAS.
4. Connect the DAS to the 8560.
5. Connect the emulator and DAS probes to the prototype.
6. Optionally, connect the PMA to the DAS, the PM to the PMA, and the PM probe lines to the prototype. Note that when you use the optional PM and PMA, the DAS can acquire data only from the PM/PMA (see Figs. 1-1(a) and 1-1(b)).

CAUTION

Make certain that none of the components have power applied to them while you are connecting the cables. Follow the precautions in each component's manuals.

Refer to Figs. 1-1(a) and 1-1(b) as you perform the following procedures.

Connecting the Terminal to the 8560 or 8540

Connect any standard ASCII terminal to either the 8560 or the 8540. Follow the procedures in your 8560 or 8540 System Users Manual.

The discussion "Putting the 8540 in TERM Mode" (later in this section) describes the DDL setup procedures that apply to the terminal.

Connecting the 8560 to the 8540, Emulator, and TTA

Install the emulator and TTA in your 8540, as described in each component's Installation Service manual. The DDL software works with any 8540/emulator/TTA configuration.

The discussion "Telling the 8560 Which Port is Attached to the 8540" (later in this section) describes the DDL setup procedures that apply to connecting these components.

Connecting the State Stamp Probe Between the TTA and DAS

Connect the State Stamp Probe between the Trigger Trace Analyzer (TTA) and the DAS 9100 Series Digital Analysis System (DAS), as follows:

1. Connect the State Stamp Probe lines marked ACQ and QUAL to the TTA Data Acquisition Interface connectors marked ACQ CLK OUT (previously labeled TRIG OUT 4) and EVENT QUALIFIER, respectively.

2. Connect the State Stamp Probe probe line marked TRIG to the TTA Data Acquisition Interface connector marked TRIG OUT **n**, where **n** = 1, 2, or 3, depending on which event is to be programmed.

3. Connect the other end of the State Stamp Probe to a DAS 91A32 data acquisition module pod connector, just like any other DAS probe.

Refer to your TTA Users Manual for descriptions of the Data Acquisition Interface connectors and for details on how to program the TTA. The discussion "Setting Up the TTA for DDL Operation", later in this section, describes the DDL setup procedures that apply to the TTA. Refer to your DAS 9100 Series Operators Manual for details on connecting probes to the DAS acquisition module pod connectors.

Connecting the DAS to the 8560

Use the RS-232-C cable supplied with the DDL package to connect the DAS to the 8560, as follows:

1. Connect one end of the cable to the RS-232-C connector labeled "RS-232" on the back panel of the DAS. Make certain that the switches on the back of the DAS are set for RS-232 mode. Refer to your DAS Operators Manual for details.

2. Connect the other end of the cable to one of the connectors labeled "J801"-"J804" or "J806"-"J809" on the back panel of the 8560. Make certain that the 8560 back panel connector that you select is configured for RS-232-C operation.

CAUTION

Only qualified service personnel should configure the back panel connector. Refer to your 8560 Installation Guide for details.

The discussions "Telling the 8560 Which Port is Attached to the DAS" and "Setting Up the DAS For DDL Operations" describe the DDL setup procedures that apply to connecting the DAS to the 8560.

Connecting the DDL System to the Prototype

Connect the emulator, TTA, and DAS acquisition and pattern generation probes to the desired test locations on your prototype. Refer to the 8540, TTA, and DAS manuals for details.

Connecting the PM and PMA to the DAS

Optionally, connect the Personality Module (PM) and the Personality Module Adapter (PMA) to the DAS, as described in the PM, PMA, and DAS manuals. Also, connect the PM probe lines to the prototype. Note that when you use the optional PM and PMA, the DAS can acquire data only from the PM/PMA.

SETTING UP SPECIFIC DDL SYSTEM COMPONENTS

The previous subsection showed you how to connect the DDL system components. This subsection shows you how to set up specific components for DDL operation.

The following DDL components require special setup to function properly in the DDL system:

- 8560 Multi-User Software Development Unit
- 8540 Integration Unit
- 8500 Modular MDL Series Trigger Trace Analyzer (TTA)
- DAS 9100 Series Digital Analysis System

Telling the 8560 Which Port is Attached to the DAS

Before you can use the 8560 and the DAS for DDL operations, you must tell the 8560 which port is connected to the DAS, as follows:

NOTE

You need to perform the following procedure only once.

1. Use the RS-232-C cable supplied with the DDL package to connect the DAS to the desired 8560 port.

CAUTION

Only qualified service personnel should perform the next step.

2. Verify that the 8560 port to which you connected the DAS is jumpered for RS-232-C operation, rather than HSI operation. Refer to the 8560 Installation Guide for details.

3. Log in to the 8560 as "root". Logging in as "root" gives you the superuser status you need to perform the rest of this procedure.

4. Edit the /etc/ttys file. This file is typically of the following form:

```
12tty0
12tty1
12tty2
12tty3
12tty4
12tty5
12tty6
12tty7
```

The last digit of each entry represents the port number. That is, "12tty0" refers to port 0, "12tty1" refers to port 1, and so on.

On the line that corresponds to the port that is connected to the DAS, change the first character to "0" (zero) and the second character to "B". This change tells the 8560 that the DAS port is not a login port and that the port should operate at 4800 baud.

Save the file and exit the editor.

5. After changing the /etc/ttys file, you must reinitialize the 8560 ports, using the following TNIX command line:

```
# kill -2 1 <CR>
```

6. Remove any previously defined relationship (link) between the DAS port and any other device, using the following command line:

```
# rm -f /dev/DAS <CR>
```

7. Establish a new link between the DAS port and a newly defined device, using the following command line:

```
# ln /dev/ttyn /dev/DAS <CR>
```

In the above command line, **n** is the number of the port that is connected to the DAS.

8. Give all users read and write access to the DAS, using the following command line:

```
# chmod 666 /dev/DAS <CR>
```

9. Change the baud rate of the 8560 port that is connected to the DAS, using the following TNIX command line:

```
$ stty >/dev/DAS 2400 <CR>
```

You must also change the DAS baud rate to 2400, using the DAS's INPUT/OUTPUT menu.

The 8560 is now configured to communicate with the DAS.

Telling the 8560 Which Port is Attached to the 8540

If your terminal is attached to the 8560, you must tell the 8560 which port is connected to the 8540 each time you log in to the 8560, using the following command line:

```
$ IU=portnumber ; export IU <CR>
```

Putting the 8540 in TERM Mode

Regardless of whether your terminal is attached to the 8560 or the 8540, you must put the 8540 in TERM mode so that it will recognize TNIX and DDL commands as well as OS/40 commands. Refer to the 8540 System Users Manual for a discussion of TERM mode.

The procedure to put the 8540 in TERM mode depends on whether the terminal is connected to the 8540 or the 8560. Perform one of the next two procedures, depending on whether your terminal is connected to the 8540 or 8560.

Terminal Connected to 8540. If your terminal is connected to the 8540, put the 8540 in TERM mode, using the following command line:

```
> config term <CR>
$
```

The TNIX prompt ($) indicates that TERM mode is established.

Terminal Connected to 8560. If your terminal is connected to the 8560, you must tell the 8540 that it does not have a terminal, and that it is to accept commands from the terminal attached to the 8560. To do this, you must define a STARTUP string that will put the 8540 in TERM mode whenever it is powered up. The following procedure defines an appropriate STARTUP string, removes any previous STARTUP string, and puts the new string in the 8540's EEPROM:

NOTE

You need to perform the following procedure only once.

1. Temporarily connect a terminal to the 8540.
2. Start up the 8540.
3. Enter the following OS/40 commands:

```
> STARTUP='config term' <CR>
> permstr -d STARTUP <CR>
> permstr STARTUP <CR>
```

4. Disconnect the terminal from the 8540.

The 8540 is now configured to start up in TERM mode, ready to accept both TNIX and DDL commands from a terminal attached to the 8560.

Setting Up the TTA for DDL Operation

To set up the TTA for DDL operation, perform the following procedure:

1. Program TTA EVENT 4 to perform any desired qualification of data. Since the TTA only acquires data when the qualification conditions are met, do not make the conditions so restrictive that acquisitions never occur.

2. If you specified any data qualification in step 1, enter the following TTA command line to tell the TTA to place the data specified by EVENT 4 in acquisition memory:

   $ acq ev4 <CR>

3. Program the DDL triggering event in EVENT **n** (**n**=1, 2, or 3). Make certain that the State Stamp Probe's TRIG connector is connected to the corresponding TRIG OUT **n** connector on the TTA's Data Acquisition Interface panel.

If the emulator clock is used as the DDL clock signal, you must allow the emulator to continue running after it encounters the desired event long enough to permit the DAS and TTA to acquire the trigger signal. In other words, don't kill the clock until the DAS and TTA have had a chance to acquire the trigger pulse. The DDL software must find this trigger signal in both DAS and TTA acquisition memory before it can perform time-correlation.

The next two discussions describe the DAS and TTA acquisition considerations to keep in mind when programming the TTA.

DAS Acquisition Considerations. The DAS must be allowed to acquire the trigger signal and flush any DAS acquisition pipelines. To assure that the DAS has ample opportunity to acquire the trigger, set up the desired trigger condition in TTA event **n** (**n**=1 or 2) and a bus cycle counter in counter (**n**+1). Set up the counter such that the TTA generates a breakpoint several bus cycles after the trigger event is recognized.

For example, if the desired DDL trigger event is a data value of "3e", and the DAS requires another 20 bus cycles to acquire the trigger event, you can program the TTA as follows:

```
$ eve 2 d=3e <CR>
$ cou 3 v=20 s=cyc o=delay g=seqh -s <CR>
```

(Refer to the TTA Users Manual for a description of these TTA commands.)

Note that the above example requires the State Stamp Probe connector marked "TRIG" to be connected to the TTA Data Acquisition Interface connector marked "TRIG OUT 2". The desired event ("3e") is programmed in TRIG OUT 2.

TTA Acquisition Considerations. The TTA must also be allowed to acquire the trigger signal. The trigger signal is generated by TRIG **n**, stretched by the State Stamp Probe, and returned to the TTA's QUAL input connector. To assure that the stretched pulse is acquired, the TTA must perform at least one more acquisition after the trigger event.

No special setup is required if the breakpoint event is the fetch of a multiple-cycle instruction, because the TTA continues to operate until the last cycle of the instruction. However, if the breakpoint event is the fetch of a single-cycle instruction (or the last cycle of any instruction), the breakpoint stops the TTA before the trigger has been acquired. In this case, you must use the breakpoint delay mechanism described above, under the heading "DAS Acquisition Considerations".

Setting Up the DAS for DDL Operation

Using the CHANNEL SPECIFICATION menu, perform the following procedure:

1. If you are going to do disassembly on the 8560, you must set groups A-D for mnemonics operation, as described in your DAS and PMA manuals. Note that this step is performed automatically if you use the Tektronix-supplied DAS mnemonics tape. Refer to "Note 2: Using the DDL Disassembly Feature" in the Technical Notes section of this manual for details on using the disassembly feature.

2. Set the RADIX for the group that contains the State Stamp Probe to "BIN" (binary display). This allows the trigger to be set using the DAS's TRIGGER SPECIFICATION menu, as shown below.

Using the TRIGGER SPECIFICATION menu, perform the following procedure:

1. Set the mode to "91A32 ONLY" (or "PMA100 ONLY" if the optional PM/PMA is used), as described in your DAS 9100 Series Operators Manual.

2. Set the TRIGGER ON field to "0XXXXXXX". Note that DDL does not permit you to assign values to the FOLLOWED BY or RESET ON fields. Also, DDL does not permit you to qualify data acquired by the DAS.

3. Set the TRIGGER POSITION field to "END" trigger. This provides the greatest overlap of TTA and DAS data.

Using the INPUT OUTPUT SPECIFICATION menu, perform the following procedure:

1. Verify that GPIB is "offline" (GPIB OFF/RS232 ON) by setting the GPIB TALK/LISTEN ADDRESS to "31" (set switches 4-8 on the ADDRESS switch on the rear of the DAS to the "1" position). If you have done this correctly, the DAS will display a message at the top of the INPUT OUTPUT menu that says "GPIB offline".

2. Set switch 1 on the same set of switches to "1".

DDL SYSTEM REQUIREMENTS AND RESTRICTIONS

The preceding discussions showed you the general method for connecting and setting up the various components of the DDL system. The following requirements and restrictions apply to the DDL system:

- DDL requires your TTA board #1 to be 670-7132-01 or later, and TTA board #2 to be 670-7133-03 or later.

- The I/O Option must be installed in your DAS.

- If you plan to use the DDL disassembly feature, the DAS Tape Option must be installed and the DAS firmware must be version 1.09 or later. Refer to "Note 2: Using the DDL Disassembly Feature" in the Technical Notes section of this manual for details on using the disassembly feature.

- DDL supports only the 91A08, 91A24, and 91A32 DAS data acquisition modules. Although you can upload and process acquisition data from all three modules, **time-correlation is possible only with the 91A32 module.**

- DDL cannot perform time-correlation if the DAS is operated in ARMS or AND mode.

- If you use the optional PM/PMA in your DDL configuration, you must configure your DAS with two 91A32 data acquisition modules. The PMA connects to one of the modules, and the State Stamp Probe connects to one of the four inputs on the other module.

- If the DAS does not acquire data at least once for every 127 TTA acquisitions, the counter in the State Stamp Probe will overflow and the DDL time-correlation display may show erroneous data.

- A DAS setup packet that was uploaded from one DAS can be downloaded to another DAS only if the following conditions are met:

  1. Each DAS must have the same firmware version. (The firmware version is displayed in the top right of the DAS screen at power-up.)

  2. Each DAS must have modules of the same type in the same slots, except that the second DAS can have modules in slots that were empty in the first DAS.

INSTALLING THE DDL SOFTWARE ON THE 8560

The DDL software is provided on the DDL installation disk. Before you can use the DDL software, it must be installed on the 8560 by someone with superuser status.

The following procedure installs the DDL software on your 8560:

1. Log in to the 8560 as "root". Logging in as "root" gives you the superuser status you need to perform the rest of this procedure.

2. Type the following command line to make certain that you are in the "root" directory:

   # cd / <CR>

   For the DDL software to be accessible from all directories, you must be in the "root" directory when you perform the installation.

3. Insert the DDL installation disk in the 8560 disk drive, and type:

   # install <CR>

You will be asked to verify that you logged in as "root" (superuser). The installation procedure then installs the DDL software and adds the DDL Operations Menu to the 8560 GUIDE menu program. Status messages appear on your terminal screen at each stage of the installation.

