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Issue 1, November 1989

Integrated Services Digital Network (ISDN)

7500B Data Module

Feature Package 2
User's Manual

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IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

- Read and understand all instructions.
- Follow all warnings and instructions marked on the product.
- This product can be hazardous if immersed in water. To avoid the possibility of electric shock, do not use it when you are wet. If you accidentally drop it into water, do not retrieve it until you have first unplugged the line cord from the modular wall jack. Do not plug the telephone back in until it has dried thoroughly.
- Avoid using the telephone (other than a cordless type) during electrical storms in your immediate area. There is a remote risk of electric shock from lightning. Urgent calls should be brief. Even though your telephone company may be using protective measures to limit electrical surges from entering your building, absolute protection from lightning is impossible.
- If you suspect a gas leak, report it immediately, but use a telephone away from the area in question. The telephone's electrical contacts could generate a tiny spark. While unlikely, it is possible that this spark could ignite heavy concentrations of gas.
- Never push objects of any kind into this telephone through housing slots as they may touch hazardous voltage points or short out parts that could result in a risk of electric shock. Never spill liquid of any kind on the telephone.
- To reduce the risk of electric shock, do not disassemble this product. There are no user serviceable parts inside. Opening or removing covers may expose you to hazardous voltages. Incorrect reassembly can cause electric shock when the telephone is subsequently used.
- Disconnect the cords on this product before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- Slots and openings in the housing and the back or bottom are provided for ventilation to protect it from overheating, these openings must not be blocked or covered. The opening should never be blocked by placing the product on a sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
- This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply being used, contact a qualified service person.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by person walking on it.
- Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.

- Disconnect the cords on this product and refer servicing to qualified service personnel under the following conditions:
    A. When the power supply cord or plug is damaged or frayed.
    B. If liquid has been spilled into the product.
    C. If the product has been exposed to rain or water.
    D. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
    E. If the product has been dropped or the housing has been damaged.
    F. If the product exhibits a distinct change in performance.

SAVE THESE INSTRUCTIONS

When you see this symbol on the product, refer to the instruction booklet packed with the product for more information before proceeding.

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CHAPTER 1: INTRODUCTION

Congratulations on the addition of the AT&T 7500 Data Module to your Integrated Services Digital Network (ISDN) communications system. Following our tradition of excellent quality and high reliability, the new 7500 is designed to provide you with the latest in telecommunications technology (Figure 1).

