OPERATOR'S GUIDE

Business System 300A

Part No. 2240275-9701 *B
July 1985

TEXAS INSTRUMENTS

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES AND DISCARD SUPERSEDED PAGES

Note: The changes in the text are indicated by a change number at the bottom of the page and a vertical bar in the outer margin of the changed page. A change number at the bottom of the page but no change bar indicates either a deletion or a page layout change.

Business System 300A Operator's Guide (2240275-9701)

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The computers, as well as the programs that TI has created to use with them, are tools that can help people better manage the information used in their business; but tools—including TI computers—cannot replace sound judgment nor make the manager's business decisions.

Consequently, TI cannot warrant that its systems are suitable for any specific customer application. The manager must rely on judgment of what is best for his or her business.

Preface

The *Business System 300A Operator's Guide* describes the Texas Instruments Business System 300A (S300A) computer system. The guide provides easy to follow procedures for setting up and using the S300A computer and associated peripheral equipment. Additional manuals that are supplied with the peripheral equipment contain supplemental information about installation and technical aspects. These manuals are to be placed in the appropriate section of the three-ringed binder provided with the *Operator's Guide Kit*. The binder, which will contain the *Business System 300A Operator's Guide* and associated peripheral manuals, will provide a convenient reference for installation and operation of the S300A computer system.

The *Business System 300A Operator's Guide* is divided into five sections, six appendixes, a glossary, and an index. A brief description of each section is as follows:

Section

1   General Information — Describes the major features of the S300A computer and optional equipment.

2   Tour of the Computer — Describes how to unpack the computer and describes the external features of the S300A in detail.

3   Computer Installation — Provides detailed setup and installation instructions.

4   Business System 300A Operations — Provides general operating instructions for the S300A.

5   Operator Maintenance — Provides general operator-level troubleshooting and maintenance instructions.

Appendix

A   Keyboards — Provides a general description of each S300A computer keyboard.

B   Ac Power Considerations — Provides information on ac power considerations for the S300A.

C   S300A Boot-Loader Device Selection Algorithm — Describes how tape and disk unit names are assigned and how the unit to be used as the system disk is selected.

D   Assigning Disk Unit Numbers to WD500A Disk Drives — Provides information on setting the unit numbers for the WD500A.

E   Assigning Disk Unit Numbers to WD800 Disk Drives — Provides information on setting the unit numbers for the WD800.

F   System Generation — Outlines suggested parameters for system generation.

ORGANIZATION OF THE OPERATOR'S GUIDE BINDER

The binder for the *Business System 300A Operator's Guide* has separate sections for the manuals associated with each major part of the S300A. The sections are identified with tabs. All operator's manuals supplied with peripheral equipment should be placed in the binder after the appropriate tab. Small manuals should be placed in the plastic book holders provided for them.

The organization of tabs and associated optional manuals is as follows:

Tab Name	Manual Title
	Business System 300A Operator's Guide, TI part number 2240275-9701
Disk Unit Operator's Guide	*Model WD500/WD500A Disk Unit Operator's Guide,* TI part number 2533269-9701 *Model WD800/WD800A Disk Units Operator's Guide,* TI part number 2533319-9701
Printer Operator's Guide	*Model 810 Printer Installation and Operation,* TI part number 2311356-9701 *Model 850 Printer User's Manual,* TI part number 2219890-0001* *Model 850XL Printer User's Manual* TI part number 2243250-0001* *Model 855 Printer Operator's Manual,* TI part number 2225911-0001* *Model 860XL Printer User's Manual,* TI part number 2239401-0001* *Model 865 Printer Operator's Manual,* TI part number 2239405-0001* *Model 880 Printer User's Manual,* TI part number 2222627-0001*
VDT General Description	*Model 931 Video Display Terminal General Description,* TI part number 2229228-0001

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* Indicates small manuals.

Other Manuals   *Tilt Base Kit Installation*,
                              TI part number 2230305-9701
                          Business System 300A Memory Expansion Kit Installation,
                              TI part number 2240285-9701
                          Two-Channel Communications Kit Installation,
                              TI part number 2533313-9701
                          Four-Channel Communications Kit Installation,
                              TI part number 2230312-9701

IN CASE OF DIFFICULTY

The Business System 300A can be expected to give years of reliable service. If a problem occurs, many times you can find the cause and correct it yourself. Sections of this operator's guide and the operator's guides for printers, disk units, and software include troubleshooting checklists of the symptoms for the most common problems and suggested remedies for the problems.

If you cannot find the cause of a problem you should call your Business System 300A supplier. Before you call, write down the serial numbers and part numbers from the labels on the back of your equipment and note which self-test indicators were on when the trouble occurred. An explanation of self-test indicators is contained in Sections 2 and 5 of this operator's guide. Also be prepared to describe the events that led up to the problem.

SERVICE

If a problem occurs, contact your supplier to make arrangements for service or technical assistance. Most suppliers offer on-call or contract maintenance service. If your supplier does not offer direct service, ask for information regarding Texas Instruments services.

REFERENCE DOCUMENTATION

This section lists manuals associated with the S300A hardware and software. Many of these manuals will not be of interest to the average user.

Title	Part Number
Hardware Manuals/Kits	
Business System 300A Operator's Guide Kit	2240280-0002
Business System 300A Binder	2309950-0001
Business System 300A Tab Set	2310008-0001
Business System 300A Plastic Book Holder (3)	2310007-0001
Business System 300A Operator's Guide	2240275-9701
Model 931 VDT General Description Kit	2229243-0001
Business System 300A Field Maintenance Kit	2240281-0001
Business System 300A System Description	2240276-9701
Business System 300A Field Maintenance	2240277-9701
Business System 300A Depot Maintenance Kit	2240281-0002
Business System 300A System Description	2240276-9701
Business System 300A Field Maintenance	2240277-9701
Business System 300A Depot Maintenance	2240278-9701
Business System 300A System Drawings	2240279-9701
WD500/WD500A Disk Unit Operator's Guide	2533269-9701
WD500/WD500A Disk Unit Installation and Operation	2302688-9701
WD500/WD500A Disk Unit Field Maintenance	2302689-9701
WD800/WD800A Disk Units Operator's Guide	2533319-9701
WD800/WD800A Mass Storage System	
Installation and Operation	2306140-9701
WD800/WD800A Mass Storage System	
Field Maintenance	2306142-9701
Model 931 VDT General Description	2229228-0001
Model 931 VDT Quick Reference Guide	2229219-0001
Model 931 VDT Field Maintenance	2229229-0001
Model 931 VDT Depot Maintenance	2229230-0001
Unit Diagnostics Handbook, Volumes 1 through 7	945400-9701
	through
	945400-9707

Title	**Part Number**

Software Manuals

ROM Loader User's Guide	2270534-9701
990/99000 Assembly Language Reference Manual	2270509-9701

DX10 Operating System Manuals

Concepts and Facilities, Volume I	946250-9701
Operations Guide, Volume II	946250-9702
Application Programming Guide, Volume III	946250-9703
Text Editor Manual, Volume IV	946250-9704
Systems Programming Guide, Volume V	946250-9705
Error Reporting and Recovery, Volume VI	946250-9706
Online Diagnostics User's Guide	2270531-9701
Link Editor Reference Manual	949617-9701

DNOS Manuals

Master Index	2270500-9701
Concepts and Facilities	2270501-9701
Operations Guide	2270502-9701
System Command Interpreter Reference	2270503-9701
Text Editor Reference	2270504-9701
Link Editor Reference	2270522-9701
Messages and Codes Reference	2270506-9701
System Programmer's Guide	2270510-9701
System Generation Reference	2270511-9701
Online Diagnostics User's Guide	2270532-9701
Security Manager's Guide	2308954-9701
Assembly Language Programmer's Guide	2270508-9701

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5 — Operator Maintenance

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Tables

1

General Information

1.1 INTRODUCTION

The Texas Instruments Business System 300A (Figure 1-1) is a compact, general-purpose business computer that offers multiuser capability. The basic Business System 300A (S300A) consists of a tabletop computer and mass storage device. The computer has an integrated display and a detached, low-profile keyboard. The mass storage devices available for the S300A include the WD500A and WD800/WD800A Winchester disk units. The basic S300A capabilities can be expanded with optional memory expansion boards to increase the system memory to a maximum of one megabyte. Communication capabilites can be added with the addition of the two-channel and/or the four-channel communication boards, which will allow connecting modems and 931 add-on terminals to the system. The OMNI 800™ printers from Texas Instruments are also offered as options to the system.

These options make it possible to configure a system to meet a variety of needs. Figure 1-2 shows an expanded system. The S300A equipment features self-test capabilities which assure you that the system is in good working order before you begin to use it. In addition, the S300A hardware is supported by the Texas Instruments DX10 and DNOS operating systems and a variety of languages and software utility packages.

NOTE

Unless indicated otherwise, this manual uses WD800 to represent
both WD800 and WD800A Mass Storage Systems.

COMPUTER
DISPLAY

KEYBOARD

S300A COMPUTER

WD500A DISK UNIT

WD800 DISK UNIT

NOTE:

PRINTERS AND ADD-ON
TERMINALS ARE OPTIONAL

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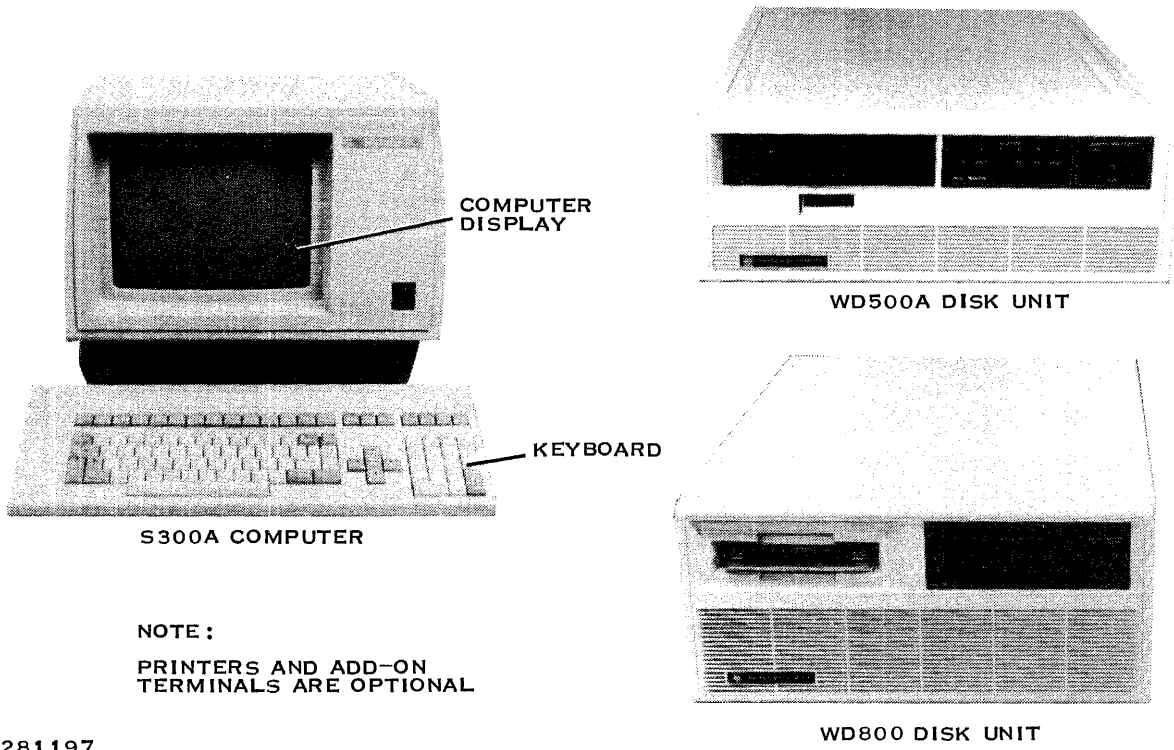
Figure 1-1.   Business System 300A

PRINTER
(OPTIONAL)

PRINTER
(OPTIONAL)

PRINTER
(OPTIONAL)

PRINTER
(OPTIONAL)

PRINTER
(OPTIONAL)

PRINTER
(OPTIONAL)

TERMINAL
(OPTIONAL)

TERMINAL
(OPTIONAL)

TERMINAL
(OPTIONAL)

TERMINAL
(OPTIONAL)

TERMINAL
(OPTIONAL)

TERMINAL
(OPTIONAL)

TWO
CHANNEL
COMM
(OPTIONAL)

FOUR
CHANNEL
COMM
(OPTIONAL)

850/860
PRINTER

855/865
PRINTER

PRINTER
OPTIONS

DISK DRIVE
WD500A OR WD800/WD800A

S300A COMPUTER

810/880
PRINTER

2281206

Figure 1-2.   Expanded Business System 300A

1.2 COMPUTER FEATURES

Table 1-1 briefly describes some of the features of the S300A computer.

Table 1-1. Computer Features

Element	Features

Keyboard	Detached from computer terminal
	Built-in tilt adjustment mechanism
	Stepped key arrangement
	Tactile feedback keys
	Typamatic (self-repeating) keys
	N-key rollover
	103 total keys in six groups:
	    59-key alphanumeric keypad
	    18-key numeric keypad
	    5-key cursor control group
	    7 editing keys in 2 groups
	    14 special function keys

Computer Display	Adjustable tilt base 12-inch (305 mm) diagonal measure monochrome display screen Data display of 24 lines by 80 characters Status display on 25th line Characters are 7 x 10 dot matrix in a 9 x 14 cell Display memory of 1920 characters Individual attributes for each character Character highlighting Reverse screen image presentation Video enable/disable control Half dot shift (enhanced character definition) 16 brightness levels accessible through software Programmable, nondestructive block cursor Keyboard selectable bell tone Z80A microprocessor-based controller Aux port for attaching one printer Internal self-tests
Character Set	96 displayable ASCII characters 32 displayable line graphics characters ASCII characters have lowercase descenders True underline capability Optional international character sets
Computer Processor	256K bytes to 1024K bytes of on-board random access memory (RAM) Memory expansion using up to three 256K byte piggyback expansion boards Based on 990-compatible TMS 99000 microprocessor Internal self-tests Optional communication capability (2-channel and 4-channel boards) to support up to six add-on terminals Supports WD500A and WD800 disk units; supports multiple disk units on one system.

1.3 BASIC MODELS

The S300A basic model configurations are the S352A, S371A, S372A, S373A, S374A, and S375A. All
of the configurations are similar, with the primary differences being in the type and capacity of the
mass storage unit (Table 1-2).

Table 1-2. Basic S300A Model Configurations

Model	Mass Storage Device Type	Formatted Capacity
S352A	WD500A consisting of:	
	Winchester disk drive	17.0 megabytes
	Flexible disk drive	1.2 megabytes
S371A	WD800 consisting of:	
	Winchester disk drive	18.5 megabytes
	Magnetic tape cartridge drive	14.5 megabytes
S372A	WD800 consisting of:	
	Winchester disk drive	43.0 megabytes
	Magnetic tape cartridge drive	14.5 megabytes
S373A	WD800A consisting of:	
	Winchester disk drive	38.0 megabytes
	Magnetic tape cartridge	14.5 megabytes
S374A	WD800A consisting of:	
	Winchester disk drive	69.0 megabytes
	Magnetic tape cartridge drive	14.5 megabytes
S375A	WD800A consisting of:	
	Winchester disk drive	114.0 megabytes
	Magnetic tape cartridge drive	14.5 megabytes

The S300A is available in the three different voltage configurations listed in Table 1-3. The voltage configurations are associated with nine different keyboards. The keyboards are arranged for the standard language and for the symbols used in the countries listed. The keyboards can be used anywhere the associated language and symbols are used, and are not limited to these countries.

Table 1-3.   Voltages and Keyboards

Line Voltage/Frequency	Keyboard Type
120 V, 60 Hz	United States
	Spain
220 V, 50 Hz	United States
	Germany
	France (Data Processing)
	France (Word Processing)
	Denmark/Norway
	Sweden/Finland
	Spain
	Switzerland
240 V, 50 Hz	United States
	United Kingdom

1.4   OPTIONAL EQUIPMENT

The optional equipment and software that the S300A supports is discussed in this section. Your supplier can help with the selection of these items. The discussion includes:

- Memory expansion for the S300A processor

- Communication (two-channel and four-channel)

- Add-on terminals (931 video display terminals)

- Add-on disk units (WD500A and WD800)

- Printers (810, 850/860, 855/865, 880)

- Cables

- Software

1.4.1   Memory Expansion
Memory Expansion Kit, part number 2232014-0001 (factory installed) or 2232014-0002 (field installable) provides an additional 256K bytes of processor memory (RAM) on each added memory board. You can add up to three boards to a basic system.

1.4.2 Communication

The communication options consist of the two-channel and four-channel communication kits. These can be installed together or separately.

- Two-Channel Communication Kit, part number 2532823-0001 (factory installed) or 2532823-0002 (field installable). This kit supports one synchronous or asynchronous RS-232-C communication channel and one asynchronous-only RS-232-C communication channel. Each channel can be used for 931 add-on terminals or RS-232-C modems.

- Four-Channel Communication Kit, part number 2532856-0003 (factory installed) or 2532856-0004 (field installable). This kit supports up to four asynchronous RS-232-C communication channels, which can be 931 add-on terminals or RS-232-C modems.

1.4.3 Add-On Terminals

The maximum number of Model 931 Video Display Terminals that can be added to the basic S300A depends on the choice of the communication option boards that are installed. If no options are installed, the S300A supports only the main S300A computer terminal. The 931 add-on terminals are configured as follows:

- A two-channel communication board provides a three-terminal capability: one integral computer terminal and two add-on terminals, or one add-on terminal and one communication line.

- A four-channel communication board provides a five-terminal capability: one integral computer terminal and four add-on terminals.

- Combined two-channel and four-channel boards provide a seven-terminal capability: one integral computer terminal and six add-on terminals.

NOTE

Any nonterminal device connected to a communication port takes the place of an add-on terminal.

Kits for direct and remote connection of the Model 931 Video Display Terminals are available. These kits include the terminal, keyboard, and cable for connecting the terminal to the S300A or a modem. Kits are available for the voltage and keyboard configurations described for the S300A in Table 1-3. The Model 931 Terminal Kit, part number 2234601-0001 (120 V), should be used for connecting the 931 VDT to the S300A. The Model 931 Remote Terminal Kit, part number 2234606-0001 (120 V), should be used for terminals to be connected to modems. Consult your Business System supplier for the kit part numbers for different voltages and keyboards.

1.4.4 Disk Units
The mass storage capability of the S300A can be expanded by adding additional WD500A or WD800 disk units. Consult your Business System supplier for details.

1.4.5 Printers
The Models 810, 850/860, 855/865, and 880 Printers are printer options for the Business System 300A. The printer kits listed below contain the cables necessary to connect the printer to the S300A. Operator's guides are supplied with the printers to describe setup and operation. The printer kits are designed for connection to the Aux printer port on the S300A or 931 video display terminals.

- Model 810 Printer Kit, part numbers 938152-0035 (120 V), -0037 (220 V), and -0038 (240 V), for use in the United States, is also available for many international languages. Contact your Business System supplier for detailed information on available international language 810 printers.

- Model 850 Printer Kit, part numbers 2233775-0001 (120 V) and -0002 (220 V). The Model 850 Printer is a 150 character-per-second, bidirectional dot-matrix printer with tractor-driven paper feed. It has internal switches that select different international character sets.

- Model 860 Printer Kit, part numbers 2233792-0001 (120 V), and 2233792-0002 (220 V). The Model 860 is similar to the Model 850, except that the 860 has a wider carriage that will accept 16-inch-wide paper.

- Model 855 Printer Kit, part numbers 2233801-0001 (120 V) and -0002 (220 V). The Model 855 Printer is a bidirectional dot-matrix printer with 150 character-per-second draft printing capability and 35 character-per-second high quality printing capability. It has internal switches that select different international character sets.

- Model 865 Printer Kit, part numbers 2233812-0001 (120 V), and 2233812-0002 (220 V). The Model 865 is similar to the Model 855, except that the 865 has a wider carriage that will accept 16-inch-wide paper.

- Model 880 Printer Kit, part numbers 2245101-0001 (120 V), and 2245101-0002 (220 V). The Model 880 Printer is a high-speed dot-matrix printer that features 300 character-per-second bidirectional printing, multiple character set selection, and complete format and configuration selection from menu display.

1.4.6 Cables

Cables are supplied with the peripheral kits for the S300A. Extension EIA communication cables, part numbers 2303071-0002 15 meters (49 feet) and 2303071-0004 61 meters (200 feet), are available. Cable kit, part number 2230503-0001, should be used for connecting modems to the S300A. This kit contains the S300A modem cable, part number 2532883-0001.

1.4.7 Software

Table 1-4 lists the software packages currently available from TI for the S300A. The minimum mass storage configuration of 17 megabytes is sufficient for any of the software packages listed. When multiple software packages or add-on terminals are used, additional processor memory is often required to provide the best performance. The disk unit access time should also be considered when using multiple add-on terminals.

Table 1-4. Software Packages

Software Type	Description
Operating system	DX10 (3.6 or later) DNOS (1.2 or later)
Computer languages	COBOL BASIC FORTRAN-78 Pascal 990 Assembly Language
Productivity	TIFORM (TI Forms) TIPE (TI Page Editor) Query Sort/Merge DBMS (Data Base Management Systems) DD990 (Data Dictionary)
Communication	3270 Emulator 3780/2780 Emulator

If you purchase optional equipment for your Business System 300A, you receive the setup and operating instructions in the shipping carton with the optional equipment. After you open the carton, remove the instructions and put them in the operator's guide binder for handy reference. Then follow the instructions for unpacking and setting up the optional equipment. It takes special knowledge to install the field installable options that go inside the S300A computer, so have these options installed by authorized service personnel.

2

Tour of the Computer

2.1 INTRODUCTION

This section includes instructions for unpacking and inspecting the S300A computer (Figure 2-1) as well as an overview of the S300A components. The following topics are covered:

- Unpacking and transporting S300A equipment

- Tour of the computer

    - Physical dimensions

    - Ac power switch

    - Video display

    - Rear of the computer

    - Keyboard

    - Fault isolation and diagnostic indicators
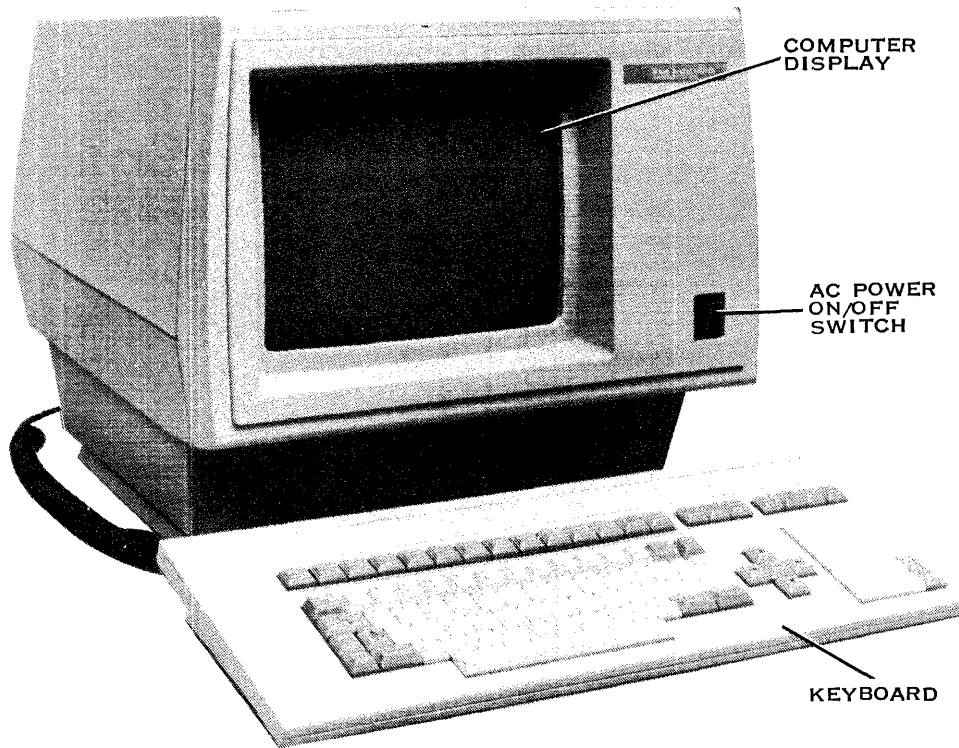
2281199

Figure 2-1.   Business System 300A Computer

2.2   UNPACKING AND TRANSPORTING S300A EQUIPMENT

The following paragraphs describe the shipping container contents and unpacking and transporting procedures.