USING THE 8560 GUIDE MENUS

The 8560 GUIDE is a menu program that helps you use the TNIX operating system and utilities without requiring a lot of preliminary study. The following paragraphs describe how the 8560 GUIDE menus allow the new or casual user to perform DDL functions with minimal effort.

THE 8560 GUIDE TOP-LEVEL MENU

The GUIDE Top-Level Menu shows you a list of 8560 tasks and then prompts you to select one of the menu items. To invoke the 8560 GUIDE menu, use the following command line:

```
$ guide <CR>
```

When you issue this command, TNIX displays the Top-Level Menu shown in Fig. 1-2.

If you have not used GUIDE before, you should select item 1, "Introduction to GUIDE". Read this introduction completely; it describes GUIDE's capabilities and tells you how to use GUIDE.

```
                    -- 8 5 6 0  G U I D E --


     1) Introduction to GUIDE
     2) Select prompting level

     3) File Manipulation Menu
     4) Program Processing Menu (compilers, assemblers, etc.)
     5) Program Debugging Menu (with 8540/8550 only)
     6) Other System Operations Menu
     7) DDL Operations Menu
     8) System Maintenance Menu (must be "superuser")

     9) Terminate GUIDE

    10) Temporary escape to command language


  Select by entering a number from 1 to 10:
```

Fig. 1-2. 8560 GUIDE Top-Level Menu.

THE DDL OPERATIONS MENU

When you select menu item 7 from the Top-Level Menu, GUIDE displays the DDL Operations Menu shown in Fig. 1-3. You select items from the DDL Operations Menu just as you do from the Top-Level Menu.

Each DDL Operations Menu entry represents a DDL task that uses one or more DDL commands. When you select a task, GUIDE prompts you to enter any parameters or other information that the command requires. GUIDE formats the command, displays it (preceded by a plus sign), and then executes it. When the command finishes, GUIDE displays the DDL Operations Menu again, prompting you to select your next DDL task.

```
                    DDL OPERATIONS MENU
     1) Return to top-level menu

     2) Start DDL data acquisition (dstart)
     3) Upload DAS and TTA data to 8560 (duplod)
     4) Upload mnemonics information (mktab)
     5) Specify display format (dform)
     6) Time-correlate and display DAS/TTA data (ddisp)

     7) Store DAS setup packet in 8560 file (getpac)
     8) Transfer DAS setup packet from 8560 file to DAS (putpac)
     9) Transfer a DAS acquisition memory to 8560 (getacq)
    10) Display contents of acquisition file (showaf)

    11) Display timing diagram on DAS (tcur)
    12) Display state table on DAS (scur)
    13) Scroll DAS cursor in current DAS display (scrol)

    14) Display current DAS card configuration (showcon)
    15) Send command string to DAS (sendd)
    16) Run DDL system diagnostics (ddiag)
    17) Temporary escape to command language

Select by entering a number from 1 to 17:
```

Fig. 1-3. DDL Operations Menu.

Example. Suppose that you want to see the time-correlated DDL display that contains TTA acquisition 30-60. An experienced user would enter the following DDL command line:

```
$ ddisp -f 30 -l 60 <CR>
```

However, a new or infrequent user would use GUIDE to perform the same task, as follows:

1. First, enter the TNIX **guide** command to invoke the GUIDE Top-Level Menu.

2. Enter "7 <CR>" to select the DDL Operations Menu from the Top-Level Menu.

3. Enter "6 <CR>" to select the DDL **ddisp** command from the DDL Operations Menu. This selection time-correlates and displays the DAS and TTA data on the DDL terminal. When you select item 6, GUIDE displays the following prompt:

   ```
   Display ALL acquisition data? (y or n): n <CR>
   ```

4. When you enter "n" (as shown above), GUIDE prompts you to specify the range of TTA events that you want to see, as follows:

   ```
   Acquisition number of first TTA line to be displayed: 30 <CR>
   Acquisition number of last  TTA line to be displayed: 60 <CR>
   ```

   Enter "30" and "60" (as shown above) to indicate that you are interested in lines 30-60, inclusive.

5. GUIDE then asks:

   ```
   Display uncorrelated data also? (y or n): n <CR>
   ```

   Enter "n" to suppress uncorrelated data.

6. At this point, GUIDE formats the appropriate **ddisp** command and displays it as follows:

   ```
   +ddisp -f 30 -l 60
   ```

   Note that, except for the leading "+", this is the same command that an experienced user would enter. The "+" at the beginning of the command line indicates that the command was issued by GUIDE, based on information that you supplied in response to GUIDE's prompts.

   GUIDE then executes the command line just as though you had entered it directly.

The next section of this manual, Typical DDL Session, uses the GUIDE menus to walk you through a typical DDL session.

FOR CONTINUED LEARNING

This Learning Guide introduced you to the basic concepts, features, and functions of the DDL system. The following sections of this manual further describe the DDL system:

Section 2, Typical DDL Session. Presents an example DDL session that illustrates many of the functions of the DDL system.

Section 3, Command Dictionary. Describes each DDL command and gives examples of typical uses. The Command Dictionary is arranged alphabetically by command name. It is preceded by a classified list of commands to help you choose a command by its function if you don't remember its name.

Section 4, Technical Notes. Provides miscellaneous technical information, including a discussion of the time-correlation algorithm.

Section 5, File Formats. Describes the formats of files that DDL creates and uses.

Section 6, Tables. Contains tables relating to the DDL software, including a one-page summary of DDL commands.

Section 7, Error Messages. Lists each DDL error message and describes probable causes and possible solutions.

Section 8, Glossary. Defines terms that are unique to the DDL system.

Section 9, Index. Contains an alphabetized list of major terms and concepts, giving the section and page number where they are discussed.

In addition to this manual, you will probably need to refer to the following manuals for details on the specific components of the DDL system:

8560 System Users Manual. Describes the 8560 and its TNIX operating system.

8560 Installation Guide. Shows you how to install your 8560.

8540 System Users Manual. Describes the 8540 and its OS/40 operating system.

DAS 9100 Series Operators Manual. Shows you how to set up and use the DAS.

DAS 9100 Series DDL State Stamp Probe Instructions. Describes the electrical characteristics and operating principles of the State Stamp Probe.

8500 Modular MDL Series Trigger Trace Analyzer Users Manual. Shows you how to set up and use the TTA.

PMA 100 Operators Manual. Shows you how to use the PMA with the DAS.

PMA 100 Disassembly Tape Instructions. Shows you how to use the various mnemonics tapes with the DAS.

Section 2

TYPICAL DDL SESSION

ILLUSTRATIONS

Section 2

TYPICAL DDL SESSION

INTRODUCTION

This section walks you through a "typical DDL session" that uses the communications, control, and time-correlation features of the DDL system.

The discussions in this section assume that you are familiar with the information presented in the Learning Guide section of this manual.

The purpose of this section is to introduce you to the capabilities of the DDL system. We do not expect you to actually perform the steps described in the following typical DDL session. However, if you read through these steps, thinking about each one, you should have a good understanding of how to approach your own DDL sessions. We have tried to make the steps as general as possible, while still demonstrating the relevant features of the DDL commands.

The emphasis is on showing you how to perform general DDL tasks, rather than on describing the individual commands that are involved. Therefore, this typical DDL session uses GUIDE's DDL Operations Menu to initiate all DDL functions. This allows you concentrate on the general flow of a typical DDL session, rather than on the syntax of specific commands. This approach also allows you to become familiar with GUIDE.

The Command Dictionary section of this manual describes the syntax and use of each DDL command.

This typical DDL session makes the following assumptions:

- Your DDL system components are connected together as described in the discussion "Connecting the DDL System Components" in the Learning Guide section of this manual.
- The 8560, 8540, emulator, TTA, and DAS are set up as described in the discussion "Setting Up Specific DDL System Components" in the Learning Guide section of this manual.
- The emulator and DAS probe lines are attached to the desired test points in the prototype.

In descriptions of terminal dialogs, your input is underlined to distinguish it from messages or prompts issued by the system.

A TYPICAL DDL SESSION

The following steps summarize the general flow of a typical DDL session:

1. Get ready for the current run.
2. Invoke GUIDE and select the DDL Operations Menu.
3. Display the current DAS card configuration.
4. Run the DDL system diagnostics.
5. Save the current DAS setup packet in an 8560 file.
6. Start the DDL data acquisition.
7. Transfer the DAS and TTA data to the 8560.
8. Specify the time-correlation display format.
9. Display the time-correlated DAS and TTA data.
10. Display the current timing diagram on the DAS.
11. Scroll through the current DAS timing diagram.
12. Display the current state table on the DAS.
13. Return to the Top-Level Menu and terminate GUIDE.

The following paragraphs describe each of these steps in detail.

Step 1: Get Ready For the Current Run

To produce a time-correlated display, the DDL software creates and uses data files on the 8560, as follows:

- The **dstart** command creates the TTAstart file.
- The **duplod** command creates the TTAtrig, TTAdata, DASconfig, and DASaq.**xx**.**sp** files.
- The **dform** command creates the DASdform file.
- The **mktab** command creates the DASmnem file.

DDL places these files in the current directory, which is where the **ddisp** command expects to find them. Therefore, you must remain in the same directory throughout each DDL session.

Also, the **dstart**, **duplod**, **dform**, and **mktab** commands overwrite any existing versions of the files that are in the current directory. Therefore, to avoid the possibility of losing crucial data, you should create a new directory for each DDL session. Use the following TNIX command lines to create a new directory and move to it:

```
$ mkdir newdir <CR>
$ cd newdir <CR>
```

All files generated by the DDL software during this session must be placed in the **newdir** directory. If you move from this directory during the current session, be sure to return before invoking any of the above DDL commands.

If your terminal is attached to the 8560, use the following command line to tell the 8560 which port (**n**) connects to the 8540:

```
$ IU=n ; export IU <CR>
```

Also, don't forget to select an appropriate emulator, such as:

```
$ sel z80 <CR>
```

Finally, you must set up the TTA and the DAS as described in the discussions "Setting Up the TTA for DDL Operation" and "Setting Up the DAS for DDL Operation" in the Learning Guide section of this manual.

You are now ready to begin your DDL session.

Step 2: Invoke GUIDE and Select the DDL Operations Menu

The first step is to invoke GUIDE, using the following TNIX command line:

```
$ guide <CR>
```

When you enter the **guide** command, the GUIDE Top-Level Menu (shown in Fig. 2-1) appears on your terminal screen.

```
                    -- 8 5 6 0  G U I D E --


        1) Introduction to GUIDE
        2) Select prompting level

        3) File Manipulation Menu
        4) Program Processing Menu (compilers, assemblers, etc.)
        5) Program Debugging Menu (with 8540/8550 only)
        6) Other System Operations Menu
        7) DDL Operations Menu
        8) System Maintenance Menu (must be "superuser")

        9) Terminate GUIDE

       10) Temporary escape to command language


    Select by entering a number from 1 to 10:
```

Fig. 2-1. 8560 GUIDE Top-Level Menu (the guide command).

To select the DDL Operations Menu, enter "7 <CR>" in response to the "Select by entering a number from 1 to 10" prompt. GUIDE then displays the DDL Operations Menu shown in Fig. 2-2.

```
                    DDL OPERATIONS MENU
      1) Return to top-level menu

      2) Start DDL data acquisition (dstart)
      3) Upload DAS and TTA data to 8560 (duplod)
      4) Upload mnemonics information (mktab)
      5) Specify display format (dform)
      6) Time-correlate and display DAS/TTA data (ddisp)

      7) Store DAS setup packet in 8560 file (getpac)
      8) Transfer DAS setup packet from 8560 file to DAS (putpac)
      9) Transfer a DAS acquisition memory to 8560 (getacq)
     10) Display contents of acquisition file (showaf)

     11) Display timing diagram on DAS (tcur)
     12) Display state table on DAS (scur)
     13) Scroll DAS cursor in current DAS display (scrol)

     14) Display current DAS card configuration (showcon)
     15) Send command string to DAS (sendd)
     16) Run DDL system diagnostics (ddiag)
     17) Temporary escape to command language

   Select by entering a number from 1 to 17:
```

Fig. 2-2. DDL Operations Menu (Top-Level Menu item 7).

The DDL Operations Menu allows you to select DDL tasks with relative ease. If your selection requires parameters or additional data, GUIDE prompts you to enter the needed information.

When your selection completes, GUIDE displays the DDL Operations Menu again, prompting you to select your next DDL task.

Step 3: Display the Current DAS Card Configuration

Somewhere near the beginning of each DDL session, you may wish to confirm that each DAS slot contains the proper DAS module.

You can check the DAS card slots physically, or you can invoke DDL Operations Menu item 14 (the **showcon** command) to show you the type of module that is in each DAS card slot.

A typical terminal dialog for invoking menu item 14 (the **showcon** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 14 <CR>

+ showcon
```

The **showcon** command produces a display similar to the one shown in Fig. 2-3.