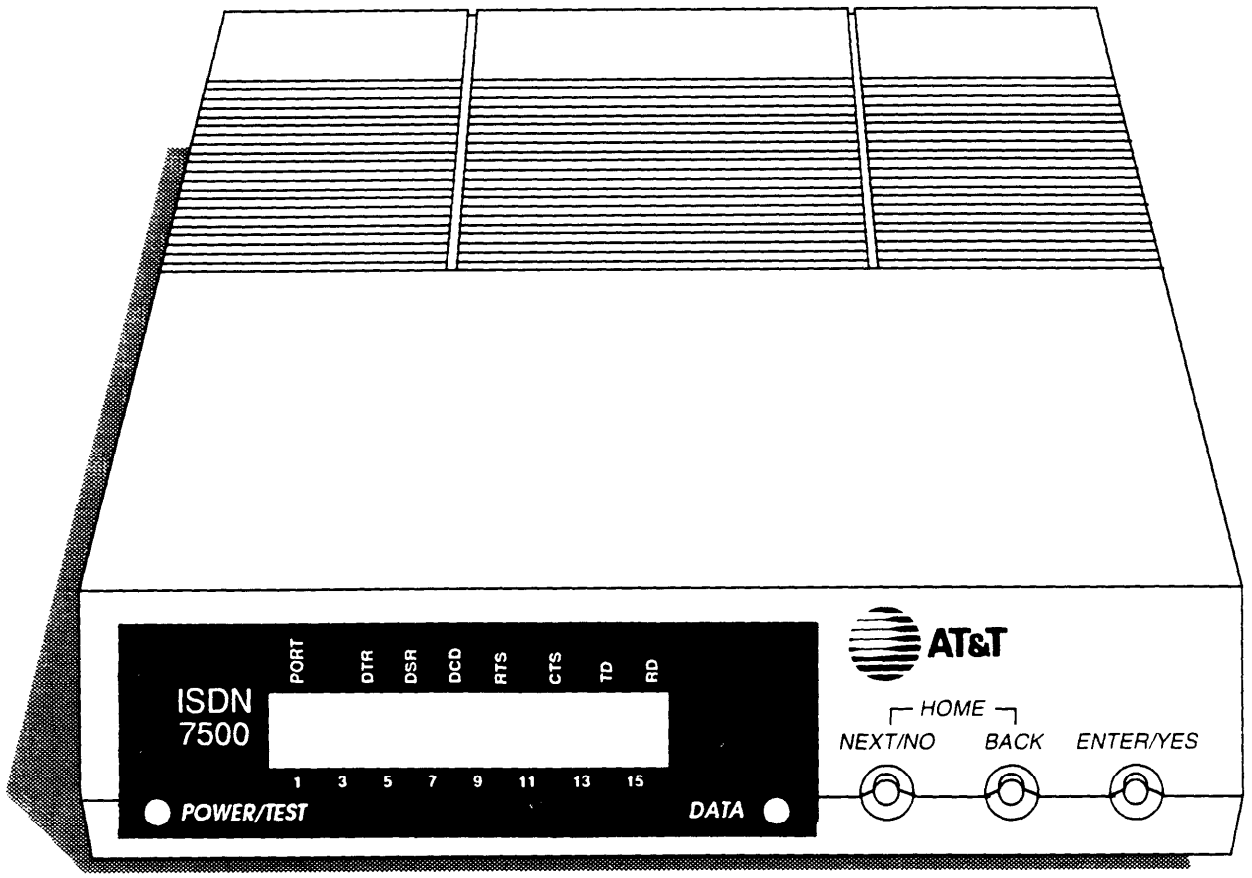


Figure 1: The 7500 Data Module

The AT&T ISDN 7500 Data Module is a terminal adaptor intended primarily for connecting unattended data terminal equipment (DTE) or data communications equipment (DCE) to the ISDN network. The 7500 is a stand alone unit which can be inserted into a multiple mounting (that is rack mounting). The 7500 has no voice functions.

The 7500 provides you with flexible data communications capabilities in one unit. The 7500 can be configured in a number of ways to allow attached DTE and DCE to send and receive data through the digital network.

Organization of the User's Manual

This manual is arranged into the following chapters:

- **CHAPTER 1: INTRODUCTION**
- **CHAPTER 2: PRODUCT OVERVIEW** — Gives an overview of the 7500 features and configurations.
- **CHAPTER 3: FRONT PANEL FEATURE ACCESS** — Explains how to use menus accessible from the front panel of the 7500.
- **CHAPTER 4: DEFINITIONS OF THE 7500 OPTIONS** — Gives definitions of options available with the 7500.
- **CHAPTER 5: ASYNCHRONOUS DCE CONFIGURATION** — Describes use of the 7500 in an asynchronous DCE configuration.
- **CHAPTER 6: ASYNCHRONOUS DTE CONFIGURATION** — Describes use of the 7500 in an asynchronous DTE configuration.
- **CHAPTER 7: SYNCHRONOUS DCE CONFIGURATION** — Describes use of the 7500 in a synchronous DCE configuration.
- **CHAPTER 8: INSTALLATION** — Gives procedure to install your 7500.
- **CHAPTER 9: TECHNICAL DESCRIPTION** — Provides information for technical personnel.
- **REFERENCE** — Provides information for technical personnel.
- **APPENDIX** — Provides hexadecimal conversion table for the ASCII characters, and X.25 and Q.931 cause messages.

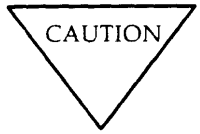
User Manual Conventions and Product Standards

The following conventions are used in this manual:

- Items in boxes, for example, [NEXT/NO], represent buttons and keys to be pressed.
- Items in bold characters, for example, **3784,** represent information entered with the data terminal keyboard.
- Items in reverse video, for example, **[DONE?]** represent messages on the 7500 display or the terminal screen.
- Items in italics, for example *HOME*, represent variables.
- 

is an icon that appears throughout this manual. It means you should pay special attention to that information. It often significantly qualifies previously presented procedures or descriptions.
- 

is an icon which appears occasionally in this manual. It means there is a possibility of equipment damage.

- 

is an icon which appears occasionally in this manual. It means there is a possibility of service interruption.

- Where this product employs the EIA-232D standard interface, older equipment which adheres to the RS-232C standard can also be connected.

Legend for Flowchart Figures