2.2.1   Contents of Shipping Carton

The S300A computer is packed in a shipping carton that contains the following items:

- S300A computer

- Keyboard

- Ac power cord

- A bag of clips

- Tilt base

- The Business System 300A Operator's Guide Kit

- Four-channel communication interface cable (only when optional four-channel communication board is installed)

These items are shown in Figure 2-2.

COMPUTER DISPLAY   KEYBOARD   POWER CORD

TILT BASE KIT

2281205

BUSINESS SYSTEM
300A OPERATOR'S GUIDE
KIT

BAG OF CLIPS

Figure 2-2.   Contents of Shipping Carton

2.2.2 Unpacking Procedure

1. Be sure the shipping container is upright.

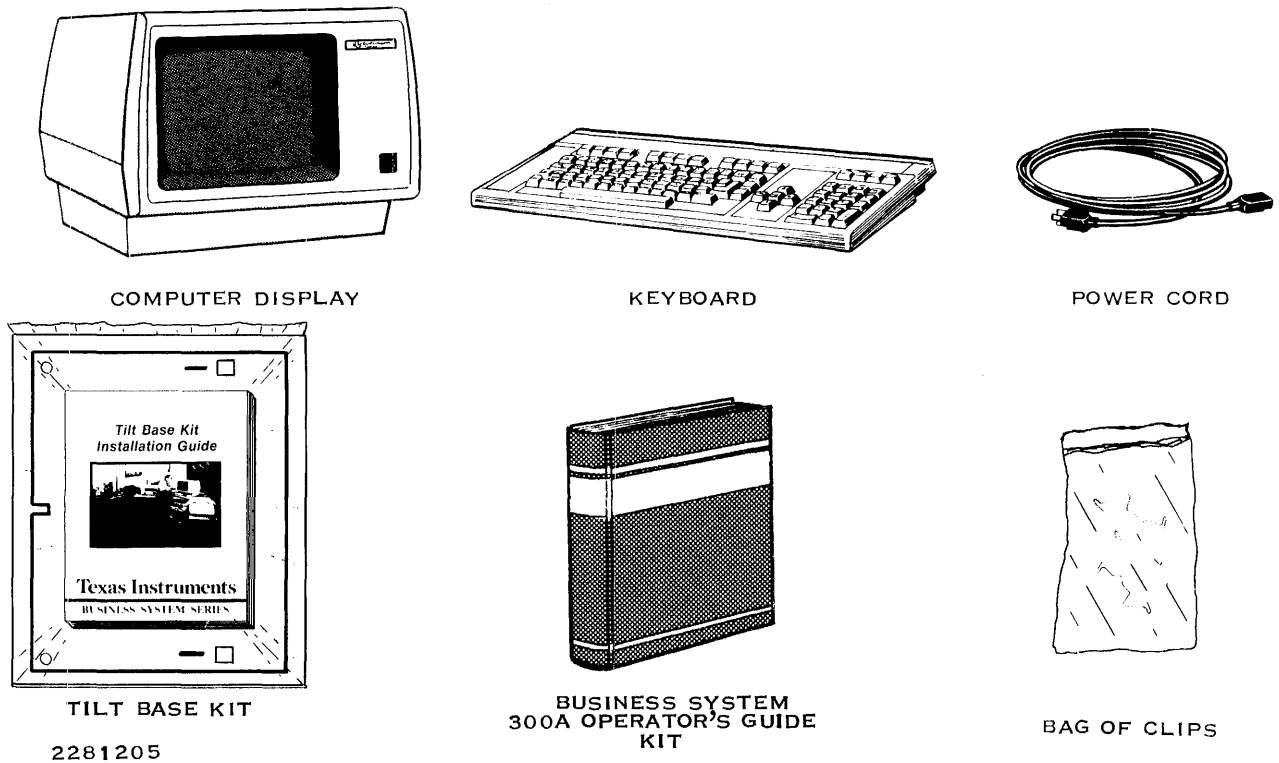2. Carefully inspect the shipping container. Report any apparent container damage to the shipping agent.

3. Gently lift the computer and components from among the fitted foam packing. Place each one on a flat, sturdy surface. Make sure all shipping container items are present.

4. Closely inspect the items for damage. Note any damage and follow local procedures for handling damaged shipments.

5. Save the shipping container and foam packing materials for possible reshipment or relocation of the Business System 300A Computer.

CAUTION

If the computer is damaged, contact your dealer or shipping agent to correct the problem before applying power to the unit.

The three-ring binder provides a convenient place to put the operation documents for the S300A. Refer to the Preface for a list of the documents that can be inserted in the binder. Insert the operator's guide in the front part of the binder and then use it as a guide to set up and operate your S300A computer.

Your software, disk unit, printer, add-on terminals, and other optional equipment are packed in separate containers. Read the unpacking, set-up, and operating documentation provided with each container before proceeding any further. Insert the documentation found in the optional equipment containers into the operator's guide binder after the appropriate tabs.

2.2.3 Transporting Procedure

If it becomes necessary to transport your Business System 300A equipment to another location, pack the equipment in the original cartons, if you still have them. If not, be sure to cushion the equipment—especially the disk unit—to protect it from excessive shock and vibration during the trip. Also, protect the display screen from damage using a soft, nonabrasive packing material.

2.3 TOUR OF THE COMPUTER

The following paragraphs provide an overview of the S300A computer components.

2.3.1 Physical Dimensions
The physical dimensions of the S300A computer are shown in Figure 2-3.

2.3.2 Ac Power Switch
The ac power switch is located for easy access in the lower right corner of the front panel. It is a rocker switch labeled with a zero and a one. Depressing the one will turn on the computer power. Depressing the zero will turn it off.

2.3.3 Video Display
The front of the computer has a 305 millimeter (12-inch) diagonal measure video display which provides an 80-column by 25-line display. The 25th line provides status information.

When a character is typed on the keyboard, the computer displays it on the video display. If nothing is typed for 15 minutes, the display goes blank. This feature extends the life of the video display. The display can be restored by pressing any key.
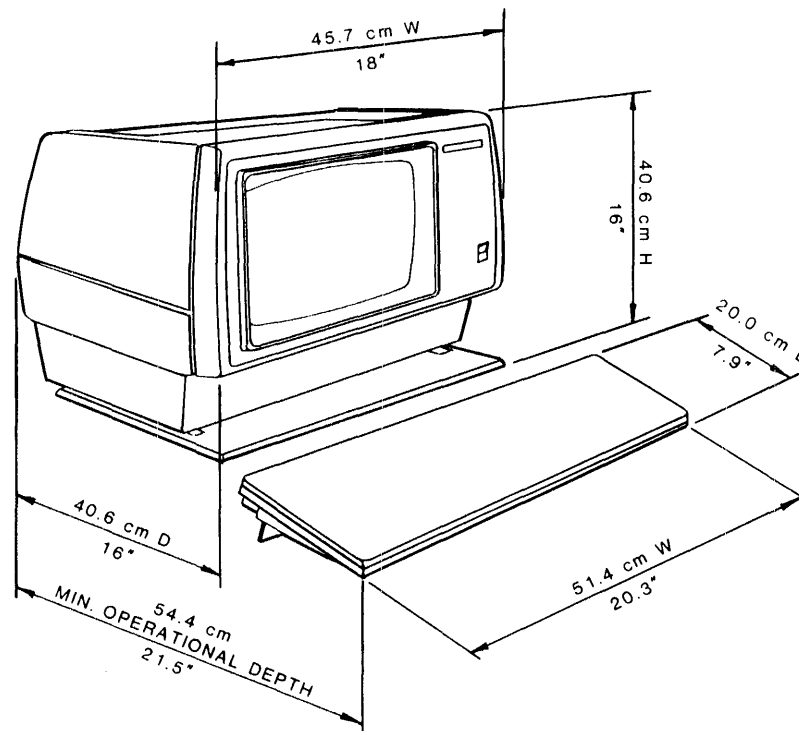
2281207

Figure 2-3.   S300A Computer Physical Dimensions

2.3.4   Rear of the Computer

The rear of the S300A computer (Figure 2-4) has a keyboard connector, an ac power cord connector, several cable connectors, a fuse holder, and labels. The cable connectors are used for attaching disk units, add-on terminals, a printer, and other equipment as follows:

J1	PBUS connector for disk unit
J2	Option board connector for optional boards such as a four-channel communication board
COMM	Peripheral terminal port (only if optional two-channel communication board is installed)
AUX1	Auxiliary device port usually used for a printer
AUX2	Peripheral terminal port (only if optional two-channel communication board is installed)

The power cord is 1.8 meters (6 feet) long. One end plugs into the back of the computer and the other into a suitable ac power outlet. Be sure to read the labels on the rear side and on the cables. The power rating label contains important information concerning the power required by your computer. The configuration label lists the components installed inside your S300A computer.
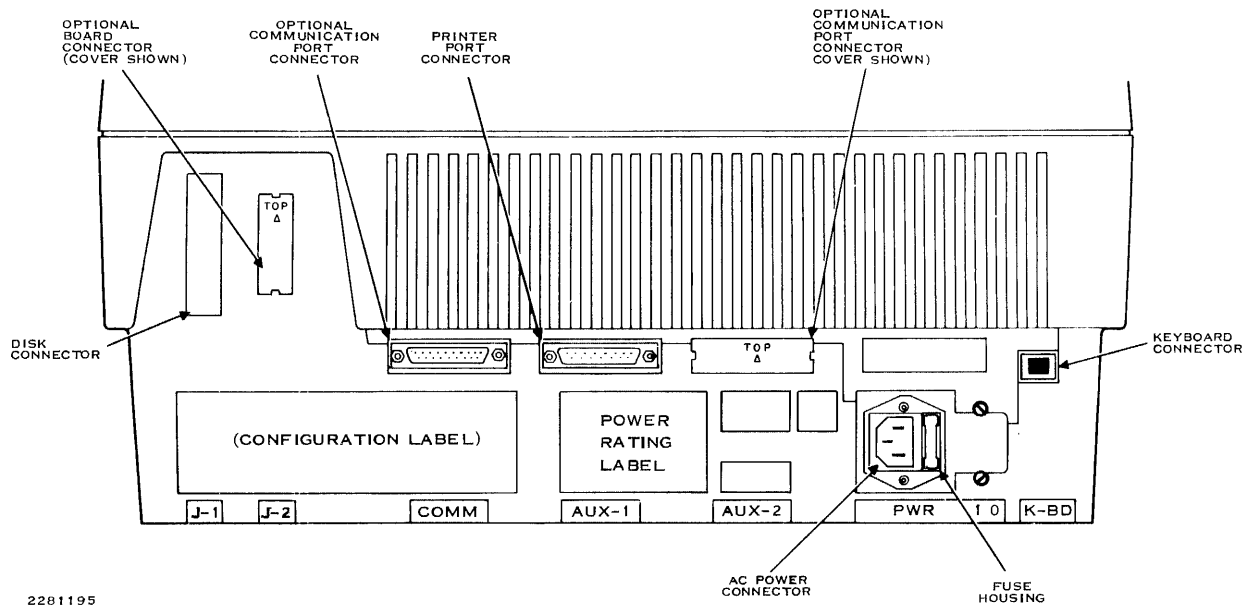
Figure 2-4.   S300A Computer Rear Side

2.3.5 Keyboard

The S300A keyboard is the same keyboard used by the 931 video display terminal. It is designed for the convenience of the operator. A 1.8-meter (6-foot) coiled cord permits the operator to place the keyboard in a convenient and comfortable position. The 103 keys are arranged in stepped rows set in an adjustable-tilt, low-profile base.

Figure 2-5 shows the standard United States keyboard. Appendix A includes drawings of all international keyboards. The keyboard contains five major groups of keys.

- The alphanumeric group enters letters, numbers, punctuation, and special symbols similar to a typewriter. The keycaps of the F and J keys are indented to help the operator find the home key when his or her hands extend left or right beyond the alphanumeric key cluster.

- The cursor control group positions the cursor for data entry.

- The numeric group enters numbers using a standard calculator-style keypad.

- The editing group allows the operator to enter and change text by character or block.

- The special function keys perform command functions that vary with the application.
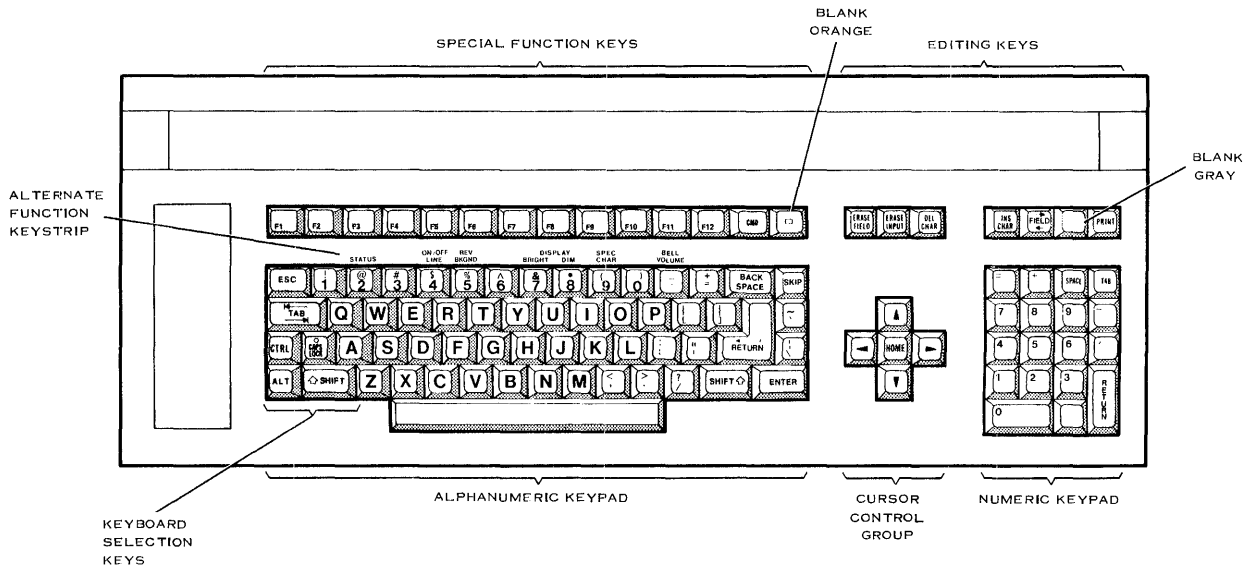
Figure 2-5. US Standard Keyboard

2.3.6   Diagnostic Indicators

Three sets of diagnostic indicator lights can be viewed by looking through the air vents in the cover of the S300A computer. These lights help the operator to determine if the computer is functioning properly and to diagnose malfunctions that are detected by self-tests.

2.3.6.1   S300A Terminal Fault Isolation Indicators.   Figure 2-6 shows the position of the four fault isolation indicator lights used to diagnose malfunctions of the S300A terminal electronics. The green *power good* light is on whenever power is applied to the computer. The red *self-test* light will be on during and after the terminal self-test if a fault is detected during the self-test. Most terminal self-test faults will also cause a terminal error message to be displayed on the video display. The red *transmit* light will flash whenever the terminal is transmitting data to the S300A processor. The red *receive* light will flash when the terminal is receiving data from the processor.

RECEIVE (RED)

TRANSMIT (RED)

SELF TEST (RED)

POWER GOOD (GREEN)
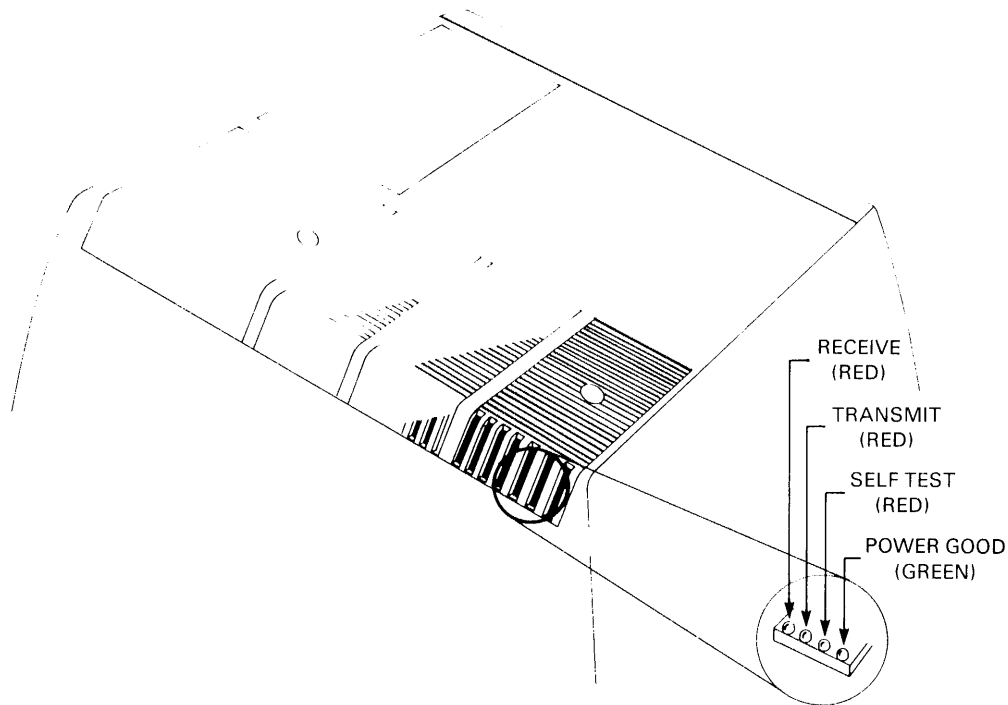
2281201

Figure 2-6.   Fault Isolation Indicators

2.3.6.2   S300A Processor Memory Diagnostic Indicators.   Figure 2-7 shows the position of the four *memory diagnostic* indicator lights (when provided). These lights are amber, and they are labeled P0, P1, P2, and P3. If a memory parity error occurs, one of the lights will illuminate to indicate the computer board on which the faulty memory chip is located.

2.3.6.3   S300A Processor Self-Test Diagnostic Indicators.   After power is applied to the computer, it goes through a self-testing process lasting from 35 to 70 seconds, depending on the amount of memory installed. Through the top of the computer, the self-test diagnostic indicator lights (Figure 2-7) can be seen as they go on and off, showing the progress of the self-test. These lights are labeled 1 through 8. Light 1 is green and the others are red. During the self-test, the red lights come on to identify the electronic components being tested. A successful self-test turns off lights 2 through 8 and turns on light 1. An unsuccessful self-test leaves one or more of the red lights turned on. Most self-test failures will also cause error codes to be displayed on the video display.

The self-test diagnostic indicators are also used to indicate failures that occur in the boot process. These codes are called *flash* codes because the indicator lights turn on and off in a sequence explained in the *ROM Loader User's Guide*.
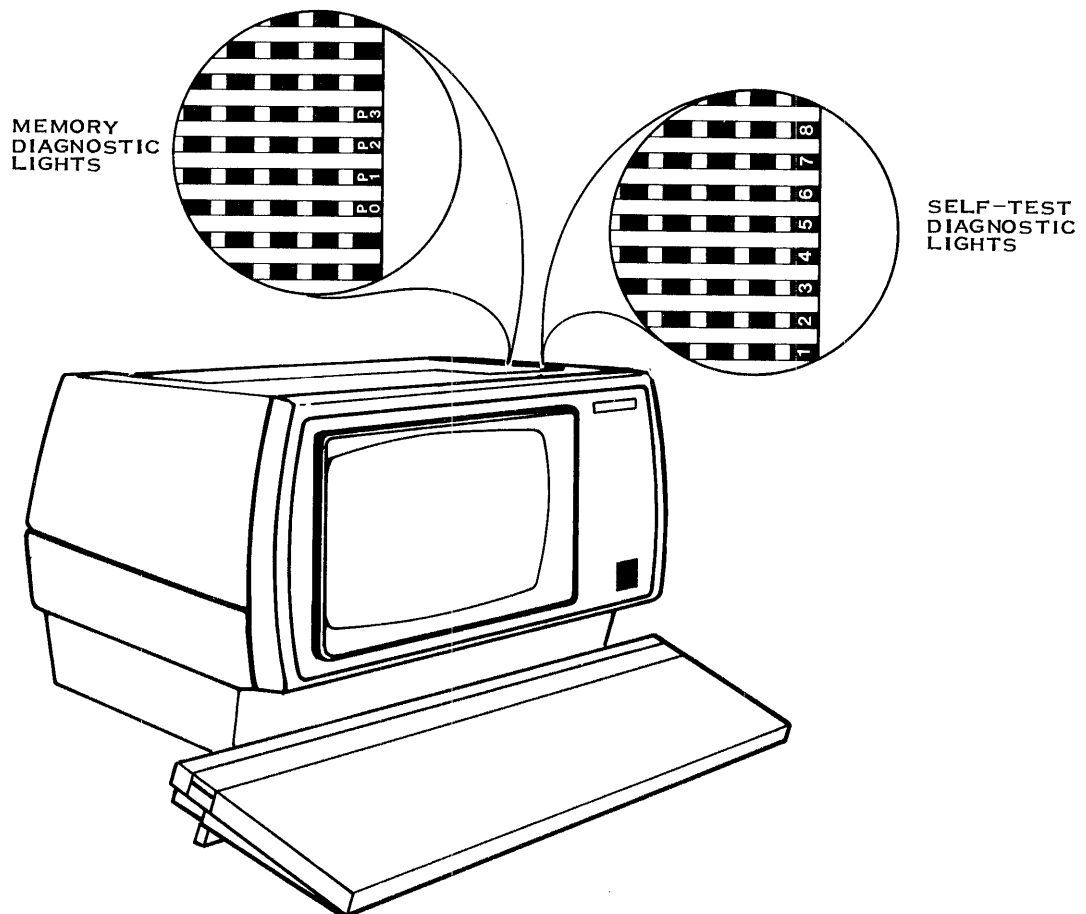
2281196

Figure 2-7.   S300A Processor Diagnostic Lights

3

Computer Installation

3.1 INTRODUCTION

The instructions for installing the system are arranged under the following topics:

- Installation considerations

- Preparing the system for operation

- System configuration

3.2 INSTALLATION CONSIDERATIONS

Topics for installation consideration are as follows:

- Equipment placement

- Electrical considerations

3.2.1 Equipment Placement
Before you begin setting up your computer, you should choose a suitable location for it. In general, the computer requires only a small area in a normal office environment. In particular, the location should meet the following requirements:

Location: The computer needs a smooth, flat, rigid, surface large enough for the computer display and keyboard (Figure 3-1). The computer should not be set on top of the disk unit. Allow at least 15.2 centimeters (6 inches) above and behind the computer for ventilation.

Temperature: The computer operates in temperatures from 10 to 40 degrees Celsius (50 to 104 degrees Fahrenheit) and in relative humidity of 20 to 80 percent without condensation. Do not expose the equipment to overheating by placing it in direct sunlight, near heating ducts, or close to machinery that generates heat.

Convenience: In a typical installation, the keyboard sits in front of the computer. The disk unit that comes with the system should be within 2 meters (6.5 feet) of the computer. Any other equipment (such as a printer) should sit nearby.