```
CURRENT DAS CARD CONFIGURATION:

     SLOT    CARD TYPE
     ----    ---------------------------------

       0     Controller
       1
       2     91A32   32 Channel / 40ns Acquisition Module
       3     91A32   32 Channel / 40ns Acquisition Module
       4     91P16   16 Channel / 40ns Pattern Generator
       5
       6     91A08   8 Channel / 10ns Acquisition Module
       7     Trigger / Time Base
       8     I/O Option

[Press return to continue]
```

Fig. 2-3. Sample showcon display (DDL menu item 14).

When the **showcon** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 4: Run the DDL System Diagnostics

The **showcon** command allowed you to verify that the DAS contained the proper modules in the proper slots (verify that the DAS is configured properly). The next step is to run the DDL system diagnostics to test the 8560/8540 communication link, the 8560/DAS communication link, and the correct operation of the State Stamp Probe (verify that the DDL system is configured properly).

Menu item 16 invokes the DDL **ddiag** command to run the DDL system diagnostics.

When you select menu item 16, GUIDE prompts you to specify the DAS slot and pod to which the State Stamp Probe is attached. GUIDE then invokes the diagnostics routines that perform the DDL system diagnostics. As each test is completed, **ddiag** displays messages that indicate the success or failure of the test.

NOTE

The optional PM/PMA is used must be unplugged from the DAS while the system diagnostics are running. Also, you must set up the DAS trigger conditions according to the directions displayed by the **ddiag** command.

A typical terminal dialog for invoking menu item 16 (the **ddiag** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 16 <CR>

Enter slot/pod to which State Stamp Probe is connected (eg: 3a): 3a <CR>

+ ddiag 3 a

                DDL diagnostic program X00.00
                Copyright 1982, TEKTRONIX INC.

Integration Unit detected
TTA detected in Integration Unit
/dev/DAS currently at 2400 baud - verify DAS baud rate
Enter <CR> to continue - or enter new baud rate for /dev/DAS: <CR>

Changing /dev/DAS communication characteristics to:
raw, datai, datao, and dtr

DAS9100 detected
Compatible acquisition module detected in DAS slot 3
```

```
==================================================================

DAS9100 trigger conditions must be set for 2 uS acquisition clock,
and to trigger on the MSB of the State Stamp Probe set low

Do you need detailed setup information? (y or n)
y <CR>

1) Select the DAS CHANNEL SPEC menu

        A) Assign POD A to the PROBE field in a TRIGGER GROUP
        B) Change the RADIX field for this trigger group to BIN

2) Select the TRIGGER SPEC menu

        A) Select 2uS in the CLOCK field, using the INCR or DECR keys
        B) Set the TRIGGER ON field for the TRIGGER GROUP assigned
           to POD A to OXXXXXXX
           (trigger when the most significant bit is zero)
        C) Set the TRIGGER POSITION field to BEGIN

==================================================================

Enter <CR> when the TRIGGER setup is complete

==================================================================

Loading TTA Comparison Memory (requires approx. 2 minutes)
. . . . . .
Loading TTA Comparison Memory complete

Beginning DAS acquisition
DAS acquisition complete
Uploading DAS acquisition memory

State Stamp Probe pattern tested OK
ddl diagnostics completed successfully

/dev/DAS communication characteristics returned to:
speed 2400 baud
erase = '^H'; kill = '^U'
nocarei; nocareo
[Press return to continue]
```

When the **ddiag** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

NOTE

If you unplugged the optional PM/PMA before running the DDL system diagnostics, be sure to plug it back in at this time.

Also, don't forget to reset the DAS for your run. The discussion "Setting Up the DAS for DDL Operations" in the Learning Guide section of this manual describes the appropriate DAS setup procedure.

Step 5: Save the Current DAS Setup Packet in an 8560 File

Now that you have configured the DAS the way you want it, and you have verified that the DDL system is functioning properly, you can save the current DAS setup information in an 8560 file. This way, you can download the setup packet to the DAS during future DDL sessions (using the DDL **putpac** command, menu item 8). This simplifies subsequent DDL system setups.

Menu item 7 invokes the DDL **getpac** command, which transfers the current DAS setup packet to a file on the 8560.

When you select menu item 7, GUIDE prompts you to enter the packet type (which describes the setup packet to be uploaded), and then prompts you to enter an 8560 filename under which the DAS setup packet will be stored. GUIDE then formats the appropriate DDL command (**getpac**), displays it (preceded by a plus sign to indicate that it was generated by GUIDE), and then executes it.

A typical terminal dialog for invoking menu item 7 (the **getpac** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 7 <CR>

Packet type? (all,patgen,refmem,acqsetup,mnemonics): all <CR>
Name of 8560 file to receive the packet: setup.all <CR>

+ getpac all setup.all
9121 bytes transferred
[Press return to continue]
```

When the **getpac** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 6: Start the DDL Data Acquisition

Thus far, you have verified that the DDL system is configured properly, and you have saved the current DAS setup packet for later use. You are now ready to start up the DDL system, collect some data, and do some time-correlation.

Menu item 2 (the **dstart** command) starts the emulator and prototype executing, and starts the DAS and TTA data acquisition operations. This command also creates the TTAstart file, which is used later by the time-correlation routine. When the prototype gets to the breakpoint condition that you programmed into the TTA in step 1, the DDL system stops. The data that was acquired by the DAS and TTA while the prototype was running is now residing in TTA and DAS acquisition memory.

When you select menu item 2, GUIDE prompts you to enter the desired starting address (if other than the current program counter), and asks if you want pattern generation as well as data acquisition.

A typical terminal dialog for invoking menu item 2 (the **dstart** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 2 <CR>

Start execution at current program counter? (y or n): n <CR>
Enter starting address in hex: 0 <CR>
Start DAS pattern generator also? (y or n): n <CR>

+ dstart 0
Stopping any current DAS operations...
Creating file 'TTAstart'...
Issuing 'START ACQUISITION' command to DAS...
Starting the TTA/Emulator...
.
... {* breakpoint trace lines printed by emulator *} ...
.
[Press return to continue]
```

When the **dstart** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 7: Transfer the DAS and TTA Data to the 8560

The next step is to save the TTA and DAS acquisition data (and other information needed to perform the time-correlation) in files on the 8560.

Selecting menu item 3 from the DDL Operations menu (the **duplod** command) creates the following files on the 8560:

- DASconfig -- describes the DAS card configuration.
- DASaq.**xx**.**sp** -- contains the DAS acquisition data from the **xx** module, in DAS slot **s**, pod **p**. There may be several of these files.
- TTAtrig -- describes the TTA's state when data acquisition stopped.
- TTAdata -- contains the TTA acquisition data.

When you select menu item 3, GUIDE executes the **duplod** command. Since the **duplod** command has no parameters, GUIDE does not prompt you for additional information. However, it may take a minute or so to upload the data depending on the number of acquisition modules in the DAS and the amount of data acquired by the TTA. During the uploading, the **duplod** command displays status messages that tell you what is happening.

A typical terminal dialog for invoking menu item 3 (the **duplod** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 3 <CR>

+ duplod
Uploading DAS configuration data to file 'DASconfig'...
Uploading slot 2, pod A acq. memory...
Uploading slot 2, pod B acq. memory...
Uploading slot 2, pod C acq. memory...
Uploading slot 2, pod D acq. memory...
Uploading slot 3, pod A acq. memory...
Uploading slot 3, pod B acq. memory...
Uploading slot 3, pod C acq. memory...
Uploading slot 3, pod D acq. memory...
Creating file 'TTAtrig'
Uploading TTA acquisition data to file 'TTAdata'
[Press return to continue]
```

When the **duplod** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 8: Specify the Display Format

Before DDL can display the time-correlated DAS and TTA data, you must describe the display format.

DDL Operations Menu item 5 (the **dform** command) allows you to specify the display format to be used in subsequent **ddisp** displays. Once defined, the display format remains in effect until redefined (by selecting menu item 5 again).

When you select menu item 5, GUIDE executes the **dform** command with the verbose (**-v**) option. The verbose option causes the **dform** command to prompt you to enter the following information:

- **Disassembly type.** You may select hardware disassembly, absolute disassembly, or no disassembly at all. Hardware disassembly shows the disassembled instruction and any "read" and "write" cycles that make up the instruction. Absolute disassembly does not show the disassembled instruction, but does show the "fetch", "read", and "write" cycles.

  NOTE

  If you select disassembly (either hardware or absolute), you must select menu item 4 (the **mktab** command) before displaying the time-correlated data with the **ddisp** command. Refer to the Command Dictionary section of this manual for details on the **mktab** command.

- **Location of State Stamp Probe.** You must supply the slot and pod to which the State Stamp Probe is connected.

- **Display group assignments.** For each group, you must list the slots and pods assigned and specify the display radix.

The **dform** command creates the file DASdform to hold the formatting information. The **ddisp** command reads this file when it formats the **ddisp** display.

A typical terminal dialog for invoking menu item 5 (the **dform** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 5 <CR>

+ dform -v
*************************************************************************
* Pressing carriage return leaves existing parameter value unchanged. *
* Entering 't' terminates operations.                                   *
* Entering 's' summarizes current 'dform' settings.                     *
*************************************************************************

Select disassembly type (a=absolute, h=hardware, n=none): n <CR>
```

```
Is PMA in use? [y,n,(CR)]:n <CR>
Enter slot/pod to which State Stamp Probe is connected [eg: 3b]:3c <CR>

---Display Group Assignments---
*****************************************************************************
* Pressing carriage return leaves existing parameter value unchanged.       *
* Entering 't' terminates operations.                                       *
* Entering 's' summarizes current 'dform' settings.                         *
*****************************************************************************

Select display group name [Aa-Ll]:a <CR>
Select action [a=add group, d=delete group, m=modify group]:a <CR>
Select display radix [x=hex, o=octal, b=bin, a=ASCII, g=Gray]:x <CR>
Select slot/pods in group [eg: 2a,2b,3a]:2a,2b,2c <CR>

Select display group name [Aa-Ll]:b <CR>
Select action [a=add group, d=delete group, m=modify group]:a <CR>
Select display radix [x=hex, o=octal, b=bin, a=ASCII, g=Gray]:o <CR>
Select slot/pods in group [eg: 2a,2b,3a]:3b <CR>

Select display group name [Aa-Ll]:c <CR>
Select action [a=add group, d=delete group, m=modify group]:a <CR>
Select display radix [x=hex, o=octal, b=bin, a=ASCII, g=Gray]:a <CR>
Select slot/pods in group [eg: 2a,2b,3a]:3c <CR>

Select display group name [Aa-Ll]:s <CR>

DISASSEMBLY:       NONE
PMA:               NOT PRESENT
STATE STAMP POD:   POD 3C

GROUP     RADIX    PROBE

  A       HEX      POD 2A
                   POD 2B
                   POD 2C

  B       OCT      POD 3B

  C       ASCII    POD 3C

Select display group name [Aa-Ll]:t <CR>
[Press return to continue]
```

When the **dform** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 9: Display the Time-Correlated DAS and TTA Data

Now that you have uploaded the TTA and DAS information, your next step is to time-correlate the data and display it on the 8560 terminal screen. The time-correlated display shows TTA data interspersed with DAS data in chronological order. These are the TTA and DAS events that were acquired before your program was stopped by the breakpoint event that you programmed into the TTA. This display allows you to see what the prototype hardware was doing while the prototype software was executing.

To time-correlate and display the TTA and DAS data, select menu item 6 (the **ddisp** command) from the DDL Operations Menu.

When you do, GUIDE asks you if you want to see all the data, or if you want to see only a certain range of data. If you want to see a range of data, GUIDE then prompts you to enter the acquisition numbers of the first and last TTA lines that you want displayed. GUIDE also asks you if you want to see uncorrelated data. Uncorrelated data is TTA (or DAS) data for which there is no corresponding DAS (or TTA) data. GUIDE then formats the appropriate **ddisp** command, displays it, and executes it.

Figure 2-4 shows a sample time-correlated display produced by the **ddisp** command.

```
ACQ   ADDR        DATA       MNEMONIC       7-PROBE-0     BUS

  SEQ           A          B         C
                HEX       OCTAL     ASCII

 1    0100        21          LXI   H        0000 0000    M R F

   8          22FE17        35          A
   9          22FFC7        17          A
-------------------------------------------------------------------
 2    0101        00                                     0000 0000    M R

  10          23FFC7        17          B
  11          23FFFB        16          C
-------------------------------------------------------------------
 3    0102        05                                     0000 0000    M R

  12          33FFC7        16          D
  13          2355C7        26          A
```

Fig. 2-4. Sample ddisp display (DDL menu item 6).

In the time-correlated display, TTA data is labeled with a TTA acquisition number (ACQ). It is displayed in the same format used by the TTA **disp** command. Refer to your Trigger Trace Analyzer Users Manual for details on the **disp** command and its display format.

The DAS data is labeled with a DAS sequence number (SEQ). This sequence number corresponds to the sequence number used in various DAS displays. The **ddisp** display shows the DAS information in the format that you specified with the **dform** command (refer to step 7).

A typical terminal dialog for invoking menu item 6 (the **ddisp** command) to generate a time-correlated display looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 6 <CR>

Display ALL correlated acquisition data? (y or n): n <CR>
Acquisition number of first TTA line to be displayed: 1 <CR>
Acquisition number of last TTA line to be displayed: 3 <CR>
Display uncorrelated data also? (y or n): n <CR>

+ ddisp -f 1 -l 3
```

DDL now time-correlates the TTA and DAS acquisition data and generates a display similar to the one shown in Fig. 2-4.

When the **ddisp** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 10: Display the Current Timing Diagram on the DAS

Suppose that you want to know more about DAS sequence number 9. DDL Operations Menu item 11 (the **tcur** command) displays the DAS timing diagram with the cursor placed at sequence number 9. When you select menu item 11, GUIDE prompts you to enter the DAS sequence number at which you want the cursor to be placed.

A typical terminal dialog for invoking menu item 11 (the **tcur** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 11 <CR>

DAS sequence number at which cursor should be placed: 9 <CR>

+ tcur 9
[Press return to continue]
```

Figure 2-5 shows a simplified timing diagram display. Note that this display appears on the DAS screen, not on the DDL terminal screen.

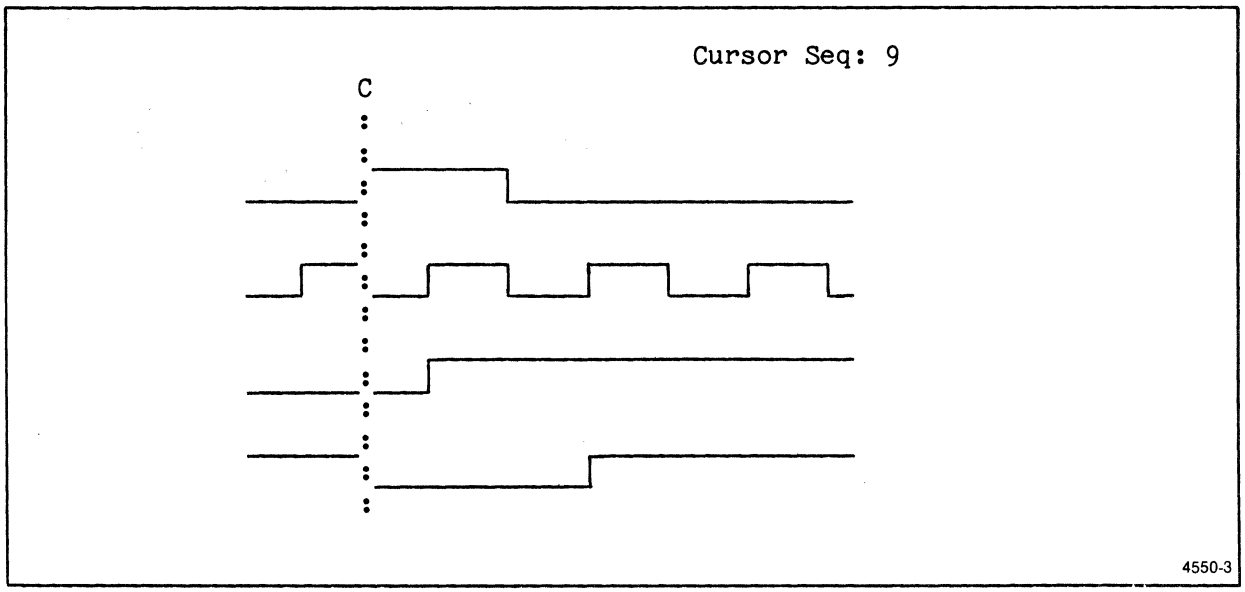

Fig. 2-5. Simplified sample tcur display (DDL menu item 11).

When the **tcur** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 11: Scroll Through the Current DAS Timing Diagram

After calling up the DAS timing diagram, use DDL Operations Menu item 13 (the **scrol** command) to move the cursor through the display on the DAS. This allows you to examine the events surrounding event 9.

When you select menu item 13, GUIDE prompts you to enter the direction and number of positions to scroll. Entering a positive number as the number moves the cursor that many positions to the right (forward) in the timing diagram; a negative number moves the cursor to the left (backward). Note that each cursor position may correspond to one or more DAS sequence numbers, depending on the magnification setting on the DAS. For example, when the DAS magnification setting is 10, each cursor position corresponds to one DAS sequence number, but when the DAS magnification setting is 1, each cursor position corresponds to approximately eight DAS sequence numbers.

A typical terminal dialog for invoking menu item 13 (the **scrol** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 13 <CR>

Direction and number of positions to scroll (-99 to +99): 9 <CR>

+ scrol 9
[Press return to continue]
```

When the **scrol** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 12: Display the Current State Table on the DAS

In the same way that the **tcur** command displays the current timing diagram on the DAS, menu item 12 (the **scur** command) displays the current state table on the DAS.

When you select menu item 12, GUIDE prompts you to enter the DAS sequence number at which you want the cursor to be placed.

To examine surrounding state table events, use the **scrol** command (see step 11). Note, however, that in a state table display, a positive scroll value scrolls the cursor backwards in the table (the table moves down the screen) that many positions. A negative scroll value does the opposite.

A typical terminal dialog for invoking menu item 12 (the **scur** command) looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 12 <CR>

DAS sequence number at which cursor should be placed: 9 <CR>

+ scur 9
[Press return to continue]
```

When the **scur** command completes, GUIDE displays the prompt "[Press return to continue]". Pressing the RETURN key causes GUIDE to display the DDL Operations Menu again, prompting you to make your next selection.

Step 13: Return to the Top-Level Menu and Terminate GUIDE

To end your DDL session, return to the Top-Level Menu and terminate GUIDE.

DDL menu item 1 returns you to the Top-Level Menu, and Top-Level Menu item 9 terminates GUIDE.

A typical terminal dialog for returning to the Top-Level Menu looks like this:

```
.
... {* DDL Operations Menu -- see Fig. 2-2 *}
.

Select by entering a number from 1 to 17: 1 <CR>
.
... {* Top-Level Menu -- see Fig. 2-1 *}
.

Select by entering a number from 1 to 10: 9 <CR>
$
```

When the GUIDE exits, control returns to the TNIX operating system.

SUMMARY OF TYPICAL DDL SESSION

This typical DDL session showed you how to use GUIDE's DDL Operations Menu to execute the following DDL commands (listed in order of their appearance):

- **showcon** -- displays the current DAS card configuration.
- **ddiag** -- executes DDL system diagnostics to test the 8560/8540 communication link, the 8560/DAS communication link, and the correct operation of the State Stamp Probe between the 8540 and the DAS.
- **putpac** -- downloads a previously saved DAS setup packet from the 8560 to the DAS.
- **getpac** -- saves the current DAS setup packet in a file on the 8560.
- **dstart** -- starts the emulator and prototype, and starts the DAS and TTA data acquisition operations.
- **duplod** -- transfers DAS acquisition data and relevant TTA information to files on the 8560.
- **dform** -- specifies the display format to be used by the **ddisp** command.
- **ddisp** -- time-correlates and displays the TTA and DAS acquisition data.
- **tcur** -- calls up the DAS timing diagram display for a specified DAS sequence number.
- **scrol** -- moves the DAS cursor a specified number of positions through a DAS timing diagram or state table display. The **scrol** command can be used immediately following a DDL **tcur** or **scur** command to scroll through the respective timing diagram or state table.
- **scur** -- calls up the DAS state table display for a specified DAS sequence number.

Each of these DDL commands is described in the Command Dictionary section of this manual.

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COMMAND DICTIONARY

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COMMAND DICTIONARY

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TIME-CORRELATION AND DISPLAY FUNCTIONS

DATA STORAGE AND DISPLAY FUNCTIONS

DAS/8560 COMMUNICATION FUNCTIONS

MISCELLANEOUS FUNCTIONS

INTRODUCTION

This Command Dictionary describes the DDL commands. The Command Index on the preceding page lists these commands according to their function. The following "Command Syntax" subsection describes the format and notation used in syntax blocks.

COMMAND SYNTAX

Each command description includes a syntax block that illustrates the format for the command. This subsection describes the notation conventions used in the syntax blocks, and the command line format. Refer to your 8540 System Users Manual for more information on command syntax, strings, and address expressions.

NOTATION CONVENTIONS

The syntax block for each command illustrates the command entry. Figure 3-1 illustrates a sample syntax block.

SYNTAX

sample [**-m**] file1 [file2] [**pa**] {address} ...
[**pb**] {**-s** string}

4550-4

Fig. 3-1. Sample syntax block.

This figure illustrates a syntax block for the fictional DDL command **sample**. **-m** and **-s** are dash modifiers; and **file1**, **file2**, **pa**, **pb**, **address**, and **string** are command parameters. Braces, brackets, and trailing dots are included for syntactical representation only.

Optional parts of the command are surrounded by brackets []. In Fig. 3-1, **file2** is an optional parameter. When optional parameters are stacked in the syntax block, it means you can select one, or none of the choices. In Fig. 3-1, you may select either **pa** or **pb** or neither.

When a parameter appears without brackets or braces, it is a required parameter. In Fig. 3-1, **file1** is a required parameter. Braces {} indicate that you must select one of the parameters stacked within the braces. In Fig. 3-1, you must select either **address** or **-s string**.

When three dots follow a parameter (or a group of parameters enclosed in brackets or braces), the parameter may be repeated a number of times up to the end of the command line. In Fig. 3-1, the choice of **address** or **string**

may be repeated as many times as the line length of 256 characters permits.

Parameters in **boldface** must be entered exactly as they appear in the syntax block, when used. In Fig. 3-1, parameters **-m**, **-s**, **pa**, and **pb** must be entered exactly as shown.

Parameters that are not in boldface describe the type of parameter. Acceptable entries for each parameter type are described in the PARAMETERS explanation for each command. In Fig. 3-1, the words **address** and **string** are parameter types.

Dash Modifiers. A dash modifier (a special type of parameter that modifies how the command executes) consists of a dash (-) followed by a letter. Figure 3-1 contains the dash modifiers **-m** and **-s**.

Multiple dash modifiers, when used, can be strung together. For example, the three dash modifiers **-A -B -C** can be entered as **-ABC**. A dash modifier can usually occur anywhere in the command line; its position in the line is only significant when it is used to modify a parameter instead of the command. In that case, the dash modifier must immediately precede the appropriate parameter. For example, in the command line **sample -m myfile -s abc** the third parameter is **-s abc**, signifying that **abc** is a string.

When you use a modifier, only the current invocation of the command is affected.

Command Line

The maximum length of a command line is 256 characters, including spaces and the terminating carriage return.

Command names must be entered in lowercase.

Delimiters separate parts of the command line from each other. Allowed delimiters are spaces, commas, or tabs.

Examples. Here are some examples of how the fictitious **sample** command could be used:

```
$ sample myfile pa -s "some text" <CR>

$ sample -m yourfile myfile pb -s "txta" 10 0E -s "txtb" <CR>

$ sample -m hisfile pb 80 90 0a0 0b0 <CR>
```

Runs System Diagnostics

SYNTAX

ddiag [**-t**] slotpod

PARAMETERS

-t Specifies the TTA trigger test mode. Used for system troubleshooting. Refer to the "DDL System Diagnostics" discussion in the Technical Notes section of this manual.

slotpod The DAS **slot** number where the 91A32 or 91A24 Acquisition Module is connected; followed by the **pod** identification letter on the Acquisition Module to which the State Stamp Probe is connected. Valid entries for **slot** are **1--6**. Valid entries for **pod** are **a--d** for the 91A32 Acquisition Module, and **a--c** for the 91A24 Acquisition Module.

EXPLANATION

NOTE

A complete description of the DDL system diagnostic program, including the errors that may occur during execution, is provided in the Technical Notes section of this manual. The error messages are also described in the Error Messages section of this manual.

The DAS must **not** have a Personality Module Adapter (PMA) module attached when DDL is executing the **ddiag** command.

The **ddiag** command invokes diagnostic routines that verify communications between the 8560 and both the DAS and the 8540, and that verify the operation of the State Stamp Probe connecting the 8540 to the DAS.

To start the diagnostic program, enter the **ddiag** command, specifying the appropriate slot and pod. For example,

$ ddiag 3c <CR>

The diagnostic program performs the tests described in the following paragraphs. As each test is completed, a status message is displayed on your system terminal. If the test fails, an error message is displayed.

1. First, the diagnostic program verifies that it can communicate with the 8540.

2. Next, the program verifies that a TTA is installed in the 8540.

3. The program now verifies that it can communicate with the DAS.

4. The program displays the baud rate of the 8560's DAS port, and prompts you to enter <CR> if both the DAS and 8560 are set for the same rate, or to enter a new rate if desired. The allowed baud rates are 300, 600, 1200, 2400, 4800, and 9600.

5. The program also checks the DAS **slotpod** you specified in the command line, to see if it contains a 91A32 or 91A24 Acquisition Module.

6. At this point, the diagnostic program aborts if it has detected any problems in communicating with the DAS, the 8540, or the TTA. If no problems were found, the diagnostic program continues.

7. The diagnostic program now prompts you to set up the DAS. The DAS must be configured to record the State Stamp Probe's Gray code value on each trigger from the TTA. You can display a detailed setup procedure on your system terminal, if desired. The diagnostic program waits for you to indicate that you have finished the setup before it continues.

8. The diagnostic program now begins to load TTA comparison memory, and displays a status message informing you that this step will take about 2 minutes. Status messages are displayed at frequent intervals, indicating that the process is proceeding.

9. Now, the DAS acquires the Gray code combinations triggered by the TTA.

10. When the DAS acquisition is complete, the DAS acquisition data is uploaded from the **slotpod** you specified in the **ddiag** command line.

11. The diagnostic program compares the information uploaded from the DAS with an internally calculated response pattern. If the proper Gray code pattern is found, the diagnostic program completes successfully.

    If errors are found in the Gray code pattern, you may save the pattern in an 8560 file for later examination. The diagnostic program completes, with errors found.

Time-Correlates and Displays Data

SYNTAX

ddisp [**-d** | **-t**] [**-f** first] [**-l** last] [**-u**]

PARAMETERS

No parameters	Displays the current time-correlated TTA/DAS acquisition data.
-d	Displays only DAS data.
-t	Displays only TTA data.
-f first	Specifies the first TTA acquisition to be shown. The default value of first is 0; permitted values are 0--254, expressed in decimal notation.
-l last	Specifies the last TTA acquisition to be shown. The default value of last is 254; permitted values are 0--254, expressed in decimal notation.
-u	Shows uncorrelated data in addition to correlated data.

EXPLANATION

The **ddisp** command performs time-correlation on TTA/DAS data, and displays the time-correlated data on the terminal. DAS and TTA events are displayed in the order in which they occurred; lines of DAS and TTA data are interleaved. Refer to Fig. 3-2.

You can control the appearance of the display by using dash modifiers, and by selecting display format options with the DDL **dform** command. Before using the **ddisp** command, you must have previously entered a **dform** command while in the current directory. You must have also specified at least one display group assignment with **dform**, at least once in the current directory. The **dform** command creates the file DASdform in your current directory. In addition, you must have uploaded the TTA/DAS data, by using the **duplod** command while in the current directory.

The Technical Notes section of this manual contains a discussion of the time-correlation algorithm used by DDL.

NOTE

Be sure to perform all operations for a given DDL session in one directory. This ensures that all files from the current DDL run (TTAstart, TTAtrig, TTAdata, DASconfig, DASdform, DASaq.**xx.sp**, and DASmnem) are placed in the current directory. It is important that files from different DDL runs **not** be mixed.

```
ACQ   ADDR        DATA       MNEMONIC       7-PROBE-0     BUS

   SEQ          A          B          C
                HEX      OCTAL      ASCII

 1    0100        21          LXI    H        0000 0000    M R F

    8          22FE17       35          A
    9          22FFC7       17          A
-------------------------------------------------------------------
 2    0101        00                          0000 0000    M R

   10          23FFC7       17          B
   11          23FFCB       16          C
-------------------------------------------------------------------
 3    0102        05                          0000 0000    M R

   12          33FFC7       16          D
   13          2355C7       26          A
```

Fig. 3-2. Sample ddisp display.

As shown in Fig. 3-2, the main features of the **ddisp** display are:

- ACQ---the TTA acquisition number associated with each sampling event on the TTA;
- the TTA information, displayed in the same format used by the TTA **disp** command.
- SEQ---the DAS sequence number associated with each DAS acquisition.
- the DAS acquisition data, uploaded from the DAS.