Security: Your Business System 300A and the information it handles are valuable assets to your business. Protect them with the same security measures you use for other office equipment and records.
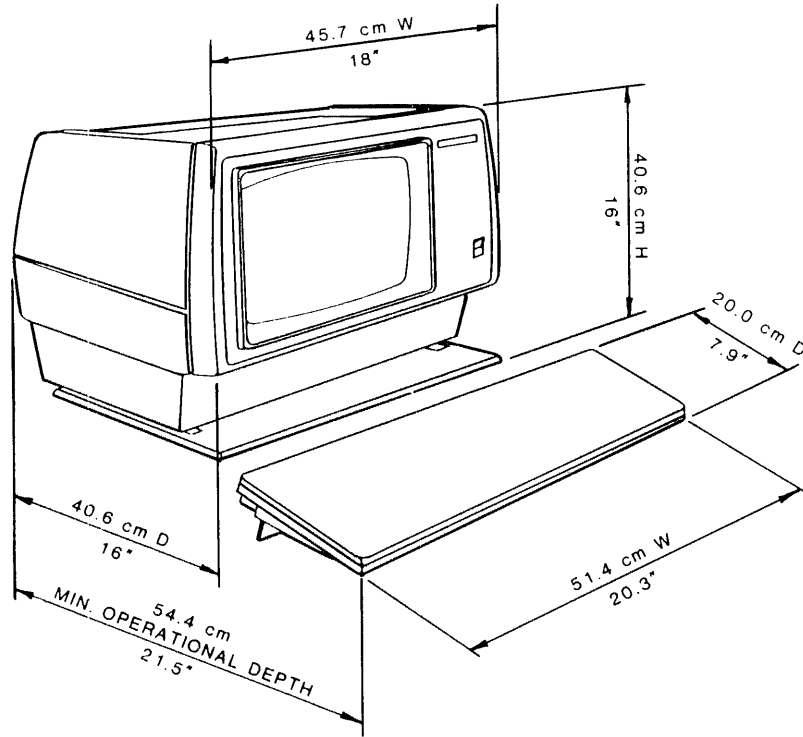
2281207

Figure 3-1.   Model S300A Computer Terminal Physical Dimensions

3.2.2 Electrical Considerations

The S300A computer contains sophisticated electronic parts that need a stable electrical environment. In particular, your location should meet the following requirements:

Power: Read the power rating label on the back of the computer for the voltage, amperage, and wattage requirements for the computer. (Other parts of the system have similar labels describing their power requirements.)

Power outlet: Make sure the wall outlet is a three-wire, earth-grounded ac outlet. Do not remove the grounding prong from the plug on the power cord. Doing so could cause an electrical shock hazard and lead to erratic operation of your equipment.

WARNING

Contact with outlet voltages can result in serious electrical shock.
Only a qualified electrician should check your power source.

Power cord: Use only the power cord that comes with your system. If you must use an extension cord, make sure it is a three-wire, grounded cord that can safely carry the proper current. If you must lay the cord across a walkway, cover the cord with a suitable bridge to minimize the hazard.

2240275-9701

Circuit: Business Systems normally operate using ordinary commercial power available in the United States at 120 volts and in foreign countries at 220 to 240 volts. The tolerance to line surges or spikes is generally plus or minus ten percent of the normal line voltage. The quality of the power from utilities can vary due to numerous factors beyond the control of the consumer. However, many offices have machinery that can generate surges or spikes on their ac power lines. These irregularities, along with line noise, are major causes of unnecessary errors, downtime, and service calls. To prevent these problems, the circuit that is used to power the computer system should be isolated from copiers, pencil sharpeners, water coolers, and other devices with motors. The best approach is to use only one circuit for your computer system. If this is insufficient to solve power-line noise problems, or if it is not practical to provide a dedicated feeder, it may be necessary to install an isolation transformer or power-conditioning device. These units should be installed as close as possible to the equipment. For additional information on circuit requirements, see Appendix B.

Interference: Keep your computer system away from machinery that can produce electromagnetic interference, such as electrical heaters and air conditioners.

Static: In climates with low humidity, static charges can form around your equipment, leading to paper-handling problems with the printer and electrical noise in the computer and disk unit. A high static electricity discharge can result in data loss or even equipment damage. To reduce the static that comes from your carpet, use static-reduction spray or antistatic mats. Use humidifiers in high-static areas.

3.3 PREPARING THE SYSTEM FOR OPERATION

Information on preparing the system for operation is arranged under the following topics:

- Setting up the computer

- Setting up the disk unit

- Optional add-on terminal(s) setup

- Optional printer setup

3.3.1 Setting Up the Computer

The instructions for setting up the computer are given in the following procedure. The items you will need in these steps are the following (see Figure 3-2):

- Computer display

- Tilt base kit

- *Tilt Base Kit Installation Guide*

- Keyboard

- Power cord

2281199
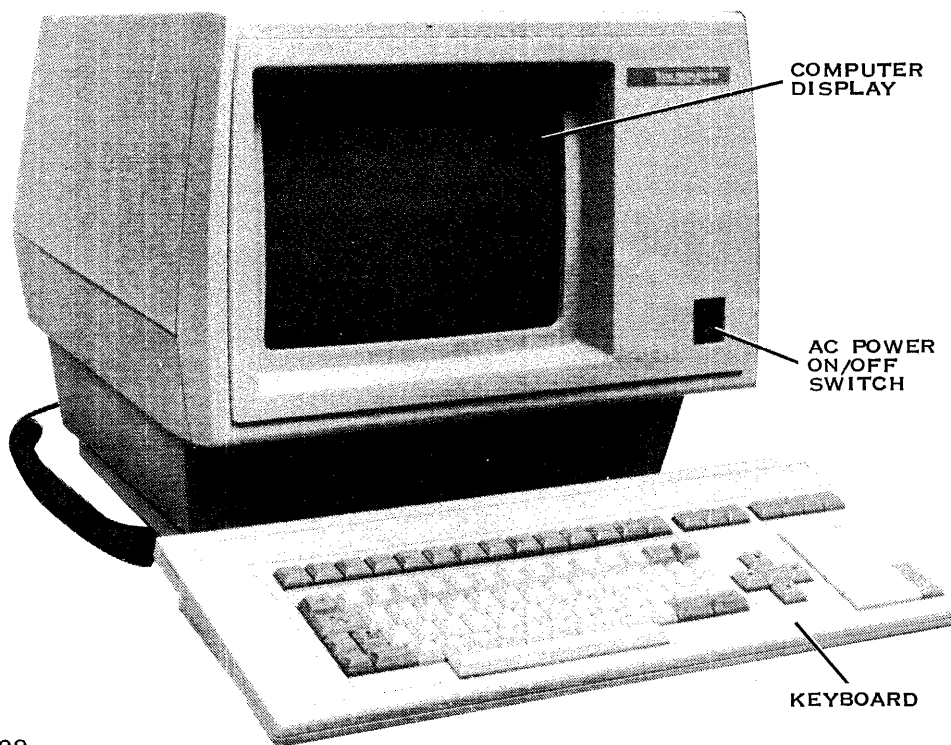
Figure 3-2.   Business System 300A Computer

1. Make sure the computer ac power switch is off and the power cord is not connected to the wall outlet.

2. The tilt base kit, which includes the *Tilt Base Kit Installation Guide*, part number 2230305-9701, is packed in the S300A computer container. Follow the instructions in the *Tilt Base Kit Installation Guide* to install the tilt base hardware (Figure 3-3) onto the computer display. Installation of the tilt base ensures proper air intake for system cooling and allows the user to vary the viewing angle of the computer display.

RETAINING
STRAPS

INTERNAL STAY
(BLACK)

EXTERNAL STAY
(BLACK)

FILAMENT
TAPE

TILT BASE
ASSEMBLY

**Tilt Base Kit
Installation Guide**

Part No. 2250265 870
September 1982

Texas Instruments

BUSINESS SYSTEM SERIES
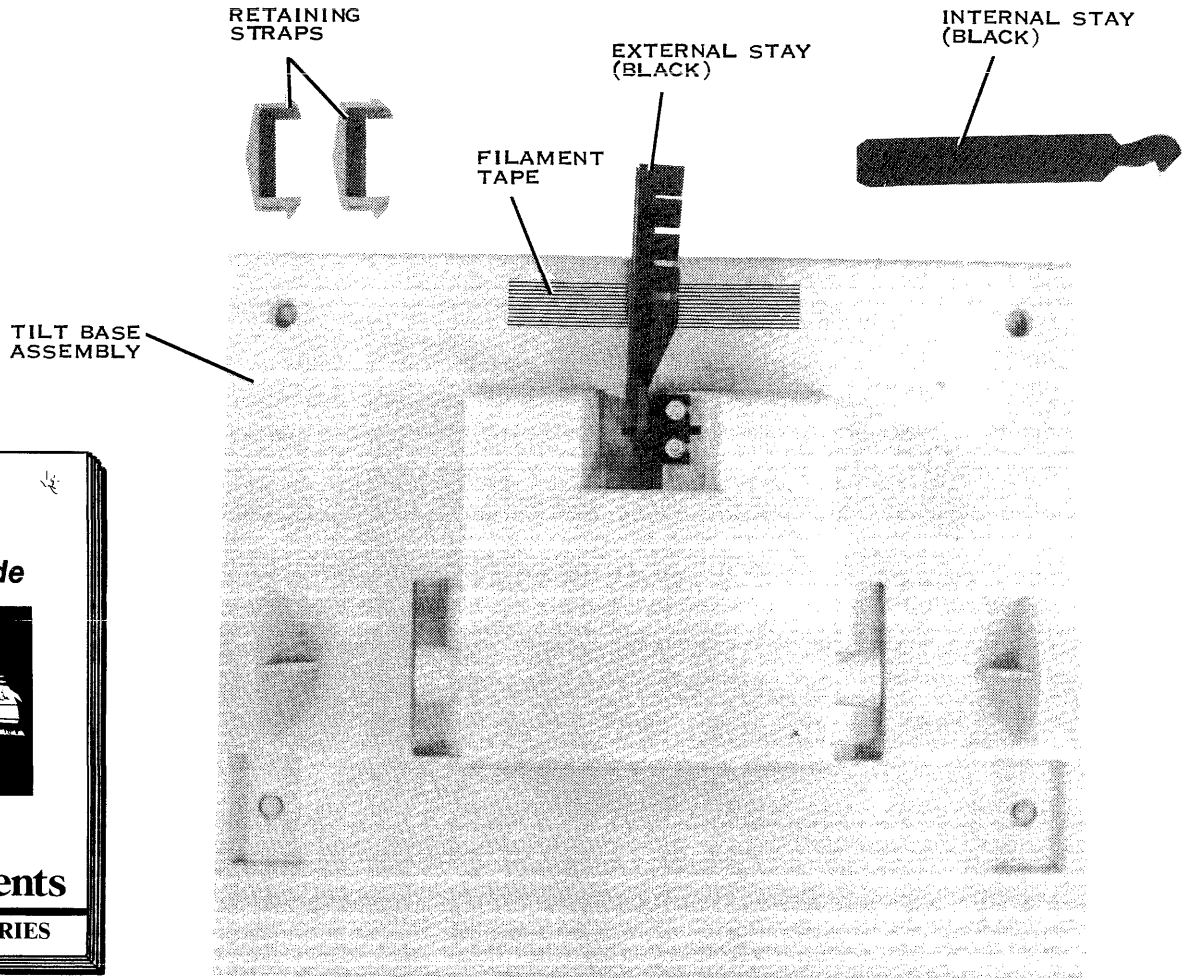
2281200

Figure 3-3.   Tilt Base Kit Components

3. Check that the computer display can be tilted forward and backward by hand as shown in Figure 3-4. Once the tilt base operation is satisfactory, place the manual in the operator's guide binder after the appropriate option tab for future reference.
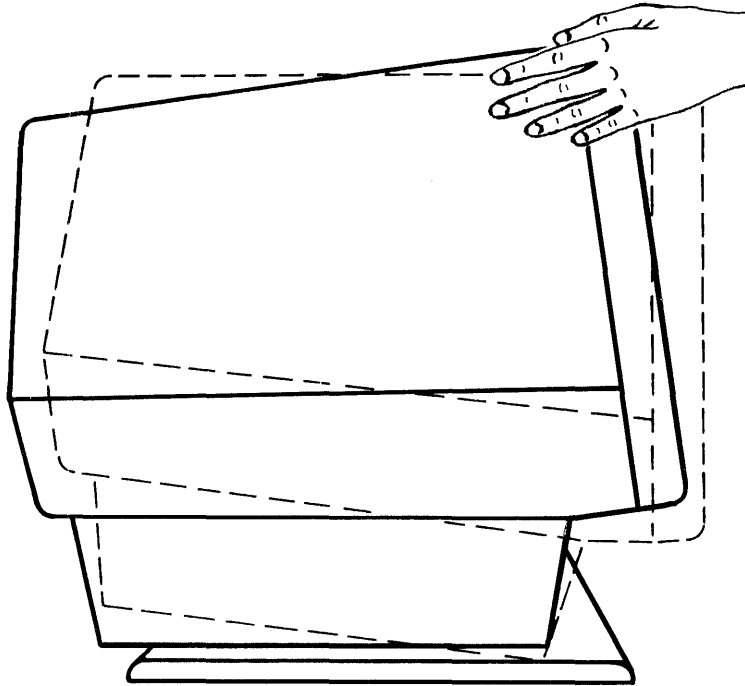
2281208

Figure 3-4.   Installed Tilt Base Assembly

4. Plug the coiled keyboard cord into the connector labeled K-BD at the back of the computer display (Figure 3-5). Note that the keyboard cord has a polarized plug that fits only one way into the connector. Make sure you have a firm connection.

5. Plug the power cord into the ac power connector (labeled PWR) on the back of the computer display. Make sure you have a firm connection.

6. Plug the other end of the power cord into a suitable ac outlet, as described in paragraph 3.2.2 titled Electrical Considerations.
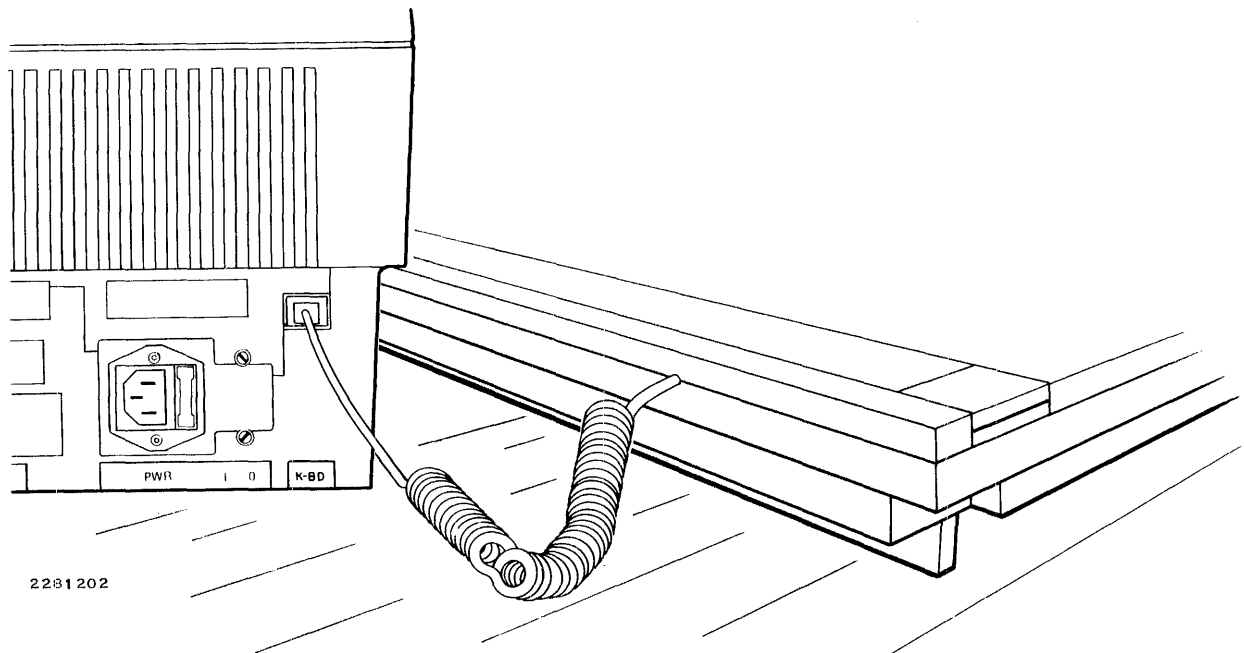
Figure 3-5.   Keyboard Connected to Computer Display

7. At this point, you are ready to make the initial check of the S300A computer. Turn the computer on by pressing the on/off switch to the 1 setting.The computer will sound a short beep and begin its self-testing process, which takes from 35 to 70 seconds. If self-test succeeds, the computer display will show this message:

    SELF-TEST COMPLETE

    followed by:

    INITIATING LOAD

    The status line in the lower right corner of the display will be as follows:

    OnIn DCD(0) DSR(0) Comm:Disc Aux:Off

    If these messages are not received, the self-test failed. Make a note of all self-test diagnostic lights and system messages displayed on the screen. Power down the computer and refer to paragraph 3.4.2 for verification of the S300A computer Comm configuration. If the configuration was corrected, repeat the S300A computer self-test. If the configuration was unchanged, refer to the troubleshooting guide in Section 5 of this manual.

8. After the successful completion of the self-test, power the S300A down.

9. If you purchased any S300A field-installable options with your system, you must have them installed by qualified personnel at this time. The options listed are as follows:

    *   Two-Channel Field-Installable Communications Kit, part number 2532823-0002

    *   Four-Channel Field-Installable Communications Kit, part number 2532856-0002

    *   Field-Installable S300A Memory Expansion Kit, part number 2232014-0002

10. If a field-installable option was installed in the prior step, repeat steps 7 and 8 to ensure proper operation before proceeding.

3.3.2 Setting Up the Disk Unit
The instructions for unpacking and setting up the WD500A or WD800 disk unit are contained in the appropriate operator's guide that is supplied with each unit. If you have additional disk units, unpack and install them at this time. Refer to Appendix C for boot loader and device selection information, which may be helpful in configuring additional disk units. Appendix D contains information on assigning disk unit numbers for the WD500A disk units. Appendix E contains similar information for the WD800 unit. If you have only one disk unit, it comes from the factory pre-configured and no adjustments are necessary. After successful completion of disk unit installation, power down the computer and the disk unit(s) before proceeding to the next step.

NOTE

The disk interface cable always connects to connector J1 on the back panel of the S300A. A spring clip supplied with the S300A must be installed on connector J1.

3.3.3 Optional Add-On Terminal Setup

If additional 931 video display terminals (VDTs) are included in your system configuration, the unpacking and setup information is contained in the *Model 931 Video Display Terminal General Description* manual included with each terminal. After setup of add-on terminal(s), proceed as follows (depending on number of additional terminals) for system setup:

1. Set the ac power switch labeled 1 and 0 on the front of the 931 VDT to 0 (OFF) and make sure the power cord is not connected to the wall outlet.

2. Locate the communication cable (part number 2230504-0002) supplied with each terminal in its shipping container. If an EIA terminal extension cable (part number 2303071-0002 15 meters (50 feet) or part number 2303071-0004 61 meters (200 feet)) was purchased, locate this cable also.

3. To identify the correct cable, follow step a for 2230504 cable installation only, and follow step b for extension cable installation:

    a. Identify the connector end of cable 2230504, labeled PERIPHERAL (P2); this end will be connected to the 931 VDT port labeled COMM.

    b. Identify the connector end of cable 2230504 labeled PERIPHERAL (P2), and connect this end to the P1 end of extension cable 2303071. Tighten the locking screws on both sides of the connector.

4. To insert the cable, follow step a for 2230504 cable installation only, and follow step b for extension cable installation:

    a. Insert the cable (2230504) connector labeled PERIPHERAL (P2) into the 931 port labeled COMM, as shown in Figure 3-6.

    b. Insert the extension cable (2303071) connector labeled P2 into the 931 port labeled COMM, as shown in Figure 3-6.

NOTE

Refer to Texas Instruments EIA Distance Policy Statement (TI Part No. 2303098) for information regarding speed/distance limitations of EIA cable installations.
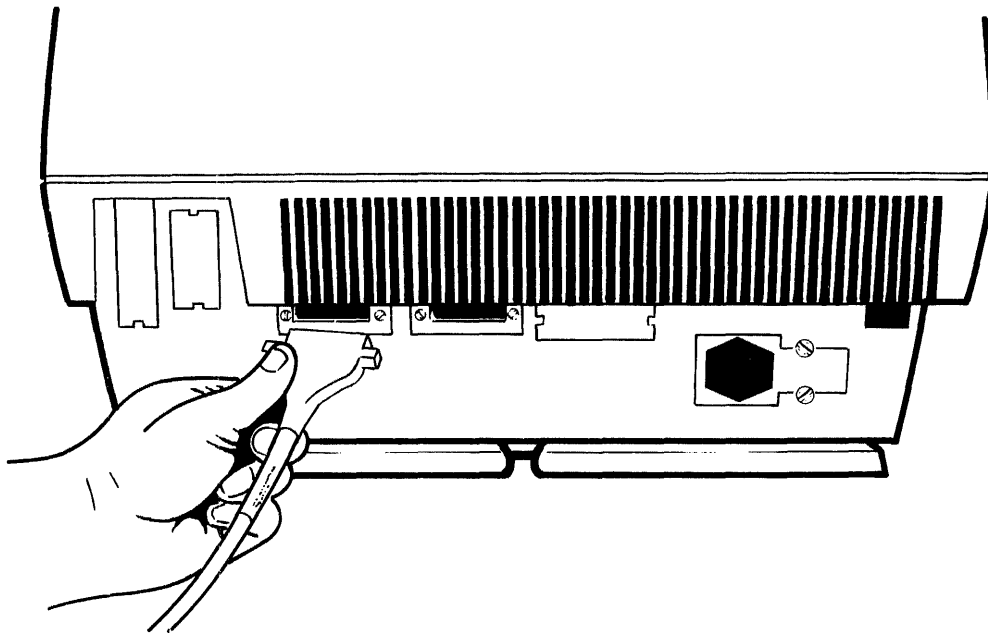
2281225

Figure 3-6.   EIA Communications Cable Installation

5. With a small, flat-bladed screwdriver, tighten the locking screw on both sides of the connector.

6. Repeat the above procedures for each additional add-on terminal in your configuration.

7. Connection(s) to the computer will depend on what options you have installed in the computer. Referring to the configuration label on the back of the computer, determine what communication option(s) are available. The four-channel communication option and/or the two-channel communication option is necessary for add-on terminal support.

8. Connect an add-on terminal to the four-channel communication board as follows:

    a. If the factory-installed four-channel communication option kit (part number 2532856-0001) was purchased, the 4-to-1 cable and spring clip (Figure 3-7) must be installed before proceeding with add-on terminal installation.

CAUTION

Failure to install the spring clip might lead to erratic operation of your system.

SHORT LEG

4-CHANNEL
CABLE
CONNECTOR
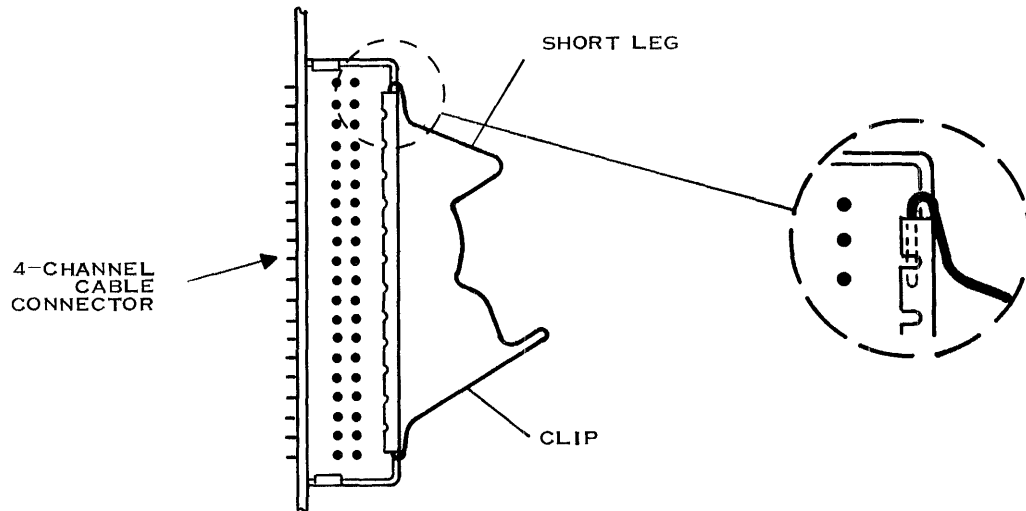
CLIP

2281227

Figure 3-7.   Installing the Spring Clip

b.   Referring to Figure 3-7, insert the ends of the connector spring clip that was packed with your S300A computer into the top and bottom loops of the four-channel connector at J2. Make sure the short leg of the clip goes on top. Next, install the 4-to-1 cable (2532896-0001) into the connector at J2 and fasten the spring clip over the connector hood. After installation of the 4-to-1 cable (Figure 3-8), each add-on terminal can connect to any of the four connectors on this cable.

c.   Connect the first add-on terminal cable end, labeled SYSTEM (P1), to connector J1.

d.   Connect the second add-on terminal cable end, labeled SYSTEM (P1), to connector J2.

e.   Connect the third add-on terminal cable end, labeled SYSTEM (P1), to connector J3.

f.   Connect the fourth add-on terminal cable end, labeled SYSTEM (P1), to connector J4.

g.   Make sure the locking screws on both sides of the connector are tight.

9. Connect the add-on terminal to the two-channel communication board as follows:

    a. Referring to Figure 3-8, identify the COMM and AUX-2 connectors on the back of the computer. The COMM connector is usually reserved for modem connections, but an add-on terminal can be connected here if desired. The AUX-2 connector provides another add-on terminal port.

    b. Connect the add-on terminal cable end labeled SYSTEM (P1) to S300A connector AUX-2.

    c. Connect the add-on terminal cable end labeled SYSTEM (P1) to S300A connector COMM.

    d. Make sure the locking screws on both sides of the connector are tight.

10. The preceding suggested add-on terminal configuration is contingent upon proper system generation (SYSGEN) procedures of terminal assignments or predefined requirements of software already installed on your system disk. Refer to Appendix F for SYSGEN information.
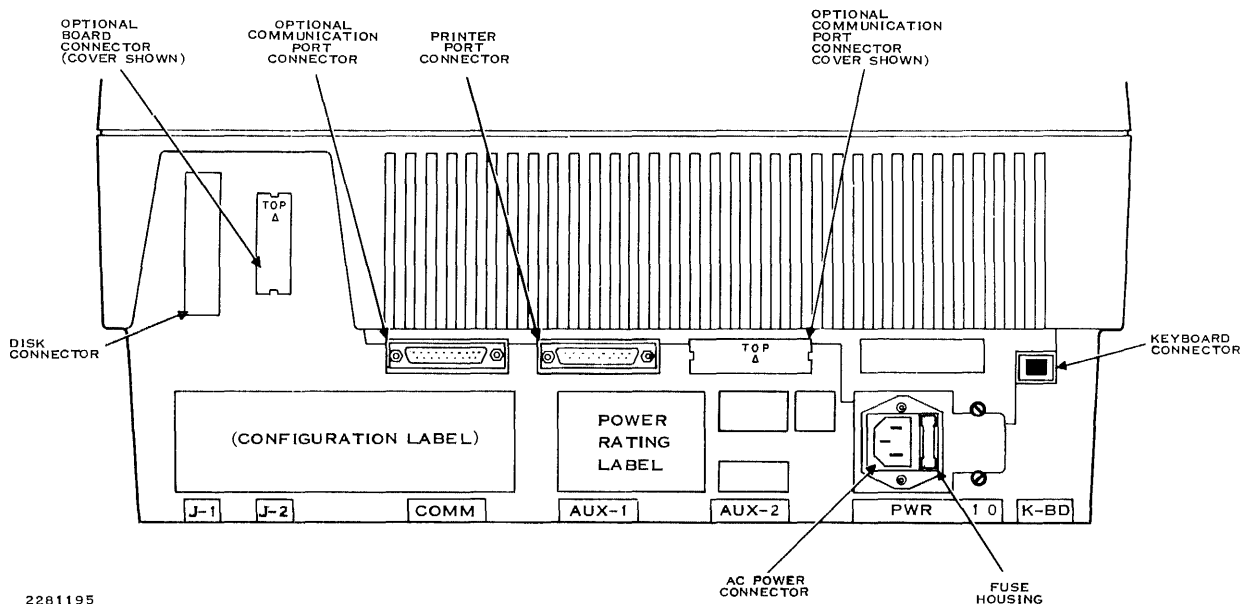

Figure 3-8.   Back of Computer Display

3.3.4 Optional Printer Setup

The instructions for unpacking and setting up the 810, 850/860, 855/865, or 880 printer are contained in the appropriate operator's guide that is supplied with each unit.

Included in the printer setup is the configuration of certain communication parameters. Some of these parameters will also be used in the proper configuration of the AUX port on the S300A or 931 add-on terminal.

The recommended communication configuration for the 850/860 and 855/865 printers is as follows:

> Baud rate: 4800
>
> Number of bits: 7

These parameters are established by setting pencil switches located inside the printers. The Models 850 and 860 Printer User's Manuals and the Models 855 and 865 Printer Operator's Manuals have instructions in an appendix on how to set these switches. Refer to these manuals by the manual titles shown in the Preface of this manual.

The recommended communication configuration for the 810 printer is as follows:

> Baud rate: 4800
>
> Parity: EVEN

These parameters are established by setting pencil switches located inside the front access cover of the 810 printer. The *Model 810 Printer Installation and Operation Manual* has instructions on how to set these switches.

After successful completion of printer setup, power down the printer to prepare for cabling to the computer or add-on terminal. Cable part number 2230504-0001 is required for connection from the AUX-1 to the printer and is included in the printer kits. An adapter cable, part number 2222477-0002, is also included with the 850/855 printer kits. This cable provides adaptation for the printer connector to the standard 25-pin EIA connector used on cable 2230504-0001. A summary of the cable installation procedures follows:

1. The 810 printer cabling requires connection of cable 2230504-0001. Install the connector end labeled PERIPHERAL (P2) to the connector on the back of the printer; connect the end labeled SYSTEM (P1), to the AUX-1 port of the S300A or add-on terminal. Make sure all connector locking screws are tightened. Refer to Figure 3-9 and the *Model 810 Printer Installation and Operator's Manual* for more details.

2. The 850/860 and 855/865 printers require the connection of adapter cable 2222477-0002 between the printer and cable 2230504-0001.

    a. Connect the P1 end of cable 2222477-0002 to the printer.

    b. Connect the P2 end of cable 2222477-0002 to the PERIPHERAL (P2) end of cable 2230504-0001.

c. Connect the SYSTEM (P1) end of cable 2230504-0001 to the AUX-1 port of the S300A or the 931 add-on terminal.

d. Make sure all connector locking screws are tightened.

Refer to Figure 3-10 and the 850 or 855 printer manuals for more details.
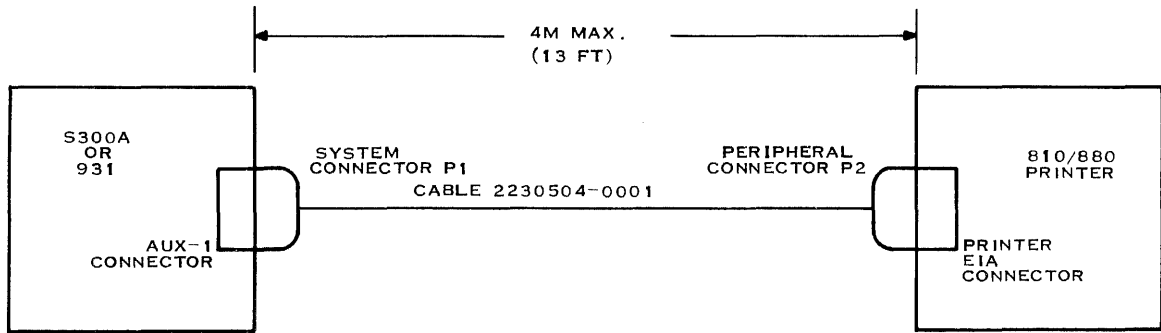
2281221

Figure 3-9.   810/880 Printer Cable Connection
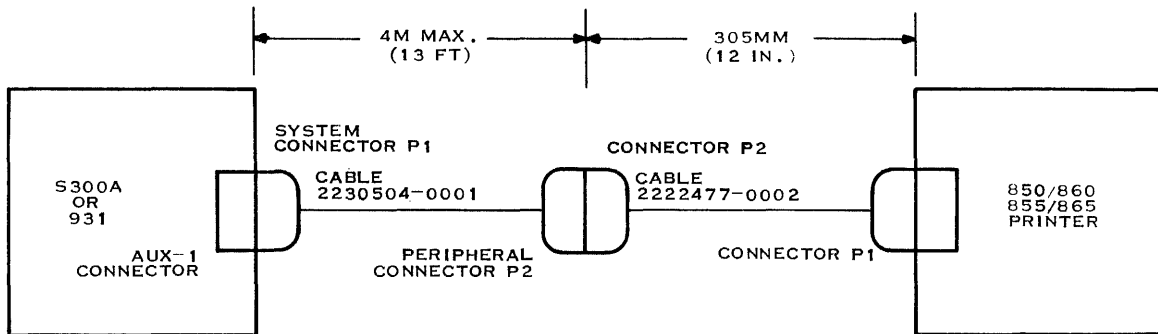
2281222

Figure 3-10.   850/860 and 855/865 Printer Cable Connection

3.3.5 Cabling Information

Figure 3-11 illustrates the cabling on a system level, showing cable connections between the S300A computer, the additional terminals, and peripheral devices. Use this illustration as a guide in cabling your S300A to the peripheral devices you have.
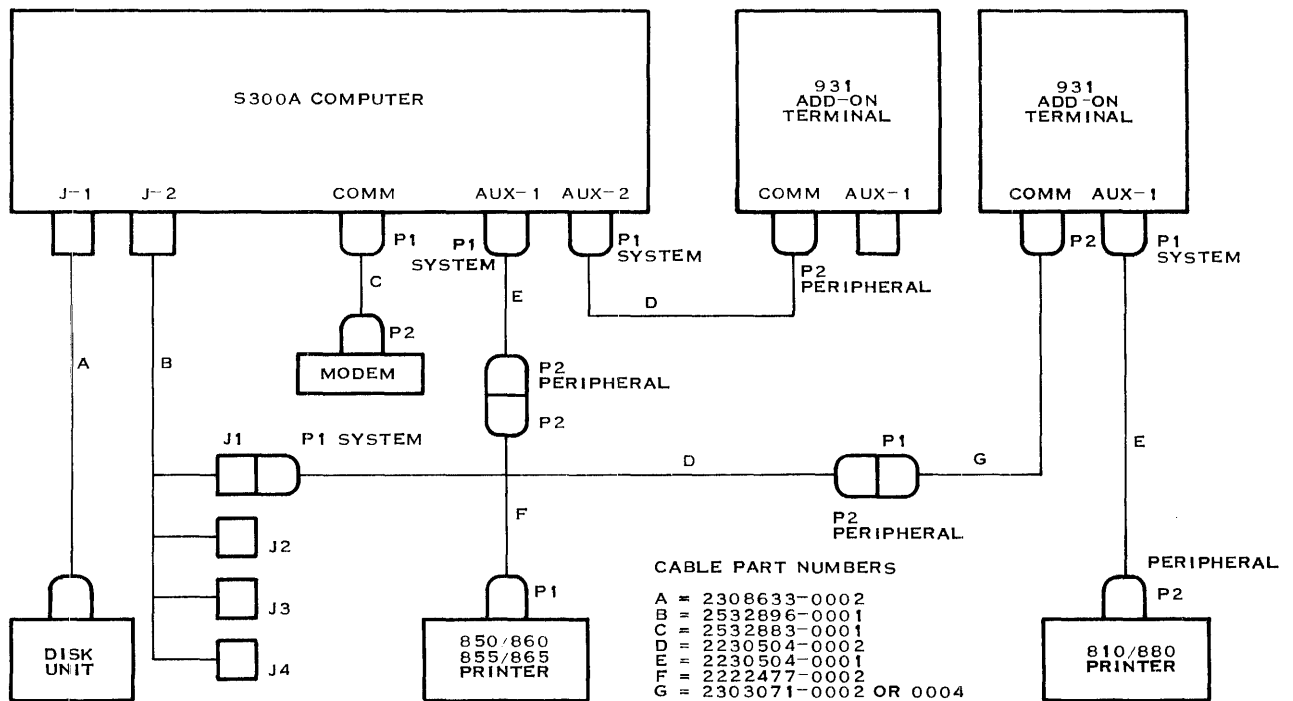
2281194

Figure 3-11.   S300A Peripheral Devices Cabling

3.4 SYSTEM CONFIGURATION

After setup and installation of the system components, you are now ready to bring the system up as one complete unit. This includes the proper power-up sequence and, if necessary, setting the configuration parameters of the S300A and add-on terminals. The system configuration instructions are divided into the following procedures:

- Power-up and self-test

- S300A computer configuration — Comm (internal) communication

- S300A computer configuration — Aux communication

- S300A computer configuration — Display

- S300A computer configuration — Diagnostics (terminal)

- S300A computer configuration — Keyboard

- Add-on terminal configuration

3.4.1 Power-Up and Self-Tests

On power-up, all system components (S300A computer, add-on terminals, and disk unit(s)) perform a self-test procedure to verify proper unit operation. The length of time the self-tests run depends on the type of units in the S300A and the selected configurations. There are, however, definite indications that you should observe during a normal power-up sequence. If these indications are not observed, then note all self-test failures, diagnostic light patterns, and verify terminal configurations as outlined in paragraphs following this procedure.

1. Power up the disk unit and make sure the drive or tape unit that contains the system software used during the boot process is ready and not write protected. The disk unit will execute its self-test sequence and display test results on the front panel lights.

NOTE

It is assumed at this point that the system disk build has been performed and the generated system (DX10 or DNOS) reflects the proper configuration of the hardware. Refer to the DX10 or DNOS operation manuals and Appendix F for further information.

2. Power up all add-on terminals by setting the power on/off toggle switch on the front to a 1 (ON). The terminal self-test starts at this time and completes in about 10 seconds. The bell rings and the message SELF-TEST PASSED appears in the lower left corner for 1 second. Then the following status message appears in the lower-right corner of the display:

   OnIn DCD(0) DSR(0) Comm:Disc Aux:Off

3. Power up the S300A computer by setting the power on/off toggle switch on the front to a 1 (ON). The terminal board and S300A processor board self-tests start running. The following items occur during normal operation:

    a. The S300A terminal self-test completes in about 10 seconds, at which time the bell rings and the message SELF-TEST PASSED appears in the lower-left corner of the display for approximately 1 second. The following status message then appears in the lower-right corner of the display:

        Onln DCD(0) DSR(0) Comm:Disc Aux:Off

    b. The processor self-tests complete in approximately 35 to 70 seconds, at which time the bell rings and the message SELF-TEST COMPLETE appears in the middle of the display. This message remains for approximately 5 seconds, and then it is replaced by the message INITIATING LOAD.

4. At this time, if the disk unit passed the self-test and the system disk or tape is ready, the software loading of the system should take place. A successful load of system software will erase the INITIATING LOAD message from the display and change the status line of the S300A computer and add-on terminals to:

    Onln DCD(1) DSR(1) Comm:Rdy Aux:Off

5. Power up any printers associated with the add-on terminals and S300A computer. If the printers were properly installed, the terminal status message, as described earlier, should display the Aux status as Aux:On. This indicates that communication to the printers has been established.

6. Once the above steps are completed successfully, refer to Section 4 of this manual for further instructions that pertain to the system operation. In the case of DX10 or DNOS operating systems, it refers to the log-on procedure and displayed menus.

3.4.2   S300A Computer Configuration

The S300A computer configuration mode can be entered at any time after the terminal self-test is complete. For proper S300A computer operation, the configuration parameters are set at the factory. The only exception is the Aux parameters. These may have to be configured to match the particular printer characteristics that were selected when the printer was installed.

A complete description of terminal configuration functions are explained in the *Model 931 Video Display Terminal General Description* manual.

If it is necessary to verify or change these parameters, the terminal configuration mode is obtained by simultaneously pressing the ALT and SHIFT keys and then the BACKSPACE key. Pressing these keys again will return the terminal to the operation mode. The following menu appears in the configuration mode:

Config: Comm Aux Dsply Keybd Diag

The configuration mode allows access to the Comm port, Aux port, Display, Keyboard, and Diagnostic parameters. The item underscored and highlighted in the configuration menu is the one selected by pressing the RETURN key. The TAB or right/left arrow keys move the underscore to different items in the configuration menu.

3.4.2.1 Communication (Comm) Port. The Comm port parameters are selected by pressing the RETURN key or the appropriate up/down arrow keys. The Comm port configurations are assigned at the factory and changes should not be necessary. Changes in the Comm port parameters can be made, however, by moving the underscore to a different value and then pressing the RETURN key. If the Comm port parameters are not set up as listed in Table 3-1, S300A self-test errors >92 (S300A diagnostic lights 1, 4, and 7 are on) or >93 (S300A diagnostic lights 1, 4, 7, and 8 are on) can occur. If this happens, reconfigure the incorrect parameters, then turn the ac power off, then on, to rerun the self-tests.

NOTE

A right angle bracket (>) indicates a hexadecimal value.

Table 3-1. Standard S300A Computer Comm Port Parameter Settings

Parameter Function	S300A Computer Comm Port Parameters
Comm Speed	9600
Comm Parity	Odd
Comm Receive Parity Check	On
Comm Protocol	FDPX
Comm Transmit Block Size	01H
Comm Transmit Block Delay	00H
Comm Port	Internal
Comm Receive DC1/DC3	Off

In the S300A computer, the Comm port is internally connected to the processor board, and the Comm parameters should not be changed. These parameter settings should not be confused with the functionality of the COMM connector (2-channel communication option) on the rear of the computer.

The Comm port parameters that will be displayed in the lower left corner of the display screen are shown in the following paragraphs. These parameters should be checked for agreement with Table 3-1 and any corrections should be made before you operate your system.

Comm Speed: 300   600   1200   2400   4800   <u>9600</u>   19200

Comm Parity: Even   <u>Odd</u>   Mark   Space

Comm Receive Parity Check: <u>On</u>   Off

Comm Protocol: <u>FDPX</u>   FDPX–RC(Rdy = On) FDPX–RC(Rdy = Off)

Comm Transmit Block Size: <u>01</u>H

The block size selections are incremented by pressing the right arrow key and decremented by pressing the left arrow key.

Comm Transmit Block Delay: <u>00</u>H

The block delay selections are incremented by pressing the right arrow key and decremented by pressing the left arrow key.

Comm Port: EIA   <u>Internal</u>

Comm Receive DC1/DC3:   On   <u>Off</u>

3.4.2.2   Auxiliary (Aux) Output Port.   The Aux port parameters must be set up to match the parameters of the printer that is connected to the Aux-1 port of the S300A computer. Typical parameter settings are as follows:

Aux Enable: <u>Yes</u>   No

Aux Speed: 300   600   1200   2400   <u>4800</u>   9600

Aux Parity: <u>Even</u>   Odd

Aux Protocol: FDPX   <u>FDPX–RC(Rdy = On)</u>   FDPX–RC(Rdy = Off)

Aux Offline Data Abort: Yes   <u>No</u>

3.4.2.3 Display (Dsply).   The display parameters are normally set up as follows:

Cursor: <u>Block</u>   Underline

Video Timer: <u>On</u>   Off

When On is selected, the terminal blanks the display after 15 minutes of inactivity. The display is restored when data is received from the S300A computer or the keyboard. Off disables this feature.

Dsply Freq: 50Hz   <u>60Hz</u>

The Dsply Freq parameter selects the display refresh rate. The most pleasing display is usually provided by 60 Hz, even at sites with 50 Hz power. In some installations, electromagnetic inter-ference from nearby devices, such as printers, fluorescent lights, transformers, and so forth, can cause the display to distort (swim). If the interference source cannot be isolated and removed, select the display frequency to match the ac line frequency.

3.4.2.4 Protected Keyboard (Keybd) Parameters.   The protected keyboard parameters allow cer-tain keyboard functions to be disabled. The procedure for verifying and changing the protected keyboard parameters is the same as for the communication port parameters. The protected key-board menu is as follows:

Protected Keyboard Functions: <u>None</u> CTRL ALT CTRL and ALT

These functions are defined as follows:

- None — Selecting this function sets the keyboard to its normal configuration, enabling the terminal to respond to all inputs.

- CTRL — Selecting this function locks out the control key.

- ALT — Selecting this function locks out the alternate key.

- CTRL and ALT — Selecting this function locks out both the control and alternate keys.

3.4.2.5 Diagnostics (Diag).   The following diagnostic menu indicates the tests that can be run on the terminal. The tests are displayed one test at a time by pressing the up/down arrow keys to cause different lines to appear.

Diag Execute: Rom Ram N-V Ram B-Pole Pattern Factory

Diag Loopback: Off On

Diag Keybd Test: Off On

Reset: No Yes

These parameters will normally be set at the factory and no operator intervention will be neces-sary. If execution of the diagnostic tests is required for checking terminal integrity, refer to the *Model 931 Video Display Terminal General Description* manual for a detailed explanation and operation description of these tests.

3.4.3   Add-On Terminal Configuration
The add-on terminal configurations are discussed in the following paragraphs.

3.4.3.1   Communication (Comm).   In an add-on terminal, the Comm port is connected to the S300A computer through one of the two-channel or four-channel communication ports. The Comm port parameters in the add-on terminals must match the parameters set for these communication ports. The matching of these parameters is normally done during SYSGEN of the operating system. For details on system generation refer to the DX10 or DNOS operating system manuals and Appendix F of this manual.

The procedure for configuring the Comm parameters for the add-on terminal is the same as described for the S300A terminal. The suggested Comm parameter settings are described in Table 3-2.

Table 3-2.   Standard Add-On Terminal Comm Port Parameter Settings

Parameter Function	931 VDT Add-On Terminal Parameters
Comm Speed	9600
Comm Parity	Odd
Comm Receive Parity Check	On
Comm Protocol	FDPX
Comm Transmit Block Size	01H
Comm Transmit Block Delay	00H
Comm Port	EIA*
Comm Receive DC1/DC3	Off

Note:

* This parameter is the only one that is different from the S300A terminal configuration. EIA refers to the external communications provided by the S300A computer to an add-on terminal.

3.4.3.2   Auxiliary (Aux).   If a printer is associated with the add-on terminal, follow the same setup as described under the S300A computer Aux configuration.

3.4.3.3   Display (Dsply).   Refer to the same procedure as outlined in the S300A computer display configuration.

3.4.3.4   Keyboard (Keybd).   Refer to the same procedure outlined in the S300A computer display configuration.

3.4.3.5   Diagnostics (Diag).   Refer to the same procedure as outlined in the S300A computer diagnostic configuration.

4

Business System 300A Operations

4.1 INTRODUCTION

This section contains the following information:

- DNOS and DX10 operating system log-on procedures

- S300A video display description

- Keyboard description

- S300A terminal adjustments

Before proceeding with this section, ensure that the computer has been installed, configured, and booted according to the directions in Section 3 of this guide, Computer Installation.

4.2 LOGGING ON AFTER BOOT

The following procedure will explain procedures for log-on after booting the DNOS or DX10 operating systems.

1. Press the blank orange key (the key with a small orange rectangle in its center).

2. Simultaneously press the SHIFT key and the 1 key to enter the exclamation point (!). The following message will appear in the lower-left corner of the display if the DX10 operating system is not initialized. DNOS will not display this message.

   WARNING: SYSTEM IS NOT INITIALIZED:

3. Press the RETURN key. The following display will appear with the DX10 operating system. The DNOS display will be similar.

                    TEXAS INSTRUMENTS
                    DX10 SYSTEM 3.6.0

   SELECT ONE OF THE FOLLOWING COMMAND GROUPS

                 /DEV   — DEVICE OPERATIONS
                 /FILE   — FILE OPERATIONS
                 /PDEV   — PROGRAM DEVELOPMENT
                 /SMAIN   — DX10 MAINTENANCE
                 /SOP   — DX10 OPERATION

   [ ]   Onln DCD(1) DSR(1) Comm:Rdy   Aux:Off

4. The Business System 300A is now ready to operate. To initialize the DX10 operating system, enter the initialize system (IS) command. Refer to the appropriate operating system manuals for further instructions on system operation.

4.3 S300A VIDEO DISPLAY DESCRIPTION

When the computer power switch is set to 1 (on), the 25-line, 80-column screen is divided into two active areas. The active display areas are:

- The main display area of 24 lines and 80 columns

- The status line on line 25

Figure 4-1 shows the functional areas of the screen.