Specifies Display Format

SYNTAX

```
dform [-v]

      [-h]
      [-a]                          [-p n]
dform [-n] [-s slotpod] [-p y] [groupradix [slotpod[,slotpod]...]]...
```

PARAMETERS

No parameters	Displays the current setting of the **dform** options.
-v	Specifies the "verbose" option: DDL will prompt you for each parameter setting. If you use this parameter, you may not use other parameters on the command line.
-h	Specifies hardware disassembly. The display shows the disassembled instruction line followed by the other processor cycles that make up the instruction, and also identifies read and write cycles. Your DDL System must have a Personality Module Adapter (PMA) and a Personality Module (PM) attached. You must have previously invoked the **mktab** command to store the mnemonics table file DASmnem in your current directory.
-a	Specifies absolute disassembly. The display shows fetch, read, and write cycles, but does not show disassembled instructions. Your DDL System must have a Personality Module Adapter (PMA) and a Personality Module (PM) attached. You must have previously invoked the **mktab** command to store the mnemonics table file DASmnem in your current directory.
-n	Specifies no disassembly. This is the default setting.
-s slotpod	Specifies the slot and pod into which the State Stamp Probe is plugged (must specify a 91A32 Acquisition Module). Default is **-s 3a** (slot 3, pod a).
-p n	No Personality Module Adapter (PMA) is connected to the DAS. This is the default setting. If this parameter is incorrectly set, errors in time-correlation displays will occur.
-p y	A Personality Module Adapter (PMA) is connected to the DAS. If this parameter is incorrectly set, errors in time-correlation displays will occur.

groupradix — Specifies the name of the group in which you are placing pods, and the format in which DAS data for the group is to appear. The group name must be in the range **a--l**. The valid options for radix are:

- **x** hexadecimal.
- **o** octal.
- **b** binary.
- **a** ASCII.
- **g** Gray code. The data is displayed as a decimal representation of the Gray code. Gray code is a binary code in which the representation of two sequential numbers differs in only one bit. The State Stamp Probe uses a Gray code counter.

slotpod — Specifies the name(s) of the slot(s) and pod(s) in this group. For example, **3c** is pod **c** in slot **3**.

EXPLANATION

The **dform** command allows you to specify the format that the **ddisp** command uses to display DAS and TTA information. The parameters you specify are stored in the file called DASdform, and are used until they are overridden by a later **dform** command.

You must enter the **dform** command, including a display group assignment, at least once from the current directory, before you can perform the **ddisp** command. The **dform** command creates the file DASdform.

NOTE

When you enter the first **dform** command in the current directory, the following options are assumed unless you specify otherwise: **-s 3a**, **-n**, and **-p n**.

If you specify the **-h** or **-a** parameter, you must have previously entered the **mktab** command to create the DASmnem file in your current directory.

Only 91A32 Acquisition Modules may be assigned to display groups, since only 91A32 data may be shown in the **ddisp** display.

If you use the **dform -v** command, DDL will prompt you for each parameter setting.

If you specify hardware or absolute disassembly (**-h** or **-a**), display groups **a--d** are assigned automatically, as specified by the DAS ACQSETUP information uploaded with the **mktab** command, and are placed in the file DASmnem. You may assign groups **e--l** according to your needs. However, the **ddisp** command will not display groups **e--l** until disassembly is turned off. No DAS display group headings are shown in the **ddisp** display if disassembly is requested.

Figure 3-3 shows a display using hardware disassembly. Figure 3-4 shows a display using absolute disassembly.

```
ACQ   ADDR          DATA        MNEMONIC        7-PROBE-0      BUS
  SEQ

-------------------------------------------------------------------
1    000100         21            LXI   H       0000 0000     M R F
  119      F849              STA A   05           A
  120      F84A     05         ( READ )
  121      0005     FF         ( WRITE)
-------------------------------------------------------------------
2    000101         00                          0000 0000     M R
  122      F84B              BRA   F851
  123      F84C     04         ( READ )
-------------------------------------------------------------------
3    000102         05                          0000 0000     M R
  124      F851              STA B   04
  125      F852     04         ( READ )
  126      0004     03         ( WRITE)
```

Fig. 3-3. Sample ddisp display showing hardware disassembly.

```
ACQ   ADDR          DATA       MNEMONIC        7-PROBE-0      BUS
  SEQ

-------------------------------------------------------------------
1    000100         21           LXI   H       0000 0000     M R F
  119      F849     97       ( FETCH)
  120      F84A     05       ( READ )
  121      0005     FF       ( WRITE)
-------------------------------------------------------------------
2    000101         00                         0000 0000     M R
  122      F84B     20       ( FETCH)
  123      F84C     04       ( READ )
-------------------------------------------------------------------
3    000102         05                         0000 0000     M R
  124      F851     D7       ( FETCH)
  125      F852     04       ( READ )
  126      0004     03       ( WRITE)
```

Fig. 3-4. Sample ddisp display showing absolute disassembly.

EXAMPLES

The following command indicates that the State Stamp Probe is connected to slot 3, pod c.

```
$ dform -s 3c <CR>
```

The following command defines three groups. Group **a** is shown in hexadecimal, and contains pods **a** and **b** in slot 2. Group **b** is shown in octal, and contains pod **c** in slot 2. Group **c** is shown in Gray code, and contains pod **c** in slot 3.

```
$ dform ax 2a,2b bo 2c cg 3c <CR>
```

The following command displays the **dform** parameters that you just specified:

```
$ dform <CR>
DISASSEMBLY:       NONE
PMA:               NOT PRESENT
STATE STAMP POD:   POD 3C

GROUP    RADIX     PROBE

  A       HEX      POD 2A
                   POD 2B

  B       OCT      POD 2C

  C       GRY      POD 3C
```

SYNTAX

dstart [**-p**] [address]

PARAMETERS

No parameters	Starts only DAS data acquisition. Starts the emulator at the address in the program counter.
-p	Starts DAS pattern generation operations as well as data acquisition.
address	An expression that specifies the emulator starting address.

EXPLANATION

The **dstart** command creates a DDL control file called TTAstart in your current directory, starts DAS acquisition operations by sending a START ACQ command to the DAS, and then starts the emulator at the designated address. (The TTAstart file provides initial TTA state information to the time-correlation routines.)

If you specify **-p**, pattern generation is also performed, by sending a START SYS command to the DAS.

EXAMPLES

Enter the following command to start DAS acquisition and to start the emulator at the current program counter:

```
$ dstart <CR>
```

The following command creates the TTAstart file, starts the emulator at address 100H, and initiates both DAS acquisition and DAS pattern generation operations:

```
$ dstart -p 100 <CR>
```

The **dstart** command displays status messages on your system terminal as it proceeds. For example:

```
Stopping any current DAS operations...
Creating file 'TTAstart'...
Issuing 'START SYSTEM' command to the DAS...
    [or 'START ACQUISITION', if you didn't use the -p modifier]
Starting the TTA/Emulator...
```

SYNTAX

duplod

EXPLANATION

After you start the DDL system, and a TTA triggering event halts the system, you can use the **duplod** command to transfer the acquired DAS/TTA data to the 8560.

This command creates four control and acquisition data files, and places them in your current 8560 directory. The following files are created:

DASconfig	contains DAS card configuration information.
TTAtrig	contains information about the TTA's state at the end of data acquisition.
DASaq.**xx**.**sp**	contains DAS acquisition data for pod **p** of Acquisition Module type **xx**, which is located in slot **s** on the DAS.
TTAdata	contains uploaded TTA acquisition data.

For more information on these files, refer to the File Formats section of this manual.

EXAMPLE

Enter the **duplod** command to transfer the DAS/TTA data to the 8560:

```
$ duplod <CR>
```

It takes about one minute to upload this information, depending on the number of Acquisition Modules in the DAS, the amount of data acquired by the TTA, and the system load.

The **duplod** command displays status messages on your system terminal as it proceeds. For example:

```
Uploading DAS configuration data to file 'DASconfig' ...
Uploading slot 2, pod A acquisition data...
Uploading slot 2, pod B acquisition data...
Uploading slot 2, pod C acquisition data...
Uploading slot 2, pod D acquisition data...
Creating file 'TTAtrig'...
Uploading TTA acquisition data to file 'TTAdata'...
```

SYNTAX

getacq slotpod [filename]

PARAMETERS

slot — Specifies the DAS card slot that contains the desired Acquisition Module. Values may be in the range 1--6.

pod — Specifies the desired acquisition memory on the Acquisition Module. The valid options are:

a, **b**, **c**, or **d** on the 91A32 Acquisition Module;
a, **b**, or **c** on the 91A24 Acquisition Module; or
reg or **glitch** on the 91A08 Acquisition Module.

filename — Specifies the name of the 8560 file in which the acquisition data is placed.

EXPLANATION

The **getacq** command reads the selected DAS acquisition memory and puts the data in an 8560 file. It can read any one of the four acquisition memories from a DAS 91A32 Acquisition Module (**a**, **b**, **c**, or **d**); any one of the three acquisition memories from a DAS 91A24 Acquisition Module (**a**, **b**, or **c**); or regular acquisition memory (**reg**) or glitch memory (**glitch**) from a DAS 91A08 Acquisition Module.

For example, if you are using a 91A32 Acquisition Module in slot 2, and want to read acquisition memory from pod **c** into a file called my.file, enter the following command line:

```
$ getacq 2c my.file <CR>
```

To read glitch memory from the 91A08 Acquisition Module in slot 3 and put the data in a file called glitchfile, enter this command:

```
$ getacq 3glitch glitchfile <CR>
```

If you do not specify a filename, a default filename of the form DASaq.**xx.sp** is assigned. In this name,

xx is 32 for a 91A32 Acquisition Module, 24 for a 91A24 Acquisition Module, and 08 for a 91A08 Acquisition Module;

s is the slot number, in the range 1--6; and

p is the pod name: **A**, **B**, **C**, or **D** for a 91A32 Acquisition Module; **A**, **B**, or **C** for a 91A24 Acquisition Module; or **REG** or **GLIT** for a 91A08 Acquisition Module.

For example, the default name for a file containing acquisition data for pod **b** of a 91A32 Acquisition Module plugged into slot 5 is DASaq.32.5B.

Thus, to read regular acquisition memory from a 91A08 Acquisition Module in slot 5 and put the data in a file with the default name DASaq.08.5REG, you would simply enter the following command:

```
$ getacq 5reg <CR>
```

To read from pod **a** on a 91A24 Acquisition Module in slot 3 and place the data in the default file DASaq.24.3A, enter the following command:

```
$ getacq 3a <CR>
```

SYNTAX

getpac packettype filename

PARAMETERS

packettype — The type of DAS setup packet you want to transfer from the DAS to an 8560 file for later use. The valid options are:

- **all** — setup information for all DAS menus and the contents of reference memory.
- **acqsetup** — setup information describing the CHANNEL SPECIFICATION, TRIGGER SPECIFICATION, and TIMING DIAGRAM menus.
- **refmem** — the STATE TABLE menu setup and the contents of reference memory.
- **patgen** — the PATTERN GENERATION menu setup information.
- **mnemonics** — the DEFINE MNEMONICS menu setup.

filename — The name of the 8560 file to receive the packet.

EXPLANATION

The **getpac** command transfers a DAS setup packet (containing the current setup information) from the DAS to the 8560 file you specify.

For example, to put the current DAS setup packet **all** into an 8560 file called my.all, enter the following command:

```
$ getpac all my.all <CR>
```

SYNTAX

mktab

EXPLANATION

The **mktab** command uploads mnemonic and DAS setup information from the DAS to an 8560 file called DASmnem. The information in this file can then be used by the **ddisp** command to display instruction mnemonics on your DDL system terminal. The information is also used by the **dform** command if you request disassembly.

NOTE

To create this symbol table, you need the Tektronix-supplied DAS mnemonics tape for your prototype's microprocessor. In addition, the DAS must be connected to the 8560.

To create the symbol table, perform the following procedure:

1. Load the appropriate MNEMONICS and ACQSETUP tape into the DAS tape drive, and restore the files to the DAS. Refer to the DAS 9100 Series Operator's Manual for tape loading instructions.

   NOTE

   ACQSETUP information can be entered explicitly from the DAS keyboard, if you so desire. Refer to the DAS 9100 Series Operator's Manual for ACQSETUP requirements for your prototype's processor.

   91A32 Acquisition Modules must be in slots 2 and 3 if the ACQSETUP information on the tape is to be used. Otherwise, the ACQSETUP channel specification information must be entered explicitly from the DAS keyboard.

2. On the 8560, change your working directory to the one in which you will run your DDL operations. For example:

   $ cd ddl.work <CR>

   This ensures that the DASmnem file you are about to create will be in the same directory as the TTA and DAS files that you will upload to the 8560 with the **duplod** command.

3. Enter the following command to upload the mnemonics information:

```
$ mktab <CR>
```

The MNEMONICS and ACQSETUP information is uploaded from the DAS, processed, and placed in the 8560 file DASmnem. Status messages are displayed during this operation:

```
requesting ACQSETUP packet
requesting MNEMONICS packet
```

Moves DAS Setup Packet from 8560 to DAS

SYNTAX

putpac packettype filename

PARAMETERS

packettype — The type of DAS setup packet you want to transfer from an 8560 file to the DAS. The valid options are:

- **all** — setup information for all DAS menus and the contents of reference memory.
- **acqsetup** — setup information describing the CHANNEL SPECIFICATION, TRIGGER SPECIFICATION, and TIMING DIAGRAM menus.
- **refmem** — the STATE TABLE menu setup and the contents of reference memory.
- **patgen** — the PATTERN GENERATION menu setup information.
- **mnemonics** — the DEFINE MNEMONICS menu setup.

filename — The name of the 8560 file that contains the packet you want to transfer.

EXPLANATION

The **putpac** command transfers a DAS setup packet from the specified 8560 file to the DAS. You must have created this file previously using the **getpac** command.

For example, to transfer the DAS setup packet **all** from the 8560 file my.all to the DAS, enter the following command:

```
$ putpac all my.all <CR>
```

SYNTAX

scrol [-|+] positions

PARAMETERS

+	Moves the cursor to the **right** in a timing diagram, or **up** in a state table. This is the default.
-	Moves the cursor to the **left** in a timing diagram, or **down** in a state table.
positions	Specifies the number of cursor positions you want to scroll. Must be in the range -99 to +99.

EXPLANATION

The **scrol** command moves the DAS cursor the specified number of positions in the timing diagram or state table (depending on which display is currently shown).

For example, when the following command is entered after a **tcur** command, the cursor is moved 25 positions to the right in a timing diagram; when entered after an **scur** command, this command moves the cursor 25 positions up in a state table.

```
$ scrol 25 <CR>
```

The following command, when entered after a **tcur** command, moves the cursor 4 positions to the left in a timing diagram; when entered after an **scur** command, it moves the cursor 4 positions down in a state table.

```
$ scrol -4 <CR>
```

Each cursor position shift may be a shift of one or more sequence numbers depending on the magnification setting on the DAS. For example, if the DAS magnification setting is 1, each cursor position corresponds to approximately 8 DAS sequence numbers. If the magnification setting is 10, each cursor position corresponds to only 1 sequence number.

Positions Cursor in DAS State Table

SYNTAX

scur sequencenumber

PARAMETERS

sequencenumber — Specifies the sequence number at which the cursor is placed. Valid sequence numbers for the 91A32 or 91A08 are 0--511, decimal. Valid sequence numbers for the 91A24 are 0--1022, decimal.