2240275-9701

```
                        80 CHARACTERS



            24
          LINES

                  MAIN DISPLAY AREA




                LINE 25 - STATUS LINE
```
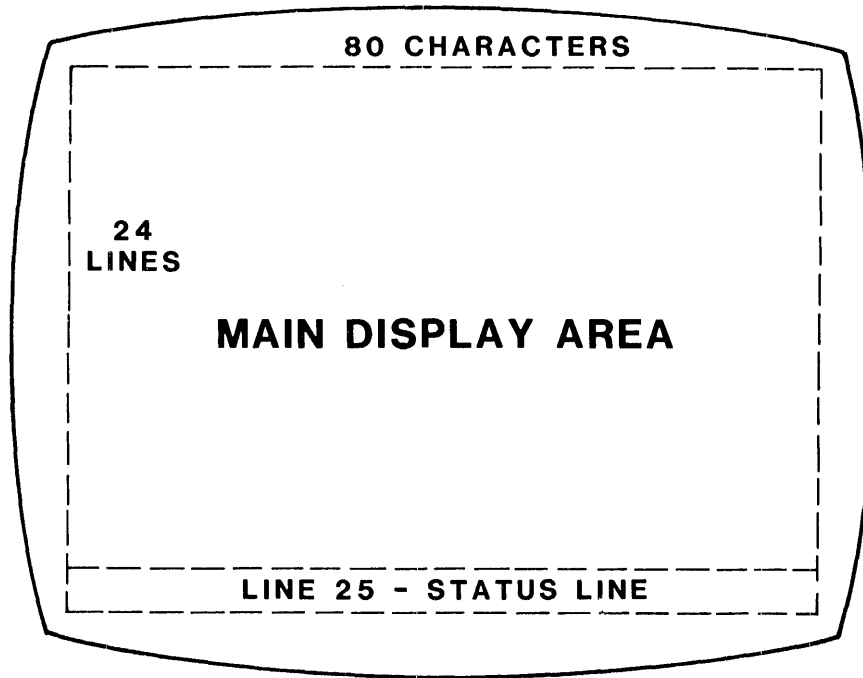
2281223

Figure 4-1.   S300A Video Display Areas

4.3.1   Main Display Area
All data input from the keyboard and the S300A processor appears within the main display area.

4.3.2   Status Line
The 25th line of the screen is the status line. It is reserved for monitoring communications among the S300A processor, the S300A terminal, and a printer (if attached), and for performing diagnostic tests of the S300A terminal. The unique features of the status line include the following:

- The status line cannot be addressed by the cursor

- The status line cannot be scrolled

- The operator cannot enter data on the status line

- Display attributes selected on the status line do not affect display attributes elsewhere on the screen.

Figure 4-2 shows the display fields on the status line.

```
L....1....2....3....4....5....6....7....R
   |<-__ HOST MESSAGE __>|<-    TERMINAL    ->|
   |        AREA         |    STATUS AREA     |

    OFFIN  DCD(0)  DSR(0)  COMM:DISC  AUX:OFF
    ONIN      1       1          CONN      BUSY
                                 BUSY      RDY
                                 RDY
                                 RNG
                                 LPBK
```
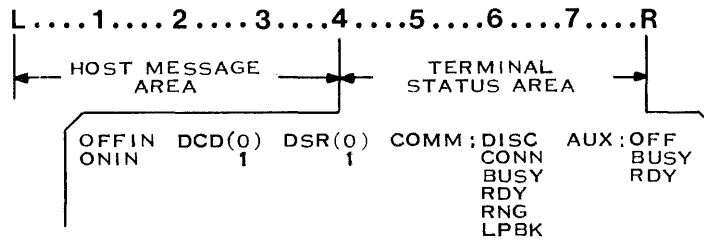
2281224

Figure 4-2.   Primary Status Line Format

The status line provides two kinds of displays:

- The S300A processor message area, which shows messages from the processor

- The S300A terminal status area, which shows status messages from the terminal concerning terminal communication with the processor and printer

4.3.2.1   S300A Processor Message Area. The S300A processor controls a 40-column field (columns 1–40) of the primary status line. The message remains visible until the processor issues another command (a new message or erase message command).

4.3.2.2   S300A Terminal Status Area. The S300A terminal controls columns 41–80 of the status line referred to as the terminal status area. Information concerning communication and auxiliary port status and error messages is reported here. Five communication parameters are reported. They are:

- Offline/Online (Offln/Onln)

- Data Carrier Detect (DCD)

- Data Set Ready (DSR)

- Comm port (Comm)

- Aux port (Aux)

Table 4-1 explains the meanings of these messages.

When the S300A computer powers up, a set of protocol exchanges are made between the S300A processor and the S300A terminal. The exchanges are reflected in the messages displayed in the terminal status area.

Table 4-1. S300A Terminal Status Line Messages

Column	Message	Meaning
42–46	Offln	The S300A terminal is in the offline mode. Data cannot be transmitted or received from the S300A processor.
	Onln	The S300A terminal is in the online mode. Data can be transmitted and received from the processor.
48–53	DCD(0)	The S300A terminal port data carrier detect signal is off. A valid data carrier detect signal is not received from the processor.
	DCD(1)	The S300A terminal port data carrier detect signal is on. A valid data carrier detect signal is received from the processor.
55–60	DSR(0)	The S300A terminal port data set ready signal is off. The data channel is not established.
	DSR(1)	The S300A terminal port data set ready signal is on. The data channel is established.
62–70	Comm:Conn	The S300A terminal port is in the Connect state. Communication link is made with the processor, but carrier is not established.
	Comm:Disc	The S300A terminal port is in the Disconnect state. Communication link is not made with the processor.
	Comm:Rdy	The S300A terminal port is in the Ready state. Communication link is made with the processor and carrier is established. Data can be transmitted to the processor.
	Comm:Busy	The S300A terminal port is in the Busy state. The S300A processor is busy. Data is held until Rdy is received.
	Comm:Lpbk	The S300A terminal has been placed in the diagnostics loopback mode of operation. See Section 7, Diagnostics, of the *Model 931 VDT General Description* for further information.
72–80	Aux:Off	Printer port is in the Off state. Printer is offline, not connected, or not configured.
	Aux:Rdy	Printer port is in the Ready state. Data can be transmitted to printer.
	Aux:Busy	Printer port is in the Busy state. Printer is busy. Data transmission stopped.

4.3.2.3 Alternate Status Line. In some instances the S300A processor sends a message longer than the space available in the S300A processor message area. In such cases, the processor may issue a command to select the alternate status line. This command suppresses the processor message and terminal status areas of the primary status line so that a message of up to 80 characters can be displayed by the S300A processor.

When the terminal is powered up it defaults to the primary status line.

The terminal operator may select either status line. To select the alternate status line do this:

1. Press and hold the ALT key, then press the 2 key.

2. Repeat this procedure to reinstate the primary status line.

The operator also may choose whether or not the status line is to be displayed. To select nondisplay of the primary or alternate status lines do this:

1. Press and hold the ALT and SHIFT keys, then press the 2 key.

2. Repeat this procedure to display the status line.

4.4 KEYBOARD DESCRIPTION

The keyboard is similar to a typewriter keyboard except for several special keys. The functions of special keys on the United States keyboard shown in Figure 4-3 are explained in the following paragraphs. Certain special keys function differently when using different application software. You should refer to the documentation supplied with your software application package for descriptions of keys with special uses for your particular application. International users should refer to Appendix A for different natural language applications.
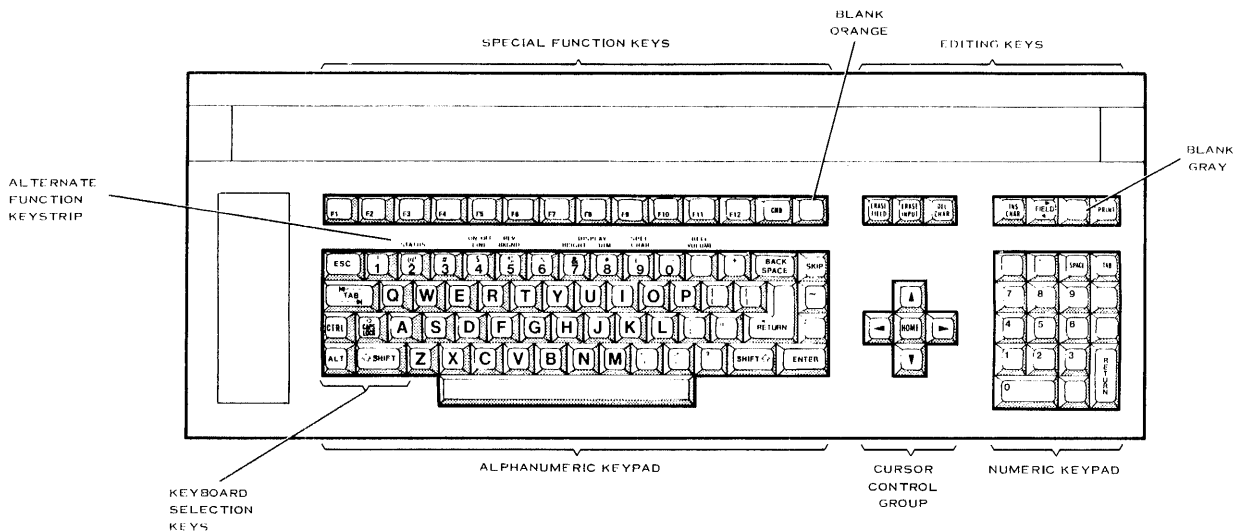
Figure 4-3.   US Standard Keyboard

The keys on the S300A computer keyboard are arranged in the following clusters as shown in Figure 4-3.

Alphanumeric keypad:	All of the letters, numbers, and punctuation marks found on a typewriter, plus some special keys used to enter data into the computer
Special function keys:	Fourteen keys whose functions depend on your application package
Editing keys:	Six keys that provide editing functions for the data that you enter
Numeric keypad:	Digits zero through nine, plus some special keys used for entering and editing data
Cursor control group:	A separate group of keys for moving the cursor on the screen

4.4.1 Alphanumeric Keypad

The keys on the alphanumeric keypad are arranged like the keys on an ordinary typewriter. The keypad has a space bar, three rows of letter keys, and a row of number and symbol keys. When you press one of these keys, the character on the keycap appears on the screen, replacing the bright rectangular cursor. In most cases, pressing a key moves the cursor to the right to show you where the next character goes. If you press an alphanumeric key and hold it down for a second or longer, it repeats the character until you release it. Keys that repeat their actions when held down are called typamatic keys.

Some of the keys on the alphanumeric keypad have special functions for use on the computer. The following descriptions cover each of these special keys:

CAPS LOCK Key — This key works something like the shift lock on an ordinary typewriter. It has two positions. When you press it down, a red light in the center of the key lights. When you press it again, the light goes out. If the CAPS LOCK is in the down position (light on) and you press a letter key, you display a capital (uppercase) letter on the screen even if you do not use the SHIFT key. If CAPS LOCK is in the up position (light off) and you press a letter key, you display a small (lowercase) letter on the screen. The difference between CAPS LOCK and the shift lock on a typewriter is that CAPS LOCK affects only the letter keys. Even with CAPS LOCK in the down position, you still have to press the SHIFT key to type one of the symbols on the top half of a keycap.

SHIFT Key — The SHIFT key works like the shift key on a typewriter. If you hold down the SHIFT key while you press a letter key, you type a capital letter. If you hold down the SHIFT key while you press a number or symbol key, you enter the symbol shown on the top half of the keycap. If you do not hold down the SHIFT key, you enter a small letter or the number or symbol shown on the bottom half of the keycap. The SHIFT key also plays a part in the use of the ALT, TAB SKIP, and FIELD keys, as explained in the descriptions of those keys.

ALT Key — The ALT (alternate) key changes the functions of several keys on the alphanumeric keypad. You do not use this key in everyday operations, but it plays a part in the procedure for setting up the computer.

CTRL Key — When you hold down the CTRL (control) key, it changes the functions of the other keys to send certain control codes to the computer. The computer does not display these control codes on the screen. You do not use this key in everyday operations.

ESC Key — When you press the ESC (escape) key, it generates a control character which, when combined with one or more succeeding characters, forms an escape sequence used to control the Business System 300A. For example, you might use the ESC key to exit from certain applications.

BACKSPACE Key — You use the BACKSPACE key like the backspace key on an ordinary typewriter. It moves the cursor to the left one character. Since BACKSPACE is a typamatic key, if you hold it down longer than a second, the cursor continues to move to the left as long as you hold down the key. Pressing the BACKSPACE key does not delete any characters.

SKIP Key — When you press the SKIP key, all characters are erased from the cursor to the right end of the line.

RETURN Key — When pressed, the RETURN key moves the cursor to the beginning of the next line, much like the carriage return on an ordinary typewriter. You also use the RETURN key after you type the name of a command you want the computer to perform. The RETURN key on the numeric keypad has the same function.

ENTER Key — When pressed, the ENTER key enters data displayed on the screen into the computer and moves the cursor to the next prompt response in a manner similar to the RETURN key function. The ENTER key does not function in the text edit mode like the RETURN key does. Documentation supplied with the software application package should describe the exact use of the ENTER key.

4.4.2 Special Function Keys
The special function keys enable you to signal the computer that you want to log on, give a command, or perform a predefined operation for your application.

F1 through F12 Keys — The functions of these keys depend on the application package installed.

CMD Key — The CMD (Command) key causes the computer to display a [ ] symbol at the bottom of the screen. This symbol indicates that the operating system will accept a command.

Blank Orange Key — The blank orange key (the key with a small orange rectangle in its center) is used to begin a session on the computer as described in paragraph 4.2.

4.4.3 Editing Keys

There are six editing keys that allow you to insert and delete characters on a line. These keys are: ERASE FIELD, ERASE INPUT, DEL CHAR, INS CHAR, FIELD, and PRINT.

ERASE FIELD Key — This key erases a response and moves the cursor back to the beginning of the response field.

ERASE INPUT Key — This key completely erases a response and tells the computer to use the default response. The exact effect depends on the command or application package.

DEL CHAR Key — The DEL CHAR (delete character) key allows you to delete characters from a response you have already entered. First, move the cursor to the character you want to delete. (You can move the cursor by using the arrow keys.) Then press DEL CHAR to delete the character. When you delete a character, the other characters on the line move to the left to take its place. Each time you press the DEL CHAR key, you delete another character. The cursor does not move. DEL CHAR is a typamatic key.

INS CHAR Key — The INS CHAR (insert character) key enables you to insert additional characters into a response you have already entered. First, move the cursor to the character where you want to make the insertion. (You can move the cursor by using the arrow keys.) Then press INS CHAR and type the character you want to insert. When you insert a character, the cursor and the other characters on the line move to the right to make room. When you want to stop inserting characters, press the RETURN key or any of the arrow keys.

FIELD Key — This key has two functions, depending on whether you hold down the SHIFT key. With SHIFT held down, it moves the cursor to the beginning of the response field. Without SHIFT held down, it moves the cursor to the beginning of your previous response. (In some applications, the FIELD key moves the cursor to the next or previous tab stop.)

Blank Gray Key — The function of the blank gray key depends on whether you use it while giving a command or while using an application. If you press it while giving a command, it moves the cursor back to the beginning of your response without changing anything you have typed. For the action of this key under your application, refer to the documentation provided with the application package.

PRINT Key — Some applications use this key for special printer functions. You do not use it in everyday operations unless the documentation for your application package specifies its use.

4.4.4 Cursor Control Group
The cursor control group of keys consists of four arrow direction keys and one home key.

HOME Key — This key moves the cursor to its home position. For commands, the home position is the first position in the field for the first prompt response. Your application might have its home position somewhere else, typically the top left corner of the screen. Refer to the documentation for your application to determine the home position, and for instructions for using the HOME key.

Up Arrow (↑) Key — This typamatic key moves the cursor up on the screen. It does not move the cursor to the left or right, and it does not change any characters the cursor passes over.

Down Arrow (↓) Key — This typamatic key moves the cursor down on the screen. It does not move the cursor to the left or right, and it does not change any characters the cursor passes over.

Right Arrow (→) Key — This typamatic key moves the cursor to the right on the same line. It does not move the cursor up or down, and it does not change any characters the cursor passes over.

Left Arrow (←) Key — This typamatic key moves the cursor to the left on the same line. It does not move the cursor up or down, and it does not change any characters the cursor passes over.

4.4.5 Numeric Keypad
The keyboard has two sets of numeric keys: one set on the alphanumeric keypad and one set on the numeric keypad. The calculator-style layout of the numeric keypad enables you to enter numbers by touch using only your right hand. The bump on the number five key helps you keep your fingers in the correct position.

To the computer, there is no difference between the numbers you enter from the alphanumeric keypad and the numbers you enter from the numeric keypad. The period (or decimal point), comma, minus sign, and RETURN keys also have the same functions as the ones on the alphanumeric keypad.

The TAB key moves the cursor to the right to the next tab stop on the line. If there is no tab stop to the right of the cursor, the TAB key moves the cursor to the first character position on the same line.

The SPACE bar moves the cursor one space to the right, deleting any characters it encounters, each time the key is pressed.

4.5 S300A TERMINAL ADJUSTMENTS

Figure 4-4 shows the location of keys used to make terminal adjustments for the convenience of the operator. Follow the procedure below to make an adjustment:

1. Refer to Table 4-2 for a description of each convenience feature and how to activate it.

2. Locate the attribute to be modified on the labeled keystrip directly above the alphanumeric group of keys.

3. Press the ALT key while simultaneously pressing the key beneath the label for the chosen feature. Execute the adjustment according to the instructions in Table 4-2.
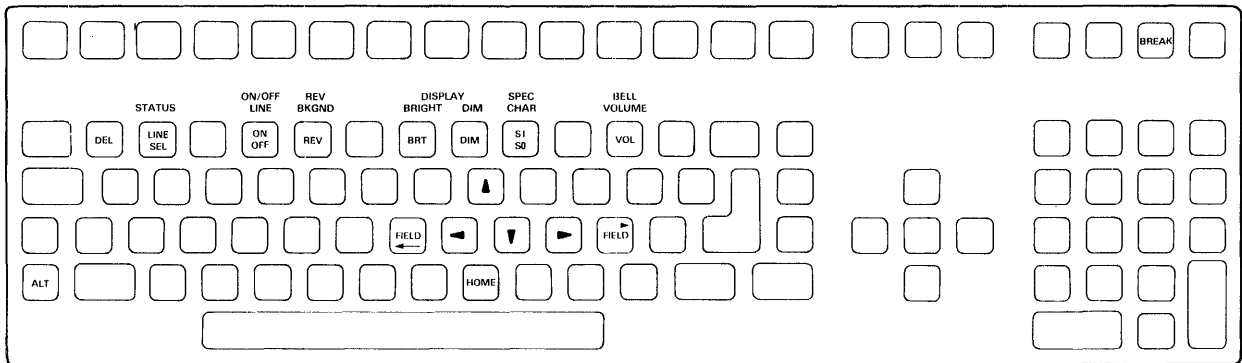
2281246

Figure 4-4.   Keyboard Alternate Section

Table 4-2. S300A Terminal Adjustments

Selection	Action	Results
STATUS	Press and hold the ALT key, then press the 2 key.	Status line is blanked from view. The S300A processor can still display messages on the status line.
	Repeat	Status line is restored.
ON/OFF LINE	Press and hold the ALT key, then press the 4 key.	Terminal goes offline. At power-up, the S300A terminal defaults to online.
	Repeat	Terminal comes online.
REV BKGND	Press and hold the ALT key, then press the 5 key.	Illuminated characters on a dark screen is the normal mode at power-up. Display changes to dark characters on an illuminated screen.
	Repeat	Display returns to original condition.
DISPLAY BRIGHT	Press and hold the ALT key, then press the 7 key to increase brightness one level.	There are 16 levels of brightness. When you reach the highest brightness level, pressing the 7 key makes no further brightness increments. Press and hold the 7 key to advance through the sequence automatically.
DISPLAY DIM	Press and hold the ALT key, then press the 8 key to decrease brightness one level.	Continue to press the 8 key until you reach the desired level. When you reach the lowest level, pressing the 8 key makes no further decrements in brightness. Press and hold the 8 key to advance through the sequence automatically.
BELL VOLUME	Press and hold the ALT key, then press the (-) key to increase volume.	Four levels are available for the alarm: none, soft, medium, and loud. Each time the volume is increased, the alarm sounds at the new volume. If the volume is at the loudest level when the advance is made, the sequence starts over from the beginning. Press and hold the (-) key to advance through the sequence automatically.

5

Operator Maintenance

5.1 INTRODUCTION

This section discusses general maintenance and troubleshooting that the operator can perform. The following topics are addressed:

- Operator preventive maintenance

- Cleaning S300A equipment

- Troubleshooting the S300A

- Normal S300A power-up

  - Printer and disk units

  - S300A terminal

  - S300A processor

  - Initial program load (IPL)

- S300A option mode

5.2 OPERATOR PREVENTIVE MAINTENANCE

Preventive maintenance such as regular care and cleaning helps to keep your equipment in good working order. Problems can be prevented by taking a few precautions and including routine maintenance as part of standard operations. Some guidelines for preventive maintenance are:

- Do not block the cooling vents located on the top, bottom, and back of the computer display. Adequate ventilation is critical to the proper operation of its components.

- Operate your computer only in temperatures from 10 to 40 degrees Celsius (50 to 104 degrees Fahrenheit) and in humidities between 20 and 80 percent (without condensation).

- Store your computer only in temperatures from −5 to 70 degrees Celsius (23 to 158 degrees Fahrenheit) and in humidities between 10 and 95 percent (without condensation).

- Be careful to keep liquids or small items from falling into the display unit or keyboard. They can severely damage the electrical parts inside. Never set drinking cups on top of the computer display.

- Clean S300A equipment using the recommended procedure in paragraph 5.3.

5.3 CLEANING S300A EQUIPMENT

Use a soft, clean cloth dampened with glass-cleaning fluid to clean the video display. Wipe the screen gently. Use a soft, clean cloth dampened with a mild soapy solution to clean exterior surfaces of all S300A equipment.

WARNING

Always turn the power off and disconnect the ac power cord before cleaning any equipment. If this is not done, you can receive a serious electric shock.

5.4 TROUBLESHOOTING THE BUSINESS SYSTEM 300A

If a malfunction is suspected in S300A equipment, downtime and repair time can be saved by doing a few easy checks. Many simple problems can be corrected by the operator. Paragraph 5.4.1, Quick Check-Out, describes how to identify and fix these problems. A more extensive check-out procedure is presented in paragraph 5.4.2, General Troubleshooting Procedure.

5.4.1 Quick Check-Out

1. SYMPTOM: The computer displays no messages and none of the diagnostic lights are on.

    a. Is the power cord for the computer plugged into a suitable ac power outlet?

    b. Is there power at the ac outlet?

    c. Is the power cord securely plugged into the back of the computer?

    d. Is the computer ac power switch set to 1 (on)?

    e. Is the computer ac power fuse good? If not, try to determine the cause for the fuse failure. Replace the fuse with one of the same type and rating. If the fuse fails again, do not replace it. Call for repair service.

    f. Was the answer YES to all of the questions above? If so, call for repair service.

2. SYMPTOM: The computer displays no messages, but the green self-test diagnostic light is on.

    a. Has it been 15 minutes since the keyboard was used? If so, press any key to restore the display.

    b. Is the display too dark to see? Try holding down the ALT key and pressing the 7 key to increase the brightness of the screen. (To darken the screen, hold down the ALT key and press the 8 key.)

    c. Is the problem still not solved? If it is not, call for repair service.

3. SYMPTOM: The computer displays a self-test error code after self-test. Begin the general troubleshooting procedure (paragraph 5.4.2).

4. SYMPTOM: The computer passes the self-test but will not load the operating system.

    a. Is the disk unit interface cable firmly connected to both the computer and the disk unit?

    b. Is the disk unit plugged into a suitable ac power outlet?

    c. Is there power at the ac outlet?

    d. Is the disk unit ac power switch set to 1 (on)?

    e. Is the disk unit ac power fuse good? If not, try to determine the cause for the fuse failure. Replace the fuse with one of the same type and rating. If the fuse fails again, do not replace it. Call for repair service.

    f. Does the disk from which the operating system is to be loaded have its write-protect switch off?

5.4.2 General Troubleshooting Procedure

The Business System 300A features extensive self-tests which form the basis for troubleshooting by the operator. Results of these self-tests are conveyed to the operator in the form of error codes and messages. The error codes are displayed on diagnostic lights and error messages appear on the video display. Although the built-in self-tests provide a thorough check of the computer functions, it is not possible to detect every malfunction.

Whenever a malfunction occurs that prevents normal operation of the Business System 300A, the operator can use the following procedure to investigate the problem.

1. Note any messages on the video display.

2. Note which S300A terminal fault isolation indicators are on.

3. Note which S300A processor diagnostic lights are on.

4. Turn off power to the computer and disk units.

5. After a minimum of 5 seconds, begin the normal power-up as described in paragraph 5.5.

6. After 15 seconds, check the fault isolation lights and status line for indications that the S300A terminal has passed its self-test. If a terminal malfunction is suspected, refer to Section 7 of the *931 Video Display Terminal Operator's Guide*.

7. Check for proper indications on the disk unit front panel. If a malfunction of the disk unit is suspected, refer to the appropriate disk unit operator's guide.

8. Check for proper completion of the S300A processor self-test. When the processor self-test is complete (after 35 to 70 seconds), a self-test code will be displayed on the video display and/or on the self-test diagnostic lights. If a processor malfunction is suspected, note the self-test code that is displayed and refer to Table 5-1 for the correct action to be taken.

9. Check for indications of successful initial program load as described in paragraph 5.5.4. Failures of IPL require technical expertise to diagnose.

Table 5-1.   S300A Processor Self-Test Codes

Fault	Hex Code	Light Number and Indication 12345678[1] GRRRRRRR[1]	Interpretation of Codes	Operator Action[2]
	>80	10000000	Self-test passed	0
	>7F	01111111	Major processor fault	1
	>40	01000000	Status request	1
Interrupt or CRU minor faults	>78	01111000	Major interrupt/CRU fault	1
	>B9	10111001	Error status register fault	1
	>BA	10111010	Level-2 (system) interrupt	1
	>BB	10111011	100-Hertz system clock fault	1
	>BC	10111100	External instruction fault	1
	>BD	10111101	Unexpected NMI interrupt	1
Memory address mapping function faults	>70	01110000	Major address mapping fault	1
	>B1	10110001	Control function fault	1
	>B2	10110010	Limit register fault	1
	>B3	10110011	Bias register fault	1
	>B4	10110100	Address adder fault	1
	>B5	10110101	Mapping function fault	1
	>B6	10110110	Memory time-out error	1
Parity logic and memory controller faults	>68	01101000	Major fault	1
	>63	01100011	Major refresh fault	1
	>96	10010110	Control/interrupt fault	1
	>97	10010111	Parity error detection fault	1
	>98	10011000	Error logging/reporting fault	1
	>B7	10110111	Write inhibit error	1
	>B0	10110000	Refresh fault	1

Table 5-1. S300A Processor Self-Test Codes (Continued)

Fault	Hex Code	Light Number and Indication 1 2 3 4 5 6 7 8[1] G R R R R R R R[1]	Interpretation of Codes	Operator Action[2]
Physical memory	>60	0 1 1 0 0 0 0 0	Major memory fault	1
faults	>61	0 1 1 0 0 0 0 1	Major memory fault	1
			Memory parity error at physical memory location:	
Memory parity	>A0	1 0 1 0 0 0 0 0	>00000 – >0FFFF	2
errors	>A1	1 0 1 0 0 0 0 1	>10000 – >1FFFF	2
	>A2	1 0 1 0 0 0 1 0	>20000 – >2FFFF	2
	>A3	1 0 1 0 0 0 1 1	>30000 – >3FFFF	2
	>A4	1 0 1 0 0 1 0 0	>40000 – >4FFFF	2
	>A5	1 0 1 0 0 1 0 1	>50000 – >5FFFF	2
	>A6	1 0 1 0 0 1 1 0	>60000 – >6FFFF	2
	>A7	1 0 1 0 0 1 1 1	>70000 – >7FFFF	2
	>A8	1 0 1 0 1 0 0 0	>80000 – >8FFFF	2
	>A9	1 0 1 0 1 0 0 1	>90000 – >9FFFF	2
	>AA	1 0 1 0 1 0 1 0	>A0000 – >AFFFF	2
	>AB	1 0 1 0 1 0 1 1	>B0000 – >BFFFF	2
	>AC	1 0 1 0 1 1 0 0	>C0000 – >CFFFF	2
	>AD	1 0 1 0 1 1 0 1	>D0000 – >DFFFF	2
	>AE	1 0 1 0 1 1 1 0	>E0000 – >EFFFF	2
	>AF	1 1 1 1 1 1 1 1	>F0000 – >FFFFF	2
Mass storage	>58	0 1 0 1 1 0 0 0	Major MSIC fault	1
interface faults	>99	1 0 0 1 1 0 0 1	MSIC internal self-test error	1
	>9A	1 0 0 1 1 0 1 0	Memory read/write self-test	1
	>9B	1 0 0 1 1 0 1 1	Level-9 interrupt fault	1
	>9C	1 0 0 1 1 1 0 0	Level-13 interrupt fault	1
	>9D	1 0 0 1 1 1 0 1	PBUS loopback test error	1
S300A terminal	>50	0 1 0 1 0 0 0 0	Major terminal port fault	5
faults	>91	1 0 0 1 0 0 0 1	Internal loopback fault	5
	>92	1 0 0 1 0 0 1 0	Initialization error	3
	>93	1 0 0 1 0 0 1 1	DSR/CTS offline error	5
	>94	1 0 0 1 0 1 0 0	Level-8 interrupt fault	5
	>95	1 0 0 1 0 1 0 1	Terminal is in DC3 mode	3
2/4-channel comm or EI300 LAN board faults	>48	0 1 0 0 1 0 0 0	Major communications fault	4
2-channel comm	>81	1 0 0 0 0 0 0 1	Port 1 at >0B00 loopback	4
board faults	>89	1 0 0 0 1 0 0 1	Port 1 level-3 interrupt	4
	>82	1 0 0 0 0 0 1 0	Port 2 at >0B80 loopback	4
	>8A	1 0 0 0 1 0 1 0	Port 2 level-4 interrupt	4

Table 5-1. S300A Processor Self-Test Codes (Continued)

Fault	Hex Code	Light Number and Indication 1 2 3 4 5 6 7 8[1] GRRRRRRR[1]	Interpretation of Codes	Operator Action[2]
4-channel comm board faults	>83	1 0 0 0 0 0 1 1	Port 1 at >0400 loopback	4
	>8B	1 0 0 0 1 0 1 1	Port 1 level-6 interrupt	4
	>84	1 0 0 0 0 1 0 0	Port 2 at >0480 loopback	4
	>8C	1 0 0 0 1 1 0 0	Port 2 level-7 interrupt	4
	>85	1 0 0 0 0 1 0 1	Port 3 at >0500 loopback	4
	>8D	1 0 0 0 1 1 0 1	Port 3 level-10 interrupt	4
	>86	1 0 0 0 0 1 1 0	Port 4 at >0580 loopback	4
	>8E	1 0 0 0 1 1 1 0	Port 4 level-12 interrupt	4
EI300 LAN board faults	>90	1 0 0 1 0 0 0 0	EI300 LAN processor failure	1
	>9E	1 0 0 1 1 1 1 0	EI300 LAN board self-test error detected	1
	>9F	1 0 0 1 1 1 1 1	EI300 LAN off-board loopback failure	6
	>83	1 0 0 0 0 0 1 1	PORT 1 at >0400 loopback	4
	>8B	1 0 0 0 1 0 1 1	PORT 1 level-6 interrupt	4
	>84	1 0 0 0 0 1 0 0	PORT 2 at >0480 loopback	4
	>8C	1 0 0 0 1 1 0 0	PORT 2 level-7 interrupt	4
	>85	1 0 0 0 0 1 0 1	PORT 3 at >0500 loopback	4
	>8D	1 0 0 0 1 1 0 1	PORT 3 level-10 interrupt	4

Notes:

[1] R = red; G = green; 1 = on; 0 = off

[2] Operator actions:

    0 — No action required; S300A processor passed all self-tests.

    1 — Cycle ac power; if error occurs again, call for repair service.

    2 — Note memory diagnostic light; cycle ac power; if error occurs again, call for repair service.

    3 — Check S300A terminal Comm port configuration parameters and cycle ac power.

    4 — Cycle ac power; if error occurs again, call for repair service. Only the ports reported by the self-test are affected.

    5 — Cycle ac power; if error occurs again, call for repair service. Only the S300A terminal is affected; add-on terminals should be operational.

    6 — Cycle ac power; if error occurs again, check LAN connection for proper installation. S300A and ports 1, 2, and 3 of EI300 should be operational. If error persists, call repair service.

5.5   NORMAL S300A POWER-UP

The following list describes the normal power-up sequence of the Business System 300A.

1. Power is turned on to printers and disk units. Each device executes an independent self-test. See paragraph 5.5.1.

2. Power is turned on to the computer.

    a. The S300A terminal executes an independent self-test (see paragraph 5.5.2).

    b. The S300A processor executes an independent self-test (see paragraph 5.5.3).

    c. The S300A processor interacts with the S300A terminal and disk units to verify the communication links.

3. Initial program load is performed from the system disk drive (see paragraph 5.5.4).

5.5.1   Printers and Disk Units
Each printer and disk unit used with the S300A computer executes an independent self-test after power-up. The disk units have diagnostic indicator lights that indicate the result of their self-test. For a description of the WD500A and WD800 diagnostic indicators or for detailed information on troubleshooting the printer or disk units, refer to the operator's guide for that equipment.

5.5.2   S300A Terminal
When power is applied to the computer, the S300A terminal executes a self-test that is independent from the S300 processor self-test. The terminal self-test continues for approximately 10 seconds. After that time, the bell is sounded, a SELFTEST PASSED message is displayed for two seconds, the status line appears, and the terminal fault isolation indicators are set. The SELFTEST PASSED message may not be seen unless the video display has been warmed up prior to the self-test.

An error message may appear in the lower left corner (25th line) of the display screen if the terminal self-test detects an error condition. Table 5-2 lists the terminal error messages. The terminal self-test routines exercise a majority of the terminal functions and electronics, but they are not completely comprehensive tests. It is possible for a terminal fault to exist without the self-test detecting a error condition. When a terminal self-test error is displayed, the terminal will probably not be usable, but if other 931 terminals are connected to the S300A computer, they may continue to be used. For information on S300A terminal troubleshooting, refer to section 7 of the *Model 931 Video Display Terminal General Description*.

Table 5-2. Terminal Self-Test Error Messages

Message	Status	Operator Action
BTY FAILURE	The battery that provides power to the terminal to save the configuration parameters when ac power is off, has failed.	1. Call service. 2. The terminal may still be used if the configuration parameters are set every time the S300A is powered up.
ROM FAILURE	Terminal electronics self-test failure.	1. Cycle ac power. 2. Call service if condition persists.
RAM FAILURE	Terminal electronics self-test failure.	1. Cycle ac power. 2. Call service if condition persists.
KBD FAILURE	Keyboard electronics self-test failure.	1. If an add-on 931 terminal is available, swap keyboards and retest. If error follows keyboard, the keyboard requires service. If the error occurs with the new keyboard, the terminal electronics requires service.
KBD ERROR	The keyboard electronics did not report its self-test results.	1. Check the keyboard cable connection. 2. Call for repair service.

5.5.3 S300A Processor

The S300A processor executes a self-test automatically after power-up. This is independent of the S300A terminal self test. The processor will also execute the self-tests selected from the option menu and the extended self-test menu. These selections are described later in this section.

The processor self-test lasts for 35 to 70 seconds depending on the amount of memory installed. During the self-test, the memory diagnostic indicator lights should be off. The self-test diagnostic indicator lights turn on and off to indicate the progress of the self-test. When the self-test completes, the self-test diagnostic lights will display a code representing the results. If one or more parts of the test failed, the codes representing those parts will be displayed by the video display unless the nature of the failure prevents it. Table 5-1 lists the self-test codes for the S300A. If the test was successful, this message will appear on the video display for five seconds:

    SELF TEST COMPLETE

The status line will read:

    Onln DCD(1) DSR(1) Comm:Rdy Aux:Off

        or

    Onln DCD(1) DSR(1) Comm:Rdy Aux:Rdy

Unless the ESC key is pressed to enter the option mode, the following message will replace SELF TEST COMPLETE after five seconds:

INITIATING LOAD

If a memory error occurs during self-test or at any time, one of the memory diagnostic indicator lights will illuminate. This light will correspond to the location of the faulty memory as shown below:

Light	Location
P0	Processor board
P1	Memory expansion board 1
P2	Memory expansion board 2
P3	Memory expansion board 3

Table 5-1 lists and defines the codes indicating the results of the processor. Figure 5-1 illustrates how to read the self-test error codes from the diagnostic lights.

```
        G   R   R   R   R   R   R   R           A   A   A   A
        R   E   E   E   E   E   E   E           M   M   M   M
        E   D   D   D   D   D   D   D           B   B   B   B
        E                                       E   E   E   E
        N                                       R   R   R   R

        M           L   M           L
        S           S   S           S
        B           B   B           B

Unit  |
Front |  1   2   3   4   5   6   7   8           p   p   p   p      Diagnostic
      |                                          0   1   2   3  <-- Light
      |                                                             Reference
      |                      (Top View)                             Designators
      |_____
                     Unit  Right  Side
```
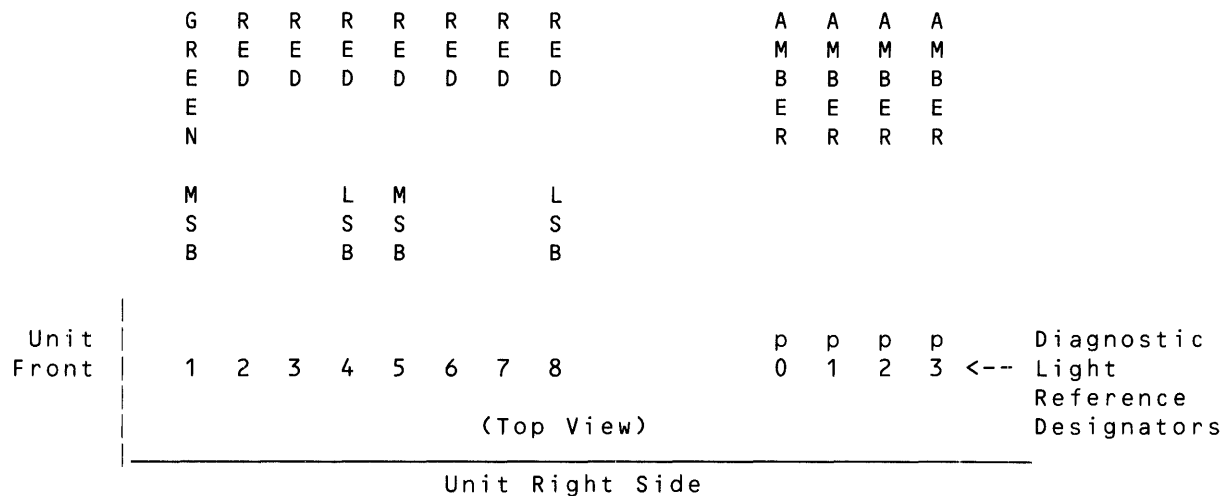
Figure 5-1. Interpreting the Self-Test Diagnostic Lights

The lights should be viewed from the right side of the computer as shown in the illustration. When a light is on, it represents a binary one. When a light is off, it represents a binary zero. Lights 1, 2, 3, and 4 form a binary number where light 1 is the most significant bit (MSB) and light 4 is the least significant bit (LSB). Lights 5, 6, 7, and 8 form a binary number where light 5 is the MSB and light 8 is the LSB. These binary numbers are converted into hexadecimal numbers to get the error code.

Binary to Hexadecimal Conversion Table

0000 = >0	0100 = >4	1000 = >8	1100 = >C
0001 = >1	0101 = >5	1001 = >9	1101 = >D
0010 = >2	0110 = >6	1010 = >A	1110 = >E
0011 = >3	0111 = >7	1011 = >B	1111 = >F

5.5.4 Initial Program Load

Initial program load is the process of transferring the operating system software from a mass storage device into the computer memory. For the S300A, the mass storage device may be a WD500A or WD800 disk unit.

If the terminal and processor self-tests are successful, the following message will appear to indicate that IPL has begun:

INITIATING LOAD

The status line will be changed to read:

Onln DCD(0) DSR(0) Comm:Disc Aux:Off

A front panel light of the disk unit will indicate a disk access is being performed. In approximately 10 seconds, the message will disappear to indicate that IPL is complete. The status line will again be changed to read:

Onln DCD(1) DSR(1) Comm:Rdy Aux:Off

or

Onln DCD(1) DSR(1) Comm:Rdy Aux:Rdy

If certain errors are encountered during IPL, the error code will be displayed on the self-test diagnostic indicators. The errors are described in the *ROM Loader User's Guide*, part number 2270534-9701. The method used to display the ROM loader error codes on the self-test indicator lights is as follows:

1. Light definition:

    • Light 1 (green) lights whenever the most significant nibble (4 bits) of the error code is displayed.

    • Light 2 lights whenever one of the four nibbles is displayed.

    • Lights 3 and 4 indicate whether the loader routine (lights 3 and 4 are off) or an operating system routine (lights 3 and 4 are on) is reporting the error.

    • Lights 5 through 8 display the value of the nibble. Light 5 is the most significant bit of the nibble.

2. The four nibbles of the error codes rotate through the self-test lights in order from the most significant nibble to the least significant nibble.

3. Each nibble displays for approximately three seconds. The lights then turn off for approximately one second before the next nibble is displayed. After the four nibbles are displayed, the sequence repeats until operator intervention halts the computer.

5.6 S300A OPTION MODE

The option mode allows the operator to select separate tests or load functions for execution. The selection is displayed as a menu on the video display. These tests may be used by the operator to help diagnose a malfunction or to confirm proper operation.

5.6.1 General Discussion of Option Mode

The option mode can be entered in two ways:

1. Pressing the ESC key during the 5-second display of the SELF TEST COMPLETE message (prior to initiating system load).

2. Upon exiting the extended self-test function by using the ESC key.

The option mode menu is shown in Figure 5-2 and explained by the text which follows.

```
F1  -  SELECT LOAD DEVICE
F2  -  SELF-TEST & LOAD
F3  -  SELF-TEST
F4  -  DIAGNOSTIC LED TEST
F5  -  KEYBOARD ECHO
F6  -  BURST CHAR TO SCREEN
F7  -  EXTENDED SELF-TEST

FUNCTION:
```

Figure 5-2. Option Mode Menu

*   F1—SELECT LOAD DEVICE. When function key F1 is pressed, the menu shown in Figure 5-3 will be displayed. The last line of the menu will be followed by a blinking cursor indicating that the operator should select the desired load device by first identifying its peripheral control space (PCS) address using function key F1, F2, or F3. The function key pressed will then be displayed along with a comma. The desired device unit number can then be entered by pressing number key 0, 1, 2, or 3. Table 5-3 lists the possible PCS/unit number/device types. Pressing the RETURN key will activate the load process using the parameters entered. The message INITIATING LOAD will be displayed and the load will be attempted from the selected device if it is online, ready, and has the appropriate loadable code (regardless of whether the device is write protected or non-write protected). If a function key has not been pressed, pressing the ESC key will cause a return to the option mode menu. If load parameters have been entered, but the RETURN key has not been pressed, pressing the ESC key will erase the present input and allow a new load device to be selected (or to return to the option mode menu if ESC is pressed a second time).

```
F1 - DISK @ >F800
F2 - DISK @ >F820
F3 - TAPE @ >F880

ENTER PCS <F-KEY>,UNIT <0-3> <CR>:
```

Figure 5-3. Select Load Device Menu

Table 5-3. Load Device Function Keys

Function Key	PCS Address	Unit #	Device Type
F1	>F800	0	disk
F1	>F800	1	disk
F1	>F800	2	disk
F1	>F800	3	disk
F2	>F820	0	disk
F2	>F820	1	disk
F2	>F820	2	disk
F2	>F820	3	disk
F3	>F880	0	tape
F3	>F880	1	tape
F3	>F880	2	tape
F3	>F880	3	tape

- F2—SELF-TEST & LOAD.   When function key F2 is pressed, a normal self-test and load sequence will be initiated (the same as the sequence when the system is powered up and no operator intervention occurs, except that the terminal electronics is not tested in this case).

- F3—SELF-TEST.   When function key F3 is pressed, the following message will be displayed: LOOP ON SELF-TEST <Y/N>:.

  - If Y is entered, a continuous self-test loop will be initiated (the same as a self-test performed on power-up, except that the terminal electronics is not retested). At the end of each pass, the message SELF TEST COMPLETE is displayed for five seconds and the bell sounded. At this time, the ESC key can be pressed to terminate the self-test loop. If terminated, the loop pass count and number of errors logged will be displayed in the upper right corner of the display and the option mode menu will be displayed.

  - If N is entered, the self-test loop will execute one time and return to the option mode menu.

  - If ESC is entered, the option mode menu will be displayed (self-test will not execute).

- F4—DIAGNOSTIC LED TEST. When function key F4 is pressed, all eight processor self-test diagnostic lights will blink on and off repeatedly. The memory diagnostic indicator lights will also blink if the corresponding memory board is present. This allows an operator to verify the operation of the lights. The message CHECK DIAGNOSTIC LEDS: is displayed. To return to the option mode menu, press the ESC key (the lights will be returned to their original state).

- F5—KEYBOARD ECHO. When function key F5 is pressed, a display screen erase will occur and the message KEYBOARD ECHO: will be displayed in the upper left corner of the screen. At this time, any key that represents a displayable character will have its character displayed when the key is pressed. To return to the option mode menu, press the ESC key twice.

- F6—BURST CHAR. When function key F6 is pressed, a display screen erase will occur and the message BURST CHAR: will be displayed in the upper left corner of the screen. At this time, the first displayable character key pressed will be output to the screen in a continuous character string until the ESC key is pressed to return to the option mode menu. This feature can be used to make CRT adjustments.

- F7—EXTENDED SELF-TEST. When function key F7 is pressed, the extended self-test mode will be entered and its menu displayed (see paragraph 5.6.2).

5.6.2 Operation Using the Extended Self-Test Mode

The extended self-test mode allows specific self-test routines to be looped on individually or as part of an operator defined sequence. This mode is used for field diagnosis of intermittent failures.

The extended self-test mode can be entered by pressing function key F7 from the option mode menu. When the extended self-test mode is entered, the menu shown in Figure 5-4 is displayed on the video display. The asterisks (*) are replaced by actual values as follows:

Memory configuration (CFG)	0, 1, 2, or 3
Expansion boards present (EXP)	0, 1, 2, or 3
128K-byte blocks of RAM (BLKS)	02, 04, 06, 08, 0A, 0C, 0E, or 10

If the 2-channel or 4-channel communication boards are detected by the S300A, the corresponding NOT PRESENT message will be replaced by a blank space. If the optional EI300 LAN interface board is installed, line F7 will be replaced by: F7 – LAN/3-CH COMM.

```
F1  -  INTERRUPT/CRU
F2  -  MAP
F3  -  MEMORY        CFG=*  EXP=*  BLKS=*
F4  -  PMC
F5  -  PBUS I/F
F6  -  2-CH COMM     NOT PRESENT
F7  -  4-CH COMM     NOT PRESENT
F8  -  STATUS REQUEST

ENTER LOOP-COUNT,TEST-STRING <CR>:
```

Figure 5-4. Extended Self-Test Mode Menu

After the menu is displayed, the operator can enter the test loop count by typing up to a four-digit hexadecimal number from >0000 to >FFFF (do not enter the > symbol). After the loop count has been entered (followed by a comma), a test string can be entered by pressing the appropriate function keys. The test string defines the tests to be run and in what sequence they are to be run. The entry process is terminated by pressing RETURN. The following list describes the tests performed in the extended self-test mode.

- Interrupt/CRU

    — Executes those self-tests that generate error codes >78, >B9, >BA, >BB, >BC, and >BD.

    — Tests the functions of the interrupt logic and the communications register unit (CRU) chip.

- MAP

    — Executes those self-tests that generate error codes >70, >B1, >B2, >B3, >B4, >B5, and >B6.