EXPLANATION

The **scur** command displays the DAS state table on the DAS screen with the cursor placed at the specified sequence number.

For example, the following command places the cursor at sequence number 216 in the state table display:

```
$ scur 216 <CR>
```

SYNTAX

sendd "string"

PARAMETERS

string — Specifies a DAS command string.

EXPLANATION

The **sendd** command enables you to send valid DAS command strings to the DAS. Valid command strings are described in the "GPIB Programming" section of the DAS 9100 Series Operator's Manual.

For example, the following command line sends the TRIGGER command followed by the HOME command to the DAS:

```
$ sendd "TRIGGER;HOME" <CR>
```

Displays DAS Acquisition Data File

SYNTAX

```
        [-x]
        [-o]
        [-d]
showaf  [-a] filename
```

PARAMETERS

-x	Specifies hexadecimal format. This is the default setting.
-o	Specifies octal format.
-d	Specifies decimal format.
-a	Specifies ASCII format. A non-printing character is displayed as a backslash (\) followed by its hexadecimal value. For example, NAK (hexadecimal 15) is displayed as "\15".
filename	The name of the 8560 file to be read.

EXPLANATION

The **showaf** command reads an 8560 file that contains DAS acquisition data, and displays the contents on the terminal in the specified format. (This 8560 file is typically created by the **duplod** or **getacq** commands.) Dash modifiers allow you to specify whether you want to view the display in hexadecimal, octal, decimal, or ASCII format. The default is hexadecimal.

For example, the following command produces a hexadecimal display similar to that shown in Fig. 3-5.

```
$ showaf myacq <CR>
```

The following command displays the same information in ASCII format, as shown in Fig. 3-6:

```
$ showaf -a myacq <CR>
```

```
Sequence start= 0 (dec)
Trigger event at sequence number 494 (dec)
Number of data bytes= 512 (dec)

0000:    0d    c2    fc    02    0d    c2    fc    02    2b    24
0010:    c8    25    c3    42    02    0e    48    0d    c2    fc
0020:    02    0d    c2    fc    02    0d    c2    fc    02    0d
                               .
                               .
                               .
0490:    51    d5    ff    ff    c5    10    00    cd    26    03
0500:    04    2f    cd    34    03    03    29    11    0c    05
0510:    cd    64
```

Fig. 3-5. Example of showaf display, hexadecimal format.

```
Sequence start= 0 (dec)
Trigger event at sequence number 494 (dec)
Number of data bytes= 512 (dec)

0000:   \0d   \c2   \fc   \02   \0d   \c2   \fc   \02   +     $
0010:   \c8   %     \c3   B    \02   \0e   H    \0d   \c2   \fc
0020:   \02   \0d   \c2   \fc   \02   \0d   \c2   \fc   \02   \0d
                               .
                               .
                               .
0490:   Q     \d5   \ff   \ff   \c5   \10   \00   \cd   &     \03
0500:   \04   /     \cd   4    \03   \03   )    \11   \0c   \05
0510:   \cd   d
```

Fig. 3-6. Example of showaf display, ASCII format.

Displays Current DAS Configuration

SYNTAX

showcon

EXPLANATION

The **showcon** command displays the current DAS card configuration on the 8560 terminal. When you enter the following command, a display similar to that shown in Fig. 3-7 appears on your terminal screen:

```
$ showcon <CR>
```

```
CURRENT DAS CARD CONFIGURATION:

     SLOT    CARD TYPE
     ----    ---------------------------------

       0     Controller
       1
       2     91A32   32 Channel / 40ns Acquisition Module
       3     91A32   32 Channel / 40ns Acquisition Module
       4     91P16   16 Channel / 40ns Pattern Generator
       5
       6     91A08   8 Channel / 10ns Acquisition Module
       7     Trigger / Time Base
       8     I/O Option
```

Fig. 3-7. Example of showcon display.

SYNTAX

tcur sequencenumber

PARAMETERS

sequencenumber — Specifies the DAS sequence number at which the cursor is placed. Valid sequence numbers for the 91A32 or 91A08 are 0--511, decimal. Valid sequence numbers for the 91A24 are 0--1022, decimal.

EXPLANATION

The **tcur** command displays the DAS timing diagram with the cursor placed at the specified sequence number.

For example, the following command places the cursor at sequence number 443 in the timing diagram display:

```
$ tcur 443 <CR>
```

Section 4

TECHNICAL NOTES

ILLUSTRATIONS

Section 4

TECHNICAL NOTES

NOTE 1: THE TIME-CORRELATION ALGORITHM

This Technical Note describes the time-correlation algorithm used by the DDL software.

Background

In DDL operations, the major function of the Trigger Trace Analyzer (TTA) is to monitor the emulator for the desired breakpoint state. When the TTA detects this state, it sends a trigger pulse to the State Stamp Probe. The State Stamp Probe lengthens the pulse and sends it on to the DAS. The DAS acquires this pulse as data, and triggers as a result. The lengthened pulse is also sent back to the TTA and recorded in a segment of its acquisition memory.

The **duplod** command loads the acquisition data portion of TTA memory into the 8560 file TTAdata, and copies the corresponding control information into the file TTAtrig. The information in these files is used by the DDL time-correlation software.

Each byte in the TTAtrig file corresponds to one of the 256 acquisitions in TTA acquisition memory. Bit two of each byte (bit 0 = LSB) reflects the state of the stretched pulse returned from the State Stamp Probe during each acquisition. Bit zero of each byte is an ID bit that indicates whether the corresponding TTA acquisition data is "new" data or "old" data, as follows:

1. As TTA data is acquired, the ID bit for each acquisition is loaded with a zero or a one. When data acquisition operations stop (due to a breakpoint event), all ID bits for the same set of acquisitions contain the same value (all zero or all one).

2. When data acquisition operations start up again, the ID bit is toggled. That is, if the previous ID bit was one, the new value is zero. Using the ID bits and information in the TTAtrig file, the DDL software can tell where the new data ends and the old data begins.

The Algorithm

After the TTA and DAS data have been uploaded to the 8560 (using the **duplod** command), the DDL software (invoked using the **ddisp** command) performs the time-correlation, as follows:

1. First, the time-correlation software determines the TTA "trigger event" by looking for the stretched trigger pulse in the file TTAtrig (indicated by bit 2 changing from zero to one).

2. Next, DDL determines the DAS trigger event by looking for the stretched trigger pulse in the DASaq.**xx.sp** file (indicated by the most significant bit changing from one to zero).

3. Using these two trigger events as the starting point, DDL reads the DAS and TTA data backwards, looking for a transition in the Gray code count. Because the Gray code count is incremented with each TTA acquisition, all data until the next transition is associated with the TTA trigger event minus one.

4. Still working backward in the DAS data, DDL searches for the next Gray code transition, which indicates the boundary of DAS data that is associated with TTA trigger event minus 2.

5. This process repeats until DDL reaches the beginning of either the DAS or TTA data files. Any DAS or TTA acquisitions that remain are considered "un-correlated".

NOTE 2: USING THE DDL DISASSEMBLY FEATURE

The DDL software has the ability to substitute disassembled processor instructions for hexadecimal, octal, or binary DAS data. This Technical Note summarizes the requirements and procedures for using the DDL disassembly feature.

Types of Disassembly (Hardware and Absolute)

The **dform** command allows you to select two kinds of disassembly: hardware and absolute.

Hardware disassembly shows the disassembled instruction followed by the other processor cycles that make up the instruction. Figure 4-1 shows a time-correlated display with hardware disassembly. Note that the "read" and "write" cycles are identified (on the right of the display, enclosed in parentheses).

Absolute disassembly does not show the disassembled instruction but does indicate the "fetch", "read", and "write" cycles of the instruction. Figure 4-2 shows a time-correlated display with absolute disassembly.

```
ACQ   ADDR          DATA        MNEMONIC        7-PROBE-0      BUS
  SEQ
 ------------------------------------------------------------------
1    000100         21           LXI   H        0000 0000     M R F
  119      F849              STA A   05          A
  120      F84A     05         ( READ )
  121      0005     FF         ( WRITE)
 ------------------------------------------------------------------
2    000101         00                           0000 0000     M R
  122      F84B              BRA   F851
  123      F84C     04         ( READ )
 ------------------------------------------------------------------
3    000102         05                           0000 0000     M R
  124      F851              STA B   04
  125      F852     04         ( READ )
  126      0004     03         ( WRITE)
```

Fig. 4-1. Sample display showing hardware disassembly.

```
ACQ   ADDR      DATA      MNEMONIC      7-PROBE-0     BUS
  SEQ

-------------------------------------------------------------------
1    000100      21         LXI   H      0000 0000    M R F
  119      F849    97      ( FETCH)
  120      F84A    05      ( READ )
  121      0005    FF      ( WRITE)
-------------------------------------------------------------------
2    000101      00                       0000 0000    M R
  122      F84B    20      ( FETCH)
  123      F84C    04      ( READ )
-------------------------------------------------------------------
3    000102      05                       0000 0000    M R
  124      F851    D7      ( FETCH)
  125      F852    04      ( READ )
  126      0004    03      ( WRITE)
```

Fig. 4-2. Sample display showing absolute disassembly.

Disassembly Requirements and Restrictions

To show disassembled DAS data in the **ddisp** display, your DDL system must include the Personality Module (PM), Personality Module Adapter (PMA), and mnemonics tape for your target microprocessor. However, data acquired with the PM/PMA combination is offset (time-skewed) by one DAS acquisition cycle relative to data acquired with standard DAS data acquisition probes. This means that acquisition data in the **n**th position of DAS acquisition memory was acquired one cycle later than other data (such as the State Stamp data). The time-skew becomes even more pronounced if you attempt to qualify the data acquired with the PM/PMA. The consequence of this time-skew is that DDL cannot perform proper time-correlation of DAS and TTA data without imposing some restrictions on the DDL setup.

Therefore, to assure proper time-correlated display with disassembly:

- You must not qualify the data read by the PM/PMA. This assures that PM/PMA data and State Stamp data will be offset by only one acquisition cycle.
- You must use the **-p y** option with the **dform** command. This option instructs the DDL software to compensate for the offset caused by using the PM/PMA.

Procedure to Obtain Disassembly

To obtain the disassembled display, you must perform the following steps before using the DDL **ddisp** command:

1. Enter the MNEMONICS and ACQSETUP information for your target microprocessor into the DAS. This information is contained in the Tektronix-supplied mnemonics tape for your target microprocessor), and can be loaded into the DAS ("restored") as described in your DAS and PMA manuals. You can enter the ACQSETUP portion of this information by hand, using the DAS keyboard. Refer to the DAS 9100 Series Operators manual for details.

2. Set up the DAS TRIGGER SPECIFICATION and CHANNEL SPECIFICATION menus, as described in the discussion "Setting Up the DAS for DDL Operations" in the Learning Guide section of this manual.

3. Use the DDL **mktab** command to upload the mnemonics and ACQSETUP information to the 8560 file **DASmnem**. Before you issue this command, make certain that you are in the proper directory (the one that contains all the files created or used by DDL during the current run). Note that you can use the same DASmnem file for all DDL runs that use the same target microprocessor and ACQSETUP information. Simply copy the file into each new DDL directory, using the TNIX **cp** command.

4. Use the DDL **dform** command with the **-p y** option and either the **-h** or **-a** option. These options tell the DDL software that your system has a PMA attached (**-p y**), and that you want hardware (**-h**) or absolute (**-a**) disassembly. (Hardware and absolute disassembly are described earlier in this Technical Note.)

You can now use the DDL **ddisp** command to obtain a time-correlated display that contains disassembly. Refer to the Command Dictionary section of this manual for details on the **ddisp**, **dform**, and **mktab** commands.

NOTE 3: CRITICAL TIMING ISSUES

The DDL system time-correlates data that was acquired from your prototype by two systems that operate asynchronously, the TTA and the DAS. This Technical Note describes the conditions that can cause the DDL software to provide a misleading time-correlated display.

Recall that when the TTA performs a data acquisition, it sends a pulse to the State Stamp Probe. Upon receiving this pulse, the State Stamp Probe increments a Gray code counter. Each time the DAS acquires data from the prototype, the value of the Gray code counter is recorded with the acquisition data. The counter value serves as the state (time) stamp for the acquired data.

However, the State Stamp Probe requires a non-zero amount of time (approximately 100 ns) to respond to the TTA pulse and increment the Gray Code value. If the DAS acquires data between the time that the TTA issues the pulse and the time that the State Stamp Probe increments the counter, the time tag acquired with the DAS data will be incorrect. In other words, if the DAS acquires data within 100 nanoseconds (approximately) of a TTA acquisition, the Gray code counter will show the value associated with the previous TTA acquisition, rather than the current TTA acquisition. When this happens, the DDL software will produce a time-correlated display that shows the DAS acquisition before, rather than after, the TTA acquisition.

Figure 4-3 demonstrates this critical time window.

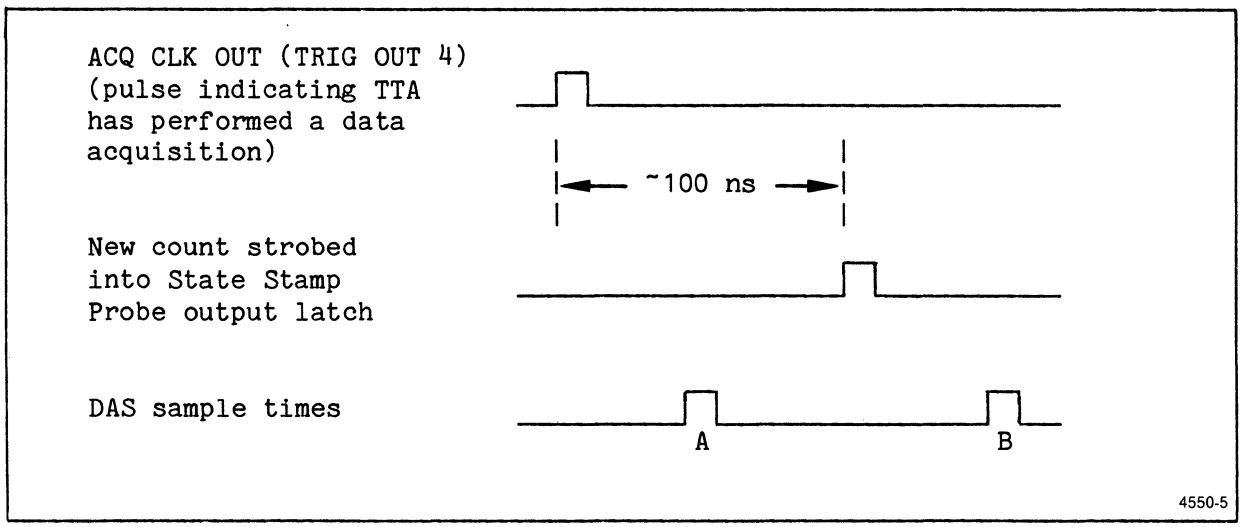

Fig. 4-3. Critical window.