    — Tests the functions of the address mapping chip.

- MEMORY

    — Executes those self-tests that generate error codes >60, >61, and >A0 through >AF.

    — Tests the performance of the RAM chips and memory controller.

- PMC

    — Executes those self-tests that generate error codes >68, >63, >96, >97, >98, >B7, and >B0.

    — Tests the functions of the memory controller and the parity generation/checking logic

- PBUS I/F

    — Executes those self-tests that generate error codes >58, >99, >9A, >9B, >9C, and >9D.

    — Tests functions of the mass storage interface controller (MSIC) chip

- 2-CH COMM

    — Executes those self-tests that generate error codes >48, >81, >89, >82, and >8A.

    — Tests the functions of the optional two-channel communications board. If this board is not installed, this test will always pass with no errors.

- 4-CH COMM

    — Executes those self-tests that generate error codes >48, >83, >8B, >84, and >8C, >85, >8D, >86, and >8E.

    — Tests the functions of the optional four-channel communications board. If this board is not installed, this test will always pass with no errors.

- STATUS REQUEST

    — When this is included in a sequence of tests, the results will be displayed after each loop of the sequence.

- LAN/3-CH COMM

    — Executes those self-tests that generate error codes >48, >83, >8B, >84, >8C, >85, >8D, >90, >9E, and >9F.

    — Tests the LAN interface functions and the communications ports of the optional EI300 LAN interface board.

The following notes refer to the extended self-test mode:

- Pressing the ESC key clears all information collected and restarts the entry process. If no information is currently in the test-string buffer then control is transferred back to the option mode menu.

- Up to 12 tests can be entered for the test string. Tests can be in any sequence and can be repeated.

- If no loop count or a count of 0 is specified (the special character , or the numeral 0,), the specified tests will execute >FFFF times.

- If no test string is specified (RETURN entered immediately after the comma separator) then tests F1 through F8 will be executed in sequence for each pass of the loop.

- After the loop count and test string have been entered (and RETURN has been pressed) the loop count and test numbers selected will be displayed before the first test begins. The display format is nnnn * TESTS : test-list, where nnnn is the loop count and test-list is the list of the requested test numbers. For example, if the default loop count and test sequence is taken, FFFF * TESTS : F1 F2 F3 F4 F5 F6 F7 F8 will be displayed. The first test in the sequence begins execution immediately after the message is displayed.

- Upon expiration of the loop count, the total loops executed and a total error count will be displayed as follows: mmmm ERRORS nnnn PASSES, where mmmm is the total number of errors through >nnnn test string passes. At this time, other test(s) can be run or control can be returned to the option mode menu by pressing the ESC key.

- Test execution can be terminated by pressing the ESC key. The test loop will stop at the end of the currently executing test and return control to the extended self-test menu.

- A status report can be requested by pressing the F8 or S key. When the key is pressed, a loop count and error count will be displayed at the end of the currently executing test as follows: mmmm ERRORS nnnn PASSES, where mmmm is the total number of errors through >nnnn passes of the test string. After displaying the status, the test loop will continue executing. A status display can be received during each pass by including F8 in the test string.

- Tests F6 and F7 will run only if the board they test is installed. If F6 and/or F7 is specified in the test string and the board is not present, the test loop will still execute. A board not installed will not generate a test error; the test is ignored.

Appendix A

Keyboards

A.1 INTRODUCTION

The Business System 300A is available with international keyboards in addition to the US standard keyboard. These are all of the available keyboards:

- United States

- Danish/Norwegian

- French Data Processing

- French Word Processing

- German/Austrian

- Spanish

- Swedish/Finnish

- Swiss

- United Kingdom

Figures A-1 through A-9 show the following:

- The keyboard layouts for each country

- The ASCII codes transmitted from the keyboard for each character

- The special character set (SC2) of 32 line-drawing characters available with each keyboard

In the figures, the keyboard is at the top of the page. The ASCII codes for the primary character set are below and to the left. The SC2 line drawing character set is below and to the right.

2281237

MSB\LSB	0	1	2	3	4	5	6	7
0			SP	0	@	P	`	p
1			!	1	A	Q	a	q
2			"	2	B	R	b	r
3			#	3	C	S	c	s
4			$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8			(	8	H	X	h	x
9			)	9	I	Y	i	y
A		◆	*	:	J	Z	j	z
B			+	;	K	[	k	{
C			,	<	L	\	l	¦
D			–	=	M	]	m	}
E			.	>	N	^	n	~
F			/	?	O	—	o	

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Figure A-1. United States Keyboard and Character Sets

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MSB / LSB	0	1	2	3	4	5	6	7
0			SP	0	@	P	`	p
1			!	1	A	Q	a	q
2			"	2	B	R	b	r
3			#	3	C	S	c	s
4			$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8			(	8	H	X	h	x
9			)	9	I	Y	i	y
A		⌐	*	:	J	Z	j	z
B			+	;	K	Æ	k	æ
C			,	<	L	Ø	l	ø
D			-	=	M	Å	m	å
E			.	>	N	^	n	~
F			/	?	O	—	o	

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Figure A-2.   Danish/Norwegian Keyboard and Character Sets

Figure A-3. French Data Processing Keyboard and Character Sets

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2281231

2281228

Figure A-4. French Word Processing Keyboard and Character Sets

2281241

	MSB	0	1	2	3	4	5	6	7
LSB									
0				SP	0	§	P	`	p
1				!	1	A	Q	a	q
2				"	2	B	R	b	r
3				#	3	C	S	c	s
4				$	4	D	T	d	t
5				%	5	E	U	e	u
6				&	6	F	V	f	v
7				'	7	G	W	g	w
8				(	8	H	X	h	x
9				)	9	I	Y	i	y
A			◆	*	:	J	Z	j	z
B				+	;	K	Ä	k	ä
C				,	<	L	Ö	l	ö
D				–	=	M	Ü	m	ü
E				.	>	N	^	n	ß
F				/	?	O	—	o	

2281232

	MSB	0	1	2	3	4	5	6	7
LSB									
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
A									
B									
C									
D									
E									
F									

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Figure A-5.   German/Austrian Keyboard and Character Sets

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Figure A-6. Spanish Keyboard and Character Sets
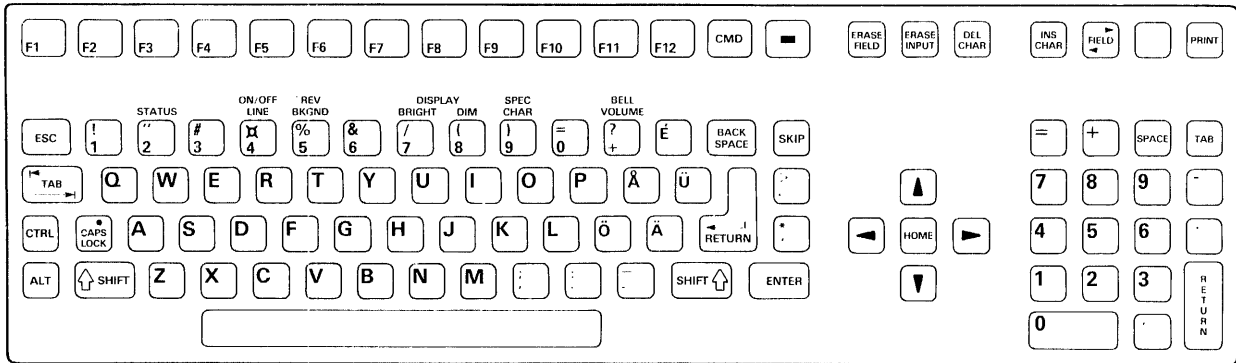
2281243

LSB \ MSB	0	1	2	3	4	5	6	7
0			SP	0	É	P	é	p
1			!	1	A	Q	a	q
2			"	2	B	R	b	r
3			#	3	C	S	c	s
4			¤	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8			(	8	H	X	h	x
9			)	9	I	Y	i	y
A		♦	*	:	J	Z	j	z
B			+	;	K	Ä	k	ä
C			,	<	L	Ö	l	ö
D			–	=	M	Å	m	å
E			.	>	N	Ü	n	ü
F			/	?	O	—	o	

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Figure A-7.   Swedish/Finnish Keyboard and Character Sets
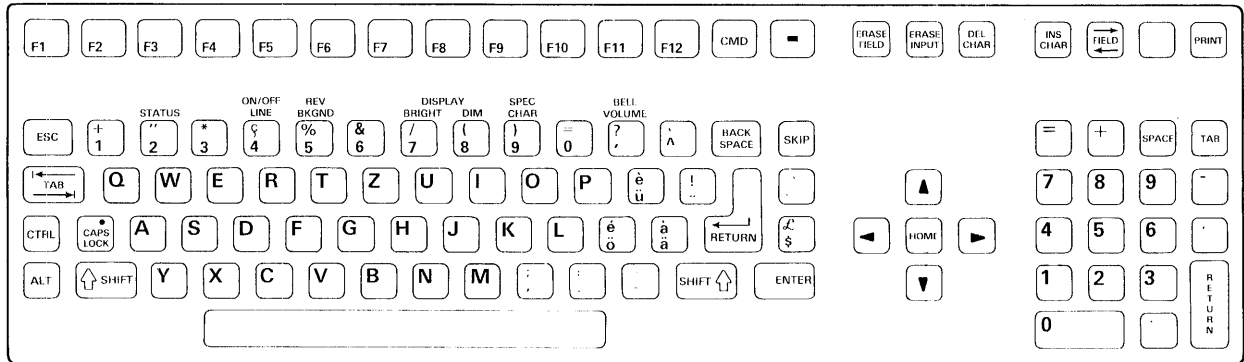
2281244

M S B / LSB	0	1	2	3	4	5	6	7
0			SP	0	à	P	`	p
1			!	1	A	Q	a	q
2			"	2	B	R	b	r
3			£	3	C	S	c	s
4			$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8			(	8	H	X	h	x
9			)	9	I	Y	i	y
A		◆	*	:	J	Z	j	z
B			+	;	K	é	k	ä
C			,	<	L	ç	l	ö
D			–	=	M	è	m	ü
E			.	>	N	^	n	..
F			/	?	O	—	o	

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2281228

Figure A-8.   Swiss Keyboard and Character Sets
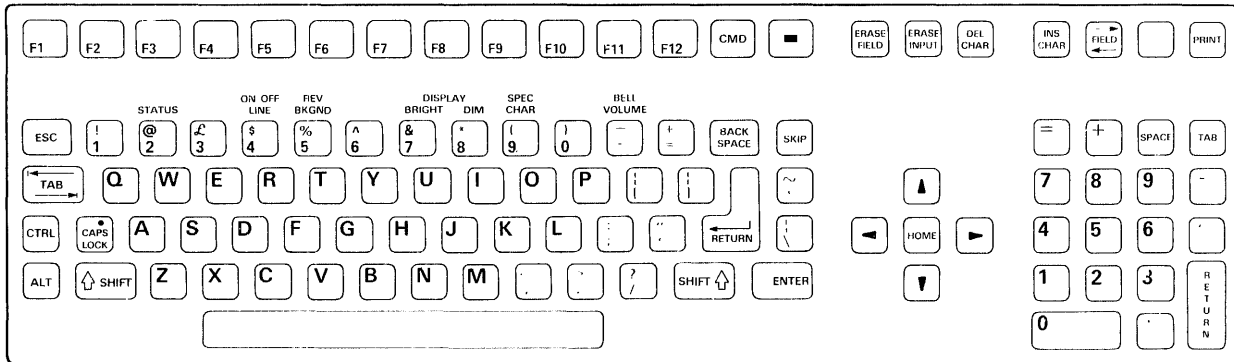
2281245

	MSB LSB	0	1	2	3	4	5	6	7
0				SP	0	@	P	`	p
1				!	1	A	Q	a	q
2				"	2	B	R	b	r
3				£	3	C	S	c	s
4				$	4	D	T	d	t
5				%	5	E	U	e	u
6				&	6	F	V	f	v
7				'	7	G	W	g	w
8				(	8	H	X	h	x
9				)	9	I	Y	i	y
A			♦	*	:	J	Z	j	z
B				+	;	K	[	k	{
C				,	<	L	\	l	¦
D				–	=	M	]	m	}
E				.	>	N	∧	n	~
F				/	?	O	—	o	

2281236

	MSB LSB	0	1	2	3	4	5	6	7
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
A									
B									
C									
D									
E									
F									

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Figure A-9.   United Kingdom Keyboard and Character Sets

A.2   DATA ENTRY AND EDITING

The operator uses the following keyboard states for data entry and editing:

- Normal (SHIFT and CAPS LOCK keys not pressed)

- SHIFT (SHIFT key pressed)

- CAPS LOCK (CAPS LOCK key pressed)

Each state selects a set of alpha characters, numerals or symbols. Table A-1 indicates which characters, numerals and symbols are selected by using each state.

Figure A-10 shows the character selections for the three states (Normal, SHIFT, CAPS LOCK) on the standard US keyboard. Data entry and editing are accomplished in a similar way with all other keyboards.

Table A-1.   Data Entry and Editing

Normal State	Alpha Characters	Two-Label Keycaps	Cursor Control, Editing, and Special Function Keys
Normal (No shift)	Lowercase	Lower label	Yes
SHIFT	Uppercase	Upper label	Yes
CAPS LOCK	Uppercase	Lower label	Yes
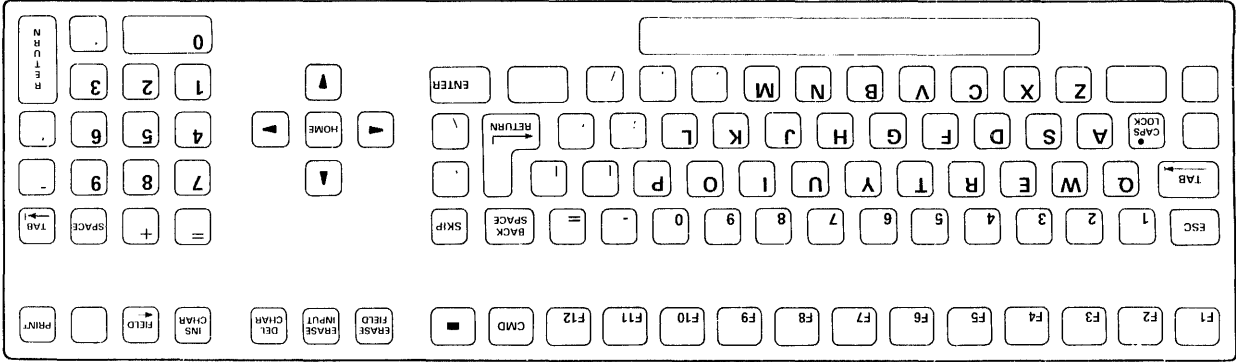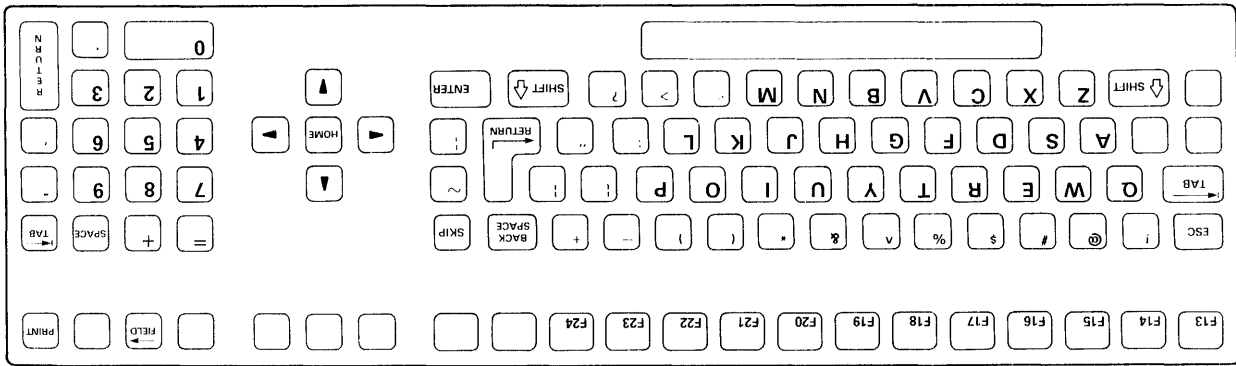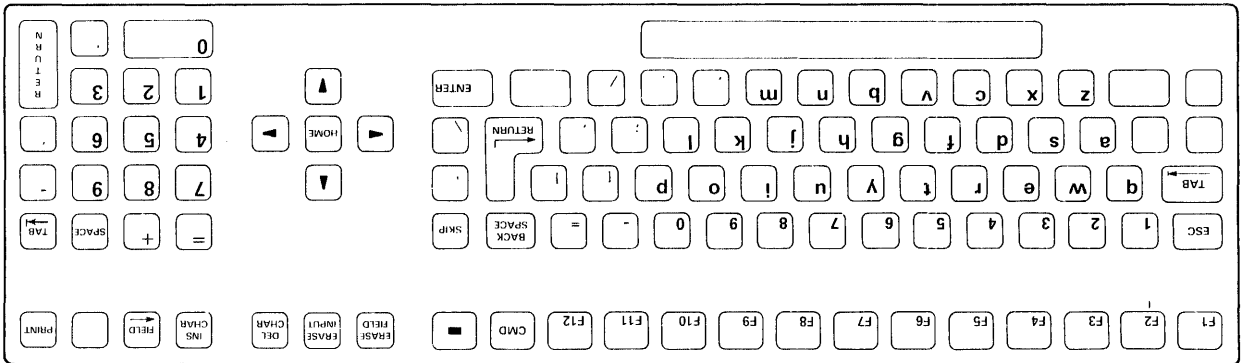
Appendix B

Ac Power Considerations

B.1 INTRODUCTION

This appendix contains information on facility wiring for the S300A.

The Business System 300A normally operates on ordinary commercial power that is available in the United States and other countries. Tolerances to line surges and sags are generally ± 10 percent of the normal line voltage. The quality of the power from the utility company can vary due to numerous factors beyond the control of the consumer. These problems include line surges, voltage drops, and momentary impulses resulting from heavy equipment power-up and power-down cycles on the same or related power company circuits. Occasionally, voltage fluctuations are caused by natural sources such as thunderstorms, and animals or tree limbs coming into contact with high-voltage lines supplying the computer system site. Voltage irregularities and line noise on the power line are major causes of computer system errors, downtime, and service calls. The additional cost of a well-planned power line service is repaid many times with reliability, safety, and easy expansion.

It is suggested that the Texas Instruments Business System 300A have a dedicated ac power feeder circuit and/or power line conditioning equipment to protect it from line noise and power fluctuations. There should not be devices with electric motors such as pencil sharpeners, copiers, typewriters, fluorescent lights, or air conditioners connected to the power feeder line supplying the computer system.

While these problems may have little effect on your installation, it is good to consider them. This section discusses these problems in more detail along with some suggested ways of preventing power line disturbances from affecting the operation of your computer system.

B.2 FACILITY WIRING

B.2.1 Planning

The wiring for the computer system plays an important role in determining the quality of power delivered. Proper grounding of the wiring and equipment is essential to prevent computer malfunctions of an irregular and intermittent nature. It is recommended that the facility electrical wiring for the computer system meet the requirements presented in the following paragraphs.

B.2.2 Power Distribution

To ensure safe and reliable operation of your computer, a dedicated power system is recommended. The power demands for computer equipment can exceed the capabilities of ordinary office wiring. Disk drives, printers, and tape drives have large starting currents, making it necessary to provide exclusive circuits for these devices.

The recommended configuration is a dedicated ac power feeder circuit with a dedicated power distribution panel for the computer equipment as shown in Figure B-1. It is best for all system equipment to be fed from a single power source. However, remote peripherals may be fed from another dedicated feeder and/or dedicated branch circuit.

NOTE

A dedicated feeder consists of one or more hot conductors, a neutral conductor, and an insulated equipment grounding conductor.

B.2.3 Grounding

It is most important that each receptacle for your computer equipment have a properly wired ground. This insulated ground wire (not conduit) must be connected to the subpanel ground bus. A ground bus must be utilized in the subpanel, and the ground wire must then be wired to the main service panel. The neutral bus must be isolated in the subpanel. At the main service panel, ground and neutral are bonded together and an earthing (earth ground) electrode is provided. This point is the single point ground, and is the primary location where the earthing electrode is connected. Figure B-2 shows this ground and neutral wiring with the equipment ground wire highlighted and separate from the conduit.

UTILITY COMPANY
TRANSFORMER

SEE DETAIL A

CUSTOMER'S FACILITY

SEE DETAIL B

TRANSFORMER
GROUNDING
ELECTRODE

BUILDING EARTHING
ELECTRODE

COMPUTER ROOM
POWER DISTRIBUTION

DEDICATED FEEDER
FOR COMPUTER
SYSTEM

NEUTRAL
BUS
(NOTE 2)

ISOLATED
NEUTRAL
BUS

TO RECEPTACLE FOR SYSTEM

TO RECEPTACLE FOR SYSTEM

TO RECEPTACLE FOR SYSTEM

TO RECEPTACLE FOR SYSTEM

NOTE 1

TO OTHER PERIPHERALS AS REQUIRED

BUILDING
EARTHING
ELECTRODE
(NOTE 3)

GROUND
BUS

DETAIL B
DEDICATED POWER DISTRIBUTION PANEL
FOR COMPUTER SYSTEM

NOTES:

1. EACH BRANCH CIRCUIT FROM THE COMPUTER POWER DISTRIBUTION PANEL MUST HAVE ITS OWN NEUTRAL AND GROUND CONDUCTORS.
2. BOND NEUTRAL BUS TO GROUND ONLY AT MAIN SERVICE ENTRANCE PANEL. ALSO BOND NEUTRAL BUS TO PANEL AT THIS POINT ONLY.
3. THIS EARTHING ELECTRODE CONNECTION IS CONSIDERED PRIMARY.

DETAIL A
MAIN SERVICE ENTRANCE
DISTRIBUTION PANEL

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Figure B-1. Typical Recommended Facility Wiring Scheme

INCOMING
POWER FROM
POWER COMPANY

MAIN
ENTRANCE SERVICE
PANEL

TO OTHER
BUILDING POWER
EQUIPMENT

COMPUTER
POWER DISTRIBUTION
SUB PANEL

TO OTHER
COMPUTER
EQUIPMENT

DEDICATED
FEEDER
CIRCUIT

CONDUIT

COMPUTER
POWER
MASTER
SWITCH

TRANS-
FORMER

NEUTRAL

GROUND

CONDUIT

120 VAC, 15A SERVICE
TO VDTS, LINE PRINTERS, ETC.

NEUTRAL

GROUND

NEMA 5-15R

TRANSFORMER
GROUND

BUILDING
GROUND

CONDUIT

120 VAC, 15A SERVICE
TO VDTS, LINE PRINTERS, ETC.

NEUTRAL

GROUND

NEMA 5-15R

TO OTHER
COMPUTER
EQUIPMENT

NOTE:
NEUTRAL CONNECTED TO SAFETY GROUND WIRE ONLY AT MAIN ENTRANCE SERVICE
PANEL (DO NOT CONNECT AT SUB PANEL)

228 1198

Figure B-2.   Typical Power Wiring With Ground Wiring Emphasized

B.2.4 Power Distribution Summary

The following list summarizes major points to consider in planning a power distribution system for your computer equipment.

- Install all electrical wiring in compliance with the latest national and local electrical codes.

- Install a dedicated power line feeder from the main switchboard or the main distribution panel to the computer power distribution panel.

- An isolation transformer, power line conditioning equipment, and/or electronic filters are recommended to isolate your computer system power from electrical noise and transients on incoming power. If an isolation transformer or power conditioning equipment is used, locate this equipment as close to the computer system as possible.

- When planning the power needs for your computer system, allow for future expansion. Pay particular attention to the power capacity of the selected isolation transformer, and to the space for additional circuit breakers in the breaker panel.

- A dedicated grounding scheme for your computer system is essential. The ground wires for the computer system must be insulated from the conduit and distribution panel. Do not use conduit for an equipment grounding conductor. The earthing electrode must measure less than 25 ohms to earth.

- All conductors in the dedicated computer system feeder must be copper. Connect only the computer system and peripheral devices to the dedicated feeder. Equipment ground conductors must be equal in size or larger than the current-carrying conductor.

- Safety standards in most European countries require power breakers to be located adjacent to each exit from the computer area. Some government agencies and corporations in the United States require at least one central power shutoff point in a computer facility. Be sure to check these requirements. Even if formal standards do not apply, a single-point shutoff with additional breakers for safety and maintenance convenience is recommended.

Remember that thoughtful planning of your power distribution system will greatly reduce potential system downtime and the related costs due to inadequate ac power service.

Appendix C

S300A Boot-Loader
Device Selection Algorithm

The assignment of disk unit names (DS01, DS02, DS03, and so forth) is performed by the operating system depending on which disk is used as a system disk. The system disk is always designated DS01 by the operating system. When the system is powered up, the system load device is selected by the boot-loader selection algorithm that is explained in the following steps. Use this algorithm explanation as a guide to assigning disk unit numbers and peripheral control spaces (PCS) to the disk drives in your S300A system during system generation (SYSGEN).

1. The system searches for an online and ready magnetic tape device (WD800 only) at PCS address >F880. If an online and ready unit is found, the system loads from it. Unit 0 is checked first, then units 1 through 3, in that order. If an online and ready unit is not found, the system proceeds to the next step.

2. The system searches for an online and ready nonwrite-protected disk device at PCS address >F800. If an online and ready nonwrite-protected unit is found, the system loads from it. Unit 0 is checked first, then units 1 through 3, in that order. If an online and ready nonwrite-protected unit is not found, the system proceeds to the next step.

3. The system searches for an online and ready nonwrite-protected disk device at PCS address >F820. If an online and ready nonwrite-protected unit is found, the system loads from it. Unit 0 is checked first, then units 1 through 3, in that order. If an online and ready nonwrite-protected unit is not found, the system returns to step 1.

NOTE

The above procedure assumes that the system disk build has been performed and the generated system (DX10 or DNOS) reflects the proper configuration of the hardware.

Appendix D

Assigning Disk Unit Numbers to WD500A Disk Drives

There are eight pencil switches numbered 1 through 8 located inside the WD500A enclosure at the rear of the formatter board. The association of the peripheral control space (PCS) and unit number to the switches is as follows:

Switch Number	8 7 6 5 4 3 2 1
PCS > F800 Unit Numbers	3 2 1 0
PCS > F820 Unit Numbers	3 2 1 0

The following example describes the switch settings on the formatter board of a basic S352A system. Note that the lowest numbered switch is always assigned to the Winchester disk.

WD500A Disk Unit	Switches Set to ON	PCS > F800
Winchester disk	1	Unit 0
Flexible disk	2	Unit 1

In this example, DS01 would refer to the Winchester disk and DS02 to the flexible disk.

NOTE

PCS > F820 is valid only for S300A systems which do not have a WD800 disk unit.

Appendix E

Assigning Disk Unit Numbers to WD800 Disk Drives

The unit select address in the WD800 specifies the unit address for the disk drive and tape drive in their respective PCSs. The WD800 disk drive is assigned a unit select address in PCS > F800. The WD800 tape drive is simultaneously assigned to the same unit select address in PCS > F880.

NOTE

After the WD800 power-up self-test is displayed, there is a 30-second time limit in which to update a new unit select address on the disk. If the time limit is exceeded, the indicators return to the normal status mode (TEST MODE light off).

Power up the WD800 disk unit in order to assign unit numbers by using the following procedures:

1. Make sure the WD800 and S300A computer power is off.

2. Set the WD800 WRITE-PROTECT switch off.

3. Turn on the ac power switch to the WD800 disk (leave the S300A off). The DISK READY indicator will light and remain lit after several seconds. The SYSTEM READY indicator will blink.

4. To display the current unit select address on the front panel, toggle the TEST MODE/ TAPE UNLOAD switch momentarily to the down (TAPE UNLOAD) position.

5. Return the switch to the center position and observe that one of the front panel indicators is lit. Refer to the following table for the unit select address corresponding to the display. The unit select addresses are position-coded.

Test Status Indicators				
1	2	3	4	Unit Select Address
On	Off	Off	Off	Unit 0
Off	On	Off	Off	Unit 1
Off	Off	On	Off	Unit 2
Off	Off	Off	On	Unit 3

6. To modify the unit select address, perform the following steps:

a. Toggle the TEST MODE/TAPE UNLOAD switch momentarily to the down (TAPE UNLOAD) position to change the unit select address displayed on the front panel indicators. Continue to toggle the switch until the desired unit select address is reached.

b. To store the new unit select address, toggle the TEST MODE/TAPE UNLOAD switch momentarily to the up (TEST MODE) position. This sets the new unit select address and updates it on the disk. The front panel indicators then return to the status mode.

c. To verify that the correct unit select address is stored, display the unit select address again by toggling the TEST MODE/TAPE UNLOAD switch to the TAPE UNLOAD position. If the unit select address does not change, it is stored correctly. If the disk WRITE PROTECT switch is ON, the unit select address will not be stored on the disk.

NOTE

You only have 30 seconds to do this procedure. If time runs out you will not be able to change unit select, and you will have to start over.

Appendix F

System Generation

F.1 GENERAL INFORMATION

This appendix contains information about the S300A computer that will be helpful when an operating system generation procedure is performed. A system generation is required whenever a DX10 or DNOS operating system for use on an S300A computer is obtained from Texas Instruments. The TI provided operating system comes preconfigured to work with a variety of business systems, but it is not configured to support S300A options, nor is it optimized for running on an S300A. The system generation process allows a user to configure the operating system specifically to the requirements of the S300A system and its intended use. If the operating system was obtained from a source other than TI, you should consult the supplier to determine if a system generation is required.

The following information should be used to supplement the system generation procedure contained in the operating system manuals. The information provided in this appendix includes:

- S300A hardware parameters and entry examples

- Performance parameters

F.2 HARDWARE PARAMETERS

Certain hardware address, interrupt, and operating speed information must be input during the system generation process. The following paragraphs provide this information for S300A systems and provide example system generation program entries.

F.2.1 Disk Units
The S300A supports TI mass storage systems that can communicate via the TI peripheral bus interface (PBUS). Two such systems are the WD500A and WD800 disk units. The following configuration information, along with the information in Table F-1, should be used when entering the disk unit data during the system generation procedure.

- The S300A can support a maximum of eight disk devices (disk drives) or a maximum of four disk devices and four cartridge tape devices. Since a WD800 has one disk drive and one tape drive, an S300A configured with a WD800 is limited to four disk devices and four cartridge tape devices.

- WD500A and WD800 disk units can be configured together on an S300A system. The order in which the devices will be addressed depends on the unit numbers assigned during the installation process (see Appendixes D and E).

- The primary peripheral control space (PCS) address for the S300A is >F800. The primary PCS is for disk devices only and can support up to four disk drives. The interrupt level associated with PCS >F800 is 13.

NOTE

A right angle bracket (>) before a number indicates a hexadecimal value.

- An S300A system with more than four disk drives (but no tape drives) can accommodate up to four secondary disk drives at secondary PCS address >F820 which has an associated interrupt level of 9.

- Up to four tape devices (WD800 cartridge tape drives) can be supported at PCS address >F880 which has an associated interrupt level of 9.

Table F-1.   Disk Unit Parameters

Device	Device Type	Number of Disk Drives	Number of Tape Drives	PCS Address	Interrupt Level
Primary[1]					
WD500A	DS	2		>F800	13
WD800	DS	1		>F800	13
	MT		1	>F880	9
Secondary[2]					
WD500A	DS	Up to 4		>F820	9

Notes:

[1] Can support up to 4 WD500A/WD800 disk drives and 4 WD800 tape drives.

[2] Valid only for systems without tape.

Example entry: S300A with one WD500A disk unit.

DEVICE TYPE?DS
TILINE ADDRESS?(> F800)   Take default (primary disk)
DRIVES:(1)2   WD500A has two disk drives
DEFAULT RECORD SIZE:(768)   Take default
INTERRUPT:(13)   Take default

Example entry: S300A with one WD800 disk unit.

DEVICE TYPE?DS   WD800 disk drive entry
TILINE ADDRESS?(> F800)   Take default
DRIVES:(1)   Take default
DEFAULT RECORD SIZE:(768)   Take default
INTERRUPT:(13)   Take default

DEVICE TYPE?MT   WD800 tape drive entry
TILINE ADDRESS?(> F880)   Take default
DRIVES:(1)   Take default
INTERRUPT:(9)   Take default

Example entry: S300A with one WD500A and one WD800 disk unit (fully configured disk units).

DEVICE TYPE?DS   WD500A/WD800 disk drive entry
TILINE ADDRESS?(> F800)   Take default
DRIVES:(1)3   Combined number of disk drives
DEFAULT RECORD SIZE:(768)   Take default
INTERRUPT:(13)   Take default

DEVICE TYPE?MT   WD800 tape drive entry
TILINE ADDRESS?(> F880)   Take default
DRIVES:(1)   Take default
INTERRUPT:(9)   Take default

Example entry: S300A with three fully configured WD500A disk units.

DEVICE TYPE?DS
TILINE ADDRESS?(> F800)   Take default
DRIVES:(1)4   Two WD500As have four drives
DEFAULT RECORD SIZE:(768)   Take default
INTERRUPT:(13)   Take default

DEVICE TYPE?DS
TILINE ADDRESS?(> F800) > F820   Third WD500A disk unit
DRIVES:(1)2   WD500A has two disk drives
DEFAULT RECORD SIZE:(768)   Take default
INTERRUPT:(9)   > F820 interrupt is level 9

F.2.2 Terminals

The S300A computer terminal and the standard add-on terminals are the Texas Instruments 931 Video Display Terminal. The following information along with the information in Table F-2 should be used when entering the terminal data during the system generation procedure.

- The S300A terminal and any 931 add-on terminals are entered as device type VDT and VDT type 931.

- The S300A terminal must be run at a speed of 9600 baud and in general the add-on terminals should also be run at 9600 baud (the S300A does not support a speed of 19,200 baud). Each terminal's Comm parameters must be configured to the speed selected by using the keyboard configuration procedure.

- If an OMNI 800 printer is attached to the Aux-1 port of the S300A terminal or to the Aux-1 port of any of the 931 add-on terminals, then answer yes to the ASSOCIATED PRINTER question. Each terminal's Aux parameters must be configured to the parameters required by the attached printer using the keyboard configuration procedure.

- Answer no to the SWITCHED LINE question for the S300A terminal and all locally connected add-on terminals. If a 931 remote terminal is connected to the S300A using modems and standard telephone lines, then answer yes for that terminal only (also make sure the terminal speed is the same as the modem speed).

Table F-2. Terminal Parameters

Interface Board	Interface Connector	Interface Type	CRU Address	Interrupt Level
S300A Processor	Internal	9902	>1700	8
4-Channel Communication	J1	9902	>0400	6
	J2	9902	>0480	7
	J3	9902	>0500	10
	J4	9902	>0580	12
2-Channel Communication	Aux-2	9902	>0B80	4
	Comm	9903	>0B00	3

Example entry: S300A terminal.

```
DEVICE TYPE?VDT
ACCESS TYPE?(RECORD)                    Take default
TIME OUT?(0)                            Enter desired time-out value
CHARACTER QUEUE?(6)                     Enter desired character queue
VDT TYPE?931                            Internal VDT type is 931
ASSOCIATED PRINTER?YES                  Yes if printer is attached to AUX-1
SWITCHED LINE?(NO)                      Take default — no
SPEED?(1200)9600                        Internal VDT operates at 9600
INTERFACE TYPE?9902                     Internal VDT interface is 9902
CRU ADDRESS?(>100)>1700                 Internal VDT CRU address is >1700
INTERRUPT?(10)8                         Internal VDT interrupt level is 8
```

Example entry: S300A local 931 add-on terminal connected to 4-channel communication board connector J3.

```
DEVICE TYPE?VDT
ACCESS TYPE?(RECORD)                    Take default
TIME OUT?(0)                            Enter desired time-out value
CHARACTER QUEUE?(6)                     Enter desired character queue
VDT TYPE?931                            VDT type is 931
ASSOCIATED PRINTER?YES                  Yes if printer is attached to AUX-1
SWITCHED LINE?(NO)                      Take default — no
SPEED?(1200)9600                        VDT operates at 9600
INTERFACE TYPE?9902                     4-ch comm J3 VDT interface is 9902
CRU ADDRESS?(>100)>0500                 4-ch comm J3 CRU address is >0500
INTERRUPT?(10)                          Take default — interrupt level 10
```

F.3 PERFORMANCE PARAMETERS

Many variables determine what the overall performance and terminal response time of the S300A system will be. For example, one hardware variable is the amount of memory on the processor board. In a multiterminal system, there can be a requirement for more memory than is physically available. When this happens, the operating system will automatically roll out some lower-priority programs to the disk to make room for other programs. This roll-out, roll-in process will usually degrade system performance. The problem is usually easily solved by adding additional system memory.

System performance can also be affected by the parameters entered during the system generation procedure. The system generation parameters for buffer sizes should be well understood in order to optimize performance. Also, it is recommended that the overlays allowed be changed from the default of 2 to 6 or 8.

Glossary

Add-On Terminal — 931 Video Display Terminal that is connected to an S300A computer; requires an optional communication board.

Algorithm — A logical process by which a decision or selection is made.

Alphanumeric — A combination of letters, numbers, and symbols.

Application Package — Computer programs (software) designed to perform specific business and accounting functions, such as sales entry, inventory control, and accounts receivable.

Backup — A reserve or second copy of data that provides protection against damage or loss of any data in the computer disk storage system.

Baud Rate — The number of data bits per second transferred during communications between two pieces of equipment.

Binary — A numbering system using only ones and zeroes.

Board — A computer circuit board holding electrical components, wiring, and connectors.

Boot — To load the operating system into the computer from the system disk.

Boot-Loader — Software instructions that tell the computer how to load the operating system.

Buffer — A temporary storage place for data.

Bug — Error in a program that causes it to malfunction.

Byte — An eight-bit binary number.

Character — A symbol recognized by the computer—a letter, a numeral, or a special symbol (such as the plus sign).

Command — An instruction given to the computer by the operator from the keyboard, or an instruction given by the computer to a video terminal or disk unit.

Configuration Parameters — A set of parameters that determines how a terminal or printer communicates with the computer.

Crash — A computer failure that stops operations. Following the crash, you need to start the computer again (reboot the operating system) before you can resume operations.

CRU — Communications Register Unit. An addressable serial interface used internally by the S300A processor.

CTS — A clear-to-send communication signal.

Cursor — A brightly lit rectangle or underline displayed on the screen of the display unit to indicate a character location.

Data — Information in the form of binary numbers processed by the computer and stored in computer memory or on a mass storage device.

Default — The value assumed by the computer when it receives a blank response to a prompt.

Device — A disk drive, tape drive, printer, or terminal.

Device Name — A name used in commands to identify a component of the system; for example, DS01, LP02, and ST06.

Diagnostic — Pertaining to the diagnosis of errors or malfunctions.

Directory — A group of files stored and accessed together.

Disk Access — A transfer of software or data to or from the disk.

Disk Drive — Hardware inside the disk unit that allows the computer to store information on a diskette or Winchester disk.

Diskette — A plastic disk (inside a dustcover) containing programs and data, which is inserted into the disk unit. You use diskettes for backup copies of information on your Winchester disk and for transporting your data to another system.

Disk Unit — Equipment that houses one or more Winchester disk drives and either a diskette drive or a cartridge tape drive; that is, a WD500A or WD800 disk unit.

Display Attribute — A selectable feature that modifies the video display; that is, reverse imaging, highlighting, underlining, status line blanking, brightness.

DNOS — Distributed Network Operating System. An operating system for the Business System 300A computer

Double-Sided, Double-Density — The type of diskette (flexible disk) used with the diskette drive of the WD500A disk unit.

DSDD — The abbreviation for double-sided, double-density.

DSR — Device Service Routine. A software routine that interfaces a computer with a peripheral device.

DX10 — An operating system for the Business System 300A computer.

Fault — A failure to function properly.

Field — Group of character positions treated as a single unit of data.

File — Named collection of data kept together on a disk, diskette, or tape cartridge.

Flexible Disk — Another name for a diskette.

Flexible Disk Drive — Another name for a diskette drive.

Format — 1. The arrangement of data (in fields) on a data medium.   2. A disk operation performed when a disk is initialized.

Four-Channel Communication Board — An optional computer board which permits the use of up to four add-on terminals.

Friction Drive — A type of printer that uses pressure from a roller (platen) to move paper past the printhead.

Hardware — Electronic components or equipment used to process, display, or communicate information.

Hardware Configuration — The arrangement of S300A equipment that includes disk units, printers, and add-on terminals entered during operating system generation.

Head — Electromagnetic device used to read and write information on the magnetic surface of a disk, diskette, or magnetic tape.

Hexadecimal — A number system that uses sixteen numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F.

Initialize — 1. The process of starting the computer and making it ready for use.   2. Preparing a disk for use.

Initial Program Load (IPL) — Loading of the operating system into computer memory.

Interrupt — A signal to the S300A processor that requires the processor to stop what it is doing and perform a specific task designated by the operating system. The processor returns to its original task after processing the interrupt.

Keyboard — Equipment similar to a typewriter keyboard, used to enter commands and data.

Keypad — Group of keys on the keyboard.

LED — Light Emitting Diode.

Load — To transfer the software or data into the computer memory.

Load Device — The disk or tape drive from which software or data is being loaded.

Log On — To establish a session with a computer by keyboard entry.

Loop — 1. To perform the same operation over and over.   2. The path taken during looping.

Glossary-3

Loopback — To connect the output signals of a port to the inputs of the same port. This is a diagnostic tool.

Mapping — A method of converting a 16-bit address into a 20-bit address. The S300A uses a custom-made integrated circuit chip to perform this process.

Mass Storage — Permanent storage of large amounts of software or data on an inexpensive type of media, such as a disk or tape.

Memory — The part of a computer that stores data as binary numbers. The S300A memory is partly permanent Read Only Memory (ROM) and partly temporary Random Access Memory (RAM).

Menu — The list of options from which to choose, displayed on the video display.

MSIC — Mass Storage Interface Chip. An integrated circuit chip used to interface between a computer and mass storage devices.

Multiuser — Capable of being used by more than one operator at the same time using add-on terminals.

Nibble — A four-bit binary number.

N-Key Rollover — Characters are displayed for all keys that are simultaneously pressed. The order of the characters displayed depends on the order the keys activate the keyboard electronics.

NMI — A nonmaskable interrupt.

Numeric Character — Any of the digits zero through nine, the comma, the period, the space, the dollar sign, the plus sign, or the minus sign.

Offline — The condition of being disconnected from a communication channel.

Online — The condition of being connected to a communication channel.

Operating System — Software that tells a computer how to run programs, to read and write data, and to carry out your commands.

Operator — The person who enters data, gives commands, and performs routine maintenance on the computer.

Option — 1. Choice offered on a menu. 2. Additional equipment purchased to make your system more flexible or easier to use.

Output — Information written or displayed by a computer. The Business System 300A computer sends its output to a printer, disk file, video display, diskette, or tape cartridge.

Parity — A method for detecting errors in data handling involving the generation of a parity bit such that the sum of the data bits and the parity bit will be odd or even for each data word.

Pathname — A name used to access a file, consisting of the volume name of the disk or diskette, the names of the directories that contain the file, and the file name—all separated by periods. For example, the pathname VOL1.DIRA.FILEX refers to the volume VOL1, directory DIRA, and file FILEX.

PBUS — The communication channel between the mass storage devices and the S300A processor.

Peripheral Control Space (PCS) — A group of eight memory word addresses that are used solely for communicating with mass storage devices. Two PCSs exist. PCS 1 starts at >F800 and can be used for up to four disk drives. PCS 2 can be used for up to four disk drives or four tape drives. When used for disk drives, PCS 2 starts at >F820. When used for tape drives, PCS 2 starts at >F880.

Peripheral Equipment — The S300A equipment that is external to the S300A terminal; for example, add-on terminals, disk units, and printers.

Port — Any one of the connections by which the S300A processor transmits/receives data to/from the S300A terminal, add-on terminals, printers, and mass storage units.

Press — To momentarily push down a key and then release it.

Printer — Equipment used to make paper copies of computer output.

Printhead — The part of the printer that does the printing.

Program — A predetermined set of computer instructions that tells a computer to perform processing functions.

Prompt — A message displayed by the computer asking you to enter information needed to carry out a command.

Ready — The condition of a mass storage device that is ready to use. Although a disk or tape drive may be online, it is not ready unless a disk or tape is physically present in the drive.

Recovery — Process of returning to a given point after a computer system failure. It may be necessary to copy data from a backup data set (backup hard disk, diskette, or tape cartridge).

ROM Loader — A program for telling the computer how to boot. These instructions are stored in permanent Read Only Memory (ROM) on the S300A processor board.

S300A Processor — A computer board that performs the central data processing functions and interacts with the S300A terminal, add-on terminals, mass storage devices, and printers.

S300A Terminal — A 931 Video Display Terminal that has an S300A processor installed inside it.

SCI — Short for System Command Interpreter, the part of the DNOS or DX10 operating system that receives and carries out your commands.

Scroll — To roll the video display upwards (downwards) in such a way that a display line disappears from the top (bottom) as a new line appears at the opposite side of the video display.

Self-Test — A test performed by a piece of equipment on itself to determine if it is functioning properly.

Software — Programs that run on a computer.

SVC Error Code — A hexadecimal (base 16) number displayed as part of an error message to identify the source of a problem.

System Disk — Disk that holds the operating system.

System Generation (SYSGEN) — A process that must be performed to customized a DNOS or DX10 operating system to a particular hardware configuration. See the term Hardware Configuration.

Tape Cartridge — A removable data storage medium used by the WD800 disk unit.

Test-String — A group of self-tests from the extended self-test menu; the tests are performed in the order that they are selected.

Tilt Base — The S300A base that allows the viewing angle of the video display to be changed.

Tractor Drive — A type of printer that uses a belt with pins to move perforated paper past the printhead.

Typamatic — The repeating action of certain keys when pressed and held down.

Two-Channel Communication Board — An optional computer board that permits the use of up to two add-on terminals or one add-on terminal and a modem.

Unit — A piece of equipment.

Unit Select Address — Consists of a memory address and a unit number assigned to a mass storage device; the memory address is that of the peripheral control space (PCS) designated for the mass storage device during system generation. The unit number is assigned 0, 1, 2, or 3 using procedures specified in the appropriate disk unit operator's guide and Appendixes D and E of this guide.

Unload — To remove a diskette or tape cartridge from the disk unit.

Video Display — The area of the S300A terminal where the computer displays information.

Volume — An organized collection of data stored on a disk or diskette.

Winchester Disk — A fixed disk inside the disk unit, providing mass storage capacity and fast access time.

Write-Protect — A feature that prevents the computer from writing over data already stored on a disk, diskette, or tape cartridge.

Index

This index lists key topics of this manual and specifies where each topic appears, as follows:

- Sections — Section references appear as *Section n*, where *n* represents the section number.

- Appendixes — Appendix references appear as *Appendix Y*, where *Y* represents the appendix letter.

- Paragraphs — Paragraph references appear as alphanumeric characters separated by decimal points. The first character refers to the section or appendix containing the paragraph, and any other numbers indicate the sequence of the paragraph within the section or appendix. For example:

  - *3.5.2* refers to Section 3, paragraph 5.2.

  - *A.2* refers to Appendix A, paragraph 2.

- Figures — Figure references appear as *Fn-x* or *FY-x*, where *n* represents the section and *Y* represents the appendix containing the figure; *x* represents the number of the figure within the section or appendix. For example:

  - *F2-7* refers to the seventh figure in Section 2.

  - *FG-1* refers to the first figure in Appendix G.

- Tables — Table references appear as *Tn-x* or *TY-x*, where *n* represents the section and *Y* represents the appendix containing the table; *x* represents the number of the table within the section or appendix. For example:

  - *T3-10* refers to the tenth table in Section 3.

  - *TB-4* refers to the fourth table in Appendix B.

- See and See also references — *See* and *See also* direct you to other entries in the index. For example:

  Logical Unit Number . . . .*See* LUNO

  Device . . . .*See also* individual device names or numbers

Page numbers that correspond to these index references appear in the Table of Contents.

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