If the DAS acquires data at point "B" (outside the critical window), the DDL software time-correlates the TTA and DAS data properly.

However, if the DAS acquires data at point "A" (within the critical window), the DAS records a counter value that corresponds to the previous TTA data acquisition. Although the DAS acquisition occurred after the TTA acquisition, it occurred before the Gray Code counter was incremented. Consequently, the DDL time-correlation algorithm places the DAS data before, rather than after, the TTA data.

NOTE 4: THE DDL SYSTEM DIAGNOSTICS

The **ddiag** command invokes diagnostic routines that verify communications between the 8560 and both the DAS and the 8540. These routines also verify the operation of the State Stamp Probe connecting the 8540 to the DAS.

In addition to these tests, there is a trigger test mode that allows you to verify that your TTA can generate the necessary triggers, and that your State Stamp Probe responds to those triggers.

Both the normal and trigger test modes are described in this Technical Note.

System Setup

In order to run the diagnostics, your DDL system hardware must consist of the following components:

- 8560 Multi-User Software Development Unit
- 8540 Integration Unit with a Trigger Trace Analyzer (TTA)
- DAS 9100 Digital Analysis System with a State Stamp Probe connected to a 91A32 or 91A24 Acquisition Module and to the 8540
- RS-232-C cabling between the 8560 and the DAS, and an HSI connection between the 8560 and the 8540.

NOTE

The DAS **must not** have a Personality Module Adapter (PMA) module attached, since this module does not allow the diagnostics routines to set the DAS for asynchronous acquisition.

In addition to these hardware requirements, communications must be established between the 8560 and the 8540, and between the 8560 and the DAS.

NOTE

If your terminal is connected directly to the 8560, enter the following TNIX command line:

```
$ IU=portnumber;export IU <CR>
```

This command line sets the TNIX shell variable "IU" to the port number of the 8540 (**portnumber**), and exports that variable.

Normal Run Mode

To start the diagnostic program, enter the **ddiag** command, specifying the slot and pod to which the State Stamp Probe is connected. For example,

$ ddiag 3c <CR>

The diagnostic program performs the tests described in the following paragraphs. As each procedure is successfully completed, a status message is displayed on your system terminal. If the test fails, an error message is displayed.

1. The diagnostic program verifies that it can communicate with the 8540, by attempting to read from a TTA control port.

   Status Message: Integration Unit detected

   Error Message: no response from Integration Unit

   Check: Is the 8540 connected? powered up? in TERM mode?

2. Next, the program verifies that a TTA is installed in the 8540.

   Status Message: TTA detected in Integration Unit

   Error Message: TTA not detected in Integration Unit

   Check: Is the TTA installed?

3. The program now verifies that it can communicate with the DAS. The file /dev/DAS must exist in the 8560 file system as a link to the DAS's communication port.

   Error Message: /dev/DAS not detected - see setup procedure in manual

   Check: Does the file /dev/DAS exist?

4. The diagnostic program now attempts to open the file /dev/DAS.

   Error Message: cannot open /dev/DAS - is the DAS connected and powered up?

   Check: Is the DAS connected to the port to which /dev/DAS is linked? Is the DAS powered up?

5. The baud rate of both the 8560 and the DAS must be the same. The allowed baud rates are 300, 600, 1200, 2400, 4800, and 9600. The diagnostic program looks for the current baud rate in the 8560 port control block. If the value found is not one of the six allowed, the following error message is displayed and the diagnostic program aborts:

   Error Message:

   ```
   check baud rate for /dev/DAS -
   allowed values = 300, 600, 1200, 2400, 4800, 9600
   ```

   Check: There is a problem internal to the 8560 I/O port control block.

   If the value found is one of the six allowed, the program displays the baud rate of the 8560's DAS port, and prompts you to enter <CR> if both the DAS and 8560 are set for the same rate, or to enter a new rate.

   Status Message:

   ```
   /dev/DAS currently at nnnn baud - verify DAS baud rate
   Enter <CR> to continue - or enter new baud rate for /dev/DAS
   ```

   If you enter a new rate, the 8560 port is changed to the new rate. If you enter an incorrect baud rate value, an error message is displayed and you can enter the rate value again:

   Error Message:

   ```
   allowed values = 300, 600, 1200, 2400, 4800, 9600
   Enter <CR> to continue - or enter new baud rate for /dev/DAS
   ```

6. The diagnostic program inspects the communication characteristics of the port to which /dev/DAS is linked, and changes the port characteristics, if required. If changes are made, the following status message is displayed:

   Status Message:

   ```
   Changing /dev/DAS communication characteristics to:
   raw, datai, datao, and dtr
   ```

   When the diagnostic program finishes or aborts, the port characteristics are restored to the initial values, and the following status message is displayed:

   Status Message:

   ```
   /dev/DAS communication characteristics returned to:
   speed [n] baud
   erase = [e] kill = [b]
   [list of port options]
   ```

   where the items in brackets are the port characteristic values.

7. The program verifies that it is communicating with a DAS.

   Status Message: DAS 9100 detected

   If an instrument other than a DAS is found, the following error message is displayed:

   Error Message: DAS 9100 not detected

   Check: Is a DAS connected to the port designated as /dev/DAS?

   If five seconds pass and the diagnostic program does not receive a response to its query, the following error is displayed:

   Error Message: no response from /dev/DAS

   Check: Is the DAS connected to the port designated as /dev/DAS? Is the cable to the DAS functioning?

8. The program verifies that the DAS **slotpod** number you specified in the **ddiag** command line does contain a 91A32 or 91A24 Acquisition Module.

   Status Message: Compatible Acquisition module detected in DAS slot **s**

   Error Message: incompatible acquisition module detected in DAS slot **s**

   Check: Did you specify the correct Acquisition Module number on the **ddiag** command line? Is the Acquisition Module installed?

   If five seconds pass and the diagnostic program does not receive a response to its query, the following error is displayed:

   Error Message: no response from /dev/DAS

   Check: Is the DAS connected to the port designated as /dev/DAS? Is the cable to the DAS functioning?

9. At this point, the diagnostic program aborts if it has detected any problems in communicating with the DAS, the 8540, or the TTA. If no problems were found, the diagnostic program continues.

   Error Message: ddiag abort: DAS and Integration Unit with TTA required

10. The DAS must be configured to record the State Stamp Probe's Gray code value on each trigger from the TTA. The diagnostic program now prompts you to set up the DAS:

    DAS9100 trigger conditions must be set for a 2uS acquisition clock, and to trigger on the MSB of the State Stamp Probe set low

    Do you need detailed setup information? (y or n)

    If you enter **n** <CR>, the following message is displayed:

    ==========

    Enter <CR> when the TRIGGER setup is complete

    ==========

    The diagnostic program waits for you to indicate that you have finished the setup before it continues.

    If you respond with **y** <CR>, or just <CR>, the following setup procedure is displayed on your system terminal:

    1) Select the DAS CHANNEL SPEC menu

        A) Assign POD A to the PROBE field in a TRIGGER GROUP
        B) Change the RADIX field for this trigger group to BIN

    2) Select the TRIGGER SPEC menu

        A) Select 2uS in the CLOCK field, using the INCR or DECR keys
        B) Set the TRIGGER ON field for the TRIGGER GROUP assigned to POD A to 0XXXXXXX
           (trigger when the most significant bit is zero)
        C) Set the TRIGGER POSITION field to BEGIN

    ==========

    Enter <CR> when the TRIGGER setup is complete

    ==========

11. The diagnostic program now begins to load TTA comparison RAM memory, and sets TTA control ports to generate the trigger signals:

    Status Message: Loading TTA comparison memory (requires approx. 2 minutes)

    Status prompts are displayed at frequent intervals, indicating that the process is proceeding:

    Status Prompts: . . . . . .

    When the loading procedure is complete, the following message is displayed:

    Status Message: Loading TTA comparison memory complete

12. Now the TTA begins the triggering sequence, and the DAS acquires the Gray code combinations generated.

    Status Message: Beginning DAS acquisition

    Two seconds after the triggers are sent, the following message is displayed:

    Status Message: DAS acquisition complete

13. The DAS acquisition data is now uploaded from the **slotpod** you specified in the **ddiag** command line.

    Status Message: Uploading DAS acquisition memory

    Error Message: data transfer checksum error

    Error Message: could not upload DAS acquisition memory

    Check: If a checksum error did not occur, the diagnostics cannot re-open file /dev/DAS immediately prior to uploading the DAS data.

14. The acquisition data is compressed to remove redundant samples. The diagnostic program compares the information uploaded from the DAS with an internally calculated response pattern. If the proper Gray code pattern is found, the diagnostic program completes successfully.

    Status Message: DDL diagnostics completed successfully

    If errors are found in the Gray code pattern, you can save the pattern in an 8560 file for later examination.

    Error Message:

    ```
    error detected in the State Stamp Probe pattern
    do you want a copy of the pattern checked? (y or n)
    ```

If you enter **y**, a file is created in your current directory which contains the compressed pattern.

Status Message: tested sequence may be found in file DDLdiagXXXXXX

In the above status message, XXXXXX is a number generated by TNIX. The diagnostic program completes, with errors found.

Error Message: DDL diagnostics complete - errors found

Check: Is the State Stamp Probe connected to this DAS Acquisition Module? Are the State Stamp Probe/8540 connections intact? If so, run trigger test mode to verify trigger generation, and the State Stamp Probe's response.

Trigger Test Mode

To run the trigger test mode portion of the diagnostics, enter the **ddiag** command with the **-t** parameter:

```
$ ddiag -t <CR>
```

1. First, the program verifies that both the 8540 and the TTA are present, issuing the same status and error messages as shown in the normal mode description.

2. If both TTA and 8540 are present and running, the TTA trigger mode is enabled:

   Status Message: ddiag TTA trigger test mode enabled

3. Then TTA comparison memory is loaded with a trigger pattern. Triggers are generated at approximately 4 second intervals. Each trigger burst consists of 129 pulses appearing at Data Acquisition Interface trigger connectors 1, 2 and 3, and at the ACQ CLK connector on the 8540 back panel.

   The State Stamp Probe should respond to each trigger burst by returning a pulse that is approximately one second long to the ACQ QUAL connector on the Data Acquisition Interface connector panel.

   Status Message: Beginning TTA trigger generation, enter <CR> to end.

   A series of periods are printed, one for each burst of trigger pulses.

   Status Message: . . . . . .

4. Enter <CR> when you want to stop the trigger test mode.

Section 5

FILE FORMATS

TABLES

Section 5

FILE FORMATS

INTRODUCTION

During a typical DDL session, the DDL software creates and uses the following files:

- DAS acquisition file (DASaq.**xx.sp**) - stores data from DAS acquisition modules.
- DAS configuration file (DASconfig) - describes the DAS card configuration.
- DDL display format file (DASdform) - defines the format of DDL time-correlation displays.
- DAS mnemonics file (DASmnem) - defines disassembly mnemonics and setup information for a specific microprocessor.
- TTA data file (TTAdata) - holds the output of a TTA **disp** command.
- TTA start file (TTAstart) - points to the location in TTA memory of the first TTA acquisition.
- TTA trigger file (TTAtrig) - contains TTA triggering information.

These files are stored on the 8560 system disk. This section describes the contents of each of these DDL files.

DAS Acquisition File (DASaq.xx.sp)

The DAS acquisition file contains information from a DAS **TRIGPOS?** status interrogation command and an **ACQMEM** acquisition memory retrieval command.

The DDL **getacq** and **duplod** commands create a DAS acquisition data file.

The DDL **ddisp** and **showaf** commands use this file.

The default DAS acquisition file name has the following form:

DASaq.**xx.sp**

In this format, **xx** is the type of DAS acquisition card (32=91A32 card, 24=91A24 card, and 08=91A08 card), **s** is the slot, and **p** is the pod from which the data was taken.

The DAS acquisition file has the following general structure:

1. The first item contains the DAS sequence number that corresponds to the first byte of DAS acquisition memory. This number is derived from the DAS response to a **TRIGPOS?** command.

2. The second item contains the DAS sequence number that corresponds to the DAS trigger event. This number is also derived from the DAS **TRIGPOS?** command. See the GPIB section of the DAS 9100 Series Operator's Manual for details.

3. The third item contains a count of the number of bytes of DAS acquisition memory in the file.

4. The remaining bytes contain the actual DAS acquisition data.

Table 5-1 describes the specific format of the DAS acquisition file.

Table 5-1
DAS Acquisition File Format

Item Number	Data Type	Contents
1	integer	DAS sequence number corresponding to first byte of DAS acquisition data
2	integer	DAS sequence number corresponding to trigger event
3	integer	Number of bytes of DAS acquisition memory to follow
4	character	First byte of DAS acquisition memory
5	character	Second byte of DAS acquisition memory
.	.	.
.	.	.
(n+3)	character	Last byte of DAS acquisition memory

DAS Configuration File (DASconfig)

The file DASconfig contains information that describes the DAS card configuration. That is, it shows which data acquisition or pattern generation card is plugged into each DAS slot.

The **duplod** command creates the DASconfig file.

The **showcon** command uses this file.

Table 5-2 describes the general file format of the DASconfig file.

Table 5-2
DAS Configuration File Format

Item Number	Data Type	Contents
1	integer	1
2	integer	(type of card in slot 1)
3	integer	2
4	integer	(type of card in slot 2)
5	integer	3
6	integer	(type of card in slot 3)
7	integer	4
8	integer	(type of card in slot 4)
9	integer	5
10	integer	(type of card in slot 5)
11	integer	6
12	integer	(type of card in slot 6)
13	integer	7
14	integer	(type of card in slot 7)
15	integer	8
16	integer	(type of card in slot 8)

DDL Display Format File (DASdform)

The file DASdform contains information that describes the format used by the **ddisp** command when displaying the time-correlated data.

The **dform** command creates the DASdform file.

The **ddisp** command uses this file.

DAS Mnemonics File (DASmnem)

The file DASmnem contains processed mnemonics and DAS ACQSETUP information that is used by the **ddisp** command when displaying disassembled time-correlated data. The **dform** command also uses this information to set up display groups.

The information contained in the DASmnem file is derived from the DAS mnemonics tape, but is processed by the DDL software. Therefore, it does not have the same format as the DAS mnemonics tape.

The **mktab** command creates the DASmnem file.

The **ddisp** and **dform** commands use this file.

TTA Data File (TTAdata)

The file TTAdata contains the redirected output of a TTA **disp** command. Refer to the TTA Users Manual for the format of a **disp** display.

The **duplod** command creates the TTAdata file.

The **ddisp** command uses this file.

TTA Start File (TTAstart)

The file TTAstart contains a pointer to the location in TTA acquisition memory of the first TTA acquisition.

The **dstart** command creates the TTAstart file.

The **ddisp** command uses this file.

TTA Trigger File (TTAtrig)

The first line of the file TTAtrig contains one byte of information (in hexadecimal). Bit 4 of that byte is the value of the ID bit of the current run.

The second line of the file indicates the TTA acquisition memory location where the next acquisition was to be placed when TTA operations stopped.

The remaining lines of the TTAtrig file contain the part of TTA memory that enables the DDL software to find the trigger pulse that was sent by the TTA, stretched by the State Stamp Probe, and sent back to the TTA.

The **duplod** command creates the TTAtrig file.

The **ddisp** command uses this file.

Section 6

TABLES

Table 6-1
DDL Command Quick-Reference

---

ddiag-----Run DDL system diagnostics

ddiag [**-t**] slotpod

-t = TTA trigger test mode
slotpod = State Stamp Probe's DAS slot number and pod ID letter
slot values: 1--6.
pod values: a--d, on 91A32
a--c, on 91A24

---

ddisp-----Time-correlate and display DAS and TTA acquisition data

ddisp [**-d** / **-t**] [**-f** first] [**-l** last] [**-u**]

No parameters = Display current TTA/DAS acquisition data
-d = Display only DAS data
-t = Display only TTA data
-f first = First TTA acquisition to be shown. Values: 0--254
-l last = Last TTA acquisition to be shown. Values: 0--254
-u = Show uncorrelated data, too.

---

dform-----Specify **ddisp** display format; place format in file DASdform

dform [**-v**]

dform [**-h** / **-a** / **-n**] [**-s** slotpod] [**-p n** / **-p y**] [groupradix [slotpod[,slotpod]...]]...

No parameters = Display current **dform** setting.
-v = verbose prompting
-h = hardware disassembly
-a = absolute disassembly
-n = no disassembly
-s slotpod = State Stamp Probe's DAS slot number and pod ID letter
Default: **-s 3a**
-p n = No PMA is connected
-p y = PMA is connected
groupradix = group and radix for DAS data
group values: **a--l**
radix values: **x, o, b, a, g**
slotpod = name(s) of the slot(s) and pod(s) in the group.

---

dstart-----Start DDL data acquisition: create TTAstart file, start emulator and prototype, start DAS and TTA acquisition

dstart [**-p**] [address]

No parameters = Starts only DAS data acquisition
-p = Starts DAS data acquisition and pattern generation
address = emulator starting address

---

duplod-----Transfer DAS and TTA acquisition data to the 8560; create DASaq.**xx.sp**, DASconfig, TTAdata, and TTAtrig files

duplod

---

getacq-----Save DAS acquisition or "glitch" memory in an 8560 file

getacq slotpod [filename]

slotpod = Acquisition Module's DAS slot number and pod ID letter
slot values: 1--6.
pod values: **a--d** on 91A32; **a--c** on 91A24; **reg, glitch** on 91A08
filename = 8560 acquisition data file

---

getpac-----Transfer a DAS setup packet from the DAS to the 8560

getpac packettype filename

packettype = DAS setup packet: **all, acqsetup, refmem, patgen, mnemonics**
filename = 8560 packet destination file

---

mktab-----Upload mnemonic and setup information from DAS; build and store disassembly symbol tables; put mnemonic and setup information, and disassembly tables in file DASmnem

mktab

---

putpac-----Transfer a DAS setup packet from the 8560 to the DAS

putpac packettype filename

packettype = DAS setup packet: **all, acqsetup, refmem, patgen, mnemonics**
filename = 8560 packet source file

---

scrol-----Move cursor a specified number of positions through timing diagram or state table display

scrol [**-**|**+**] positions

+ = Move cursor **right** in timing diagram, **up** in state table
- = Move cursor **left** in timing diagram, **down** in state table
positions = number of cursor positions. Range: -99--99.

---

scur-----Display DAS state table

scur sequencenumber

sequencenumber = DAS sequence number
Values: 0--511; on 91A32 or 91A08
Values: 0--1022; on 91A24

---

sendd-----Send a command string to the DAS

sendd "string"

string = DAS command string

---

showaf-----Display contents of a DAS acquisition data file

showaf [**-x**|**-o**|**-d**|**-a**] filename

-x = hexadecimal; default
-o = octal
-d = decimal
-a = ASCII
filename = 8560 source file

---

showcon-----Display current DAS card configuration

showcon

---

tcur-----Display DAS timing diagram

tcur sequencenumber

sequencenumber = DAS sequence number
Values: 0--511; on 91A32 or 91A08
Values: 0--1022; on 91A24

Section 7

ERROR MESSAGES

INTRODUCTION

This section describes the error messages generated by the DDL software.

This section does not describe error messages generated by the operating systems of the DDL system components or messages generated by DDL in the course of normal operations. Error messages generated by the DDL system components are described in the respective manuals.

The DDL error messages are listed alphabetically. Each error message is followed by a discussion of the probable cause of the error and (when possible) potential solutions.

checksum error during data transfer. DDL detected a checksum error while transferring data between the DAS and the 8560.

checksum error in file 'filename'. The DAS setup packet stored in file **filename** contains a checksum error.

command name doesn't start with 'get' or 'put'. The **getpac** or **putpac** command was given a new name that does not start with the string "get" or "put", respectively. DDL uses the keywords "get" or "put" to determine which direction to transfer the packet ("put" = 8560 to DAS; "get" = DAS to 8560).

could not upload DAS acquisition memory. This message is generated by the **ddiag** command to indicate a checksum error in the transmission of DAS acquisition data from the DAS to the 8560. Verify that the communications link between the DAS and the 8560 has been configured correctly.

DAS slot n has no acquisition data in 'string'. You asked DDL to upload acquisition data from a data acquisition module in slot **n** (**n** = 1-6), pod **string**. However, the module in slot **n** has acquired no data.

DAS-8560 interface error: cause. DDL encountered a problem (**cause**) while trying to communicate with the DAS. This message usually indicates an interface timeout.

ddiag abort: DAS and Integration Unit with TTA required. The **ddiag** command determined that the DDL system did not contain all three components: DAS, 8540, and TTA. Verify that the system is configured as described in the discussion "Configuring the DDL System" in the Learning Guide section of this manual.

DDL software error: code. DDL detected an unusual error condition during the execution of one of its commands. It this error persists, contact your Tektronix field service representative. The **code** will provide an indication of the cause of the problem.

/dev/DAS not found - see setup procedure in manual. The **ddiag** command could not find the file /dev/DAS. Verify that the DAS port has been properly linked as described in the discussion "Telling the 8560 Which Port is Attached to the DAS" in the Learning Guide section of this manual.

disassembly error: illegal instruction. The disassembly routine encountered an unrecognizable Define Mnemonics 2 instruction.

disassembly error: incorrect number of bits passed. The disassembly routine detected that a called mnemonics table did not receive the expected number of bits. Refer to the DAS Define Mnemonics 2 documentation for an explanation of the mnemonics table structure.

error detected in the State Stamp Probe pattern. The **ddiag** command did not receive the expected Gray code count from the DAS. This error indicates a wrong pod identification in the **ddiag** command line, or no DAS trigger or acquisition.

illegal DAS pod identifier. You specified a DAS pod identifier other than "a", "b", "c", "d", "reg", or "glitch". This message may be followed by the pod identifier.

illegal DAS slot number. The DAS slot number that you specified is not in the range 1-6. Only DAS slots 1-6 may hold acquisition modules. This message may be followed by the slot identifier.

illegal group name. You specified a group name that the DAS does not recognize. Only the group names "a"-"l" are allowed.

incompatible acquisition module detected in DAS slot n. The **ddiag** command detected an acquisition module in DAS slot **n** (**n** = 1-6) that is not a 91A32 or 91A24 module. Replace the improper module with a proper one, or change the declaration in the **ddiag** command line to reference a slot that contains an appropriate acquisition module.

invalid ACQSETUP packet format. The ACQSETUP packet uploaded from the DAS has a format error. The error may be the result of an unsuccessful upload or a DAS firmware error.

invalid 'DASmnem' file format. The DASmnem file in the current directory has an unacceptable format.

invalid display radix. You entered a radix code other than "x", "o", "g", "b", or "a".

invalid MNEMONICS packet format. The mnemonics information in the DASmnem file has a format error.

invalid packet type. You specified a setup packet other than "all", "mnemonics", "patgen", "acqsetup", or "refmem".

invalid response. Your response to a DDL prompt is unacceptable. Refer to the Command Dictionary section of this manual for details on the command in question.

invalid sequence number. The sequence number that you entered in the **tcur** or **scur** command is not within the permissible range of 0-511 for 91A32 and 91A08 modules, or 0-1022 for 91A24 modules.

missing DAS acquisition file. DDL cannot find a DAS acquisition file having a name of the form DASaq.**xx.sp** in the current directory (where **xx** = module type, **s** = slot number, and **p** = pod).

no acquisition card in DAS slot n. DAS slot **n** (**n** = 1-6) is either empty or does not contain one of the supported DAS data acquisition modules (91A08, 91A24, 91A32).

no acquisition data in file 'filename'. The file that you specified in the **showaf** command contains no acquisition data.

no 'DASconfig' file. DDL cannot find the file DASconfig in the current directory.

no 'DASdform' file. The **ddisp** command cannot find the file DASdform in the current directory. DDL needs the DASdform file to know how to format the time-correlation display requested by the **ddisp** command.

no 'DASmnem' file. DDL cannot find the file DASmnem in the current directory. This file contains the DAS mnemonics information needed by the **ddisp** command (or the **dform** command if the **-h** or **-a** option was specified). Either a **mktab** command was never executed, or the DASmnem file created by **mktab** was placed in another directory.

no 'dform' parameters previously specified. You requested a display of the current **dform** parameter values, and no parameter values have been specified (i.e., there is no existing DASdform file).

no display groups assigned. The **ddisp** command cannot format the time-correlated information because there are no display groups assigned. Use the **dform** command to assign the proper display groups.

no pods assigned. You specified a change of radix for a group that has no pods assigned.

no response from Integration Unit. The **ddiag** command is unable to verify the proper operation of the 8540 in the DDL system. This may be because the 8540 is not connected, not powered up, or not in TERM mode, or because the IU variable is not defined. Refer to the discussions "Telling the 8560 Which Port is Attached to the 8540" and "Putting the 8540 in TERM Mode" in the

Learning Guide section of this manual.

no 'TTAdata' file. DDL cannot find the file TTAdata in the current directory. DDL needs the TTAdata file to perform time-correlation.

no 'TTAstart' file. DDL cannot find the file TTAstart in the current directory. DDL needs the TTAstart file to perform time-correlation.

no 'TTAtrig' file. DDL cannot find the file TTAtrig in the current directory. DDL needs the TTAtrig file to perform time-correlation.

not a DAS acquisition file. DDL cannot display the DAS acquisition file that you requested because the specified file does not have the expected format. Verify that the file that you specified is an acquisition file.

packet format error. This message is caused by one of the following conditions:

1. The specified packet is too large for the DDL software packet buffer, which is limited to 26K bytes.

2. The specified packet does not contain an "end of packet" marker.

packet type in file 'filename' is type1 not type2. Your command line requested the transfer of a **type2** DAS setup packet (for example, "patgen"), but the specified file is **type1** (for example, "mnemonics").

parameter out of range. A parameter that you entered as part of the command line is outside of the legal range of values. Refer to the Command Dictionary section of this manual for details on the legal range of values.

scroll value not in range -99 to +99. The DAS cannot scroll its cursor more than 99 positions (plus or minus) from the current cursor position.

trigger not found in DAS data. The DDL trigger event cannot be found in the DAS acquisition data. Time-correlation is not possible in this case. Check the trigger settings on the TTA and the connections on the State Stamp Probe.

trigger not found in TTA data. The DDL trigger event cannot be found in TTA acquisition memory. Time-correlation is not possible in this case. Check the trigger settings on the TTA and the connections on the State Stamp Probe.

TTA not detected in Integration Unit. The **ddiag** command is unable to verify that the 8540 contains a TTA. Verify that the TTA is installed correctly.

unable to upload acquisition data in slot n. The DAS is unable to upload the acquisition data in slot **n** (**n** = 1-6). Check the DAS screen for additional error messages.

Section 8

GLOSSARY

absolute disassembly. A form of disassembly that does not show the disassembled instruction, but does show the "fetch", "read", and "write" cycles. See also "hardware disassembly".

acquisition memory. The portion of memory that stores the data acquired by the TTA or the DAS.

DAS. Digital Analysis System. The DAS is a logic analyzer and pattern generator that allows you to stimulate and analyze the response of digital circuitry.

DDL trigger event. The event that causes the DDL system to stop. You must program this event into the TTA prior to starting the DDL system. When the DDL system stops, you can upload the TTA and DAS acquisition data to the 8560 for analysis.

Gray code. A counting scheme in which only one bit changes at a time. This scheme assures that if the counter is read during a period of transition, an unstable value will not result; the counter will never be off by more than one count.

hardware disassembly. A form of disassembly that that shows the disassembled instruction and any "read" and "write" cycles that comprise the instruction. See also "absolute disassembly".

ID bit. Bit 0 of each TTA acquisition memory byte is the ID bit. This bit indicates whether the acquisition data is "old data" or "new data". Each time the TTA begins another set of acquisitions, the ID bit is toggled. For example, if the ID bit of the first set of TTA acquisitions is set to zero, the ID bit of the next set of acquisitions will be set to one. The DDL software uses the ID bit to perform time-correlation.

setup packet. A packet of information that describes the setup of the DAS. This packet can be uploaded to the 8560, saved in a file, and downloaded to the DAS at a later time.

time-correlation. A way to relate asynchronous events in time. The DDL software does time-correlation on the data acquired asynchronously by the TTA and DAS.

Section 9

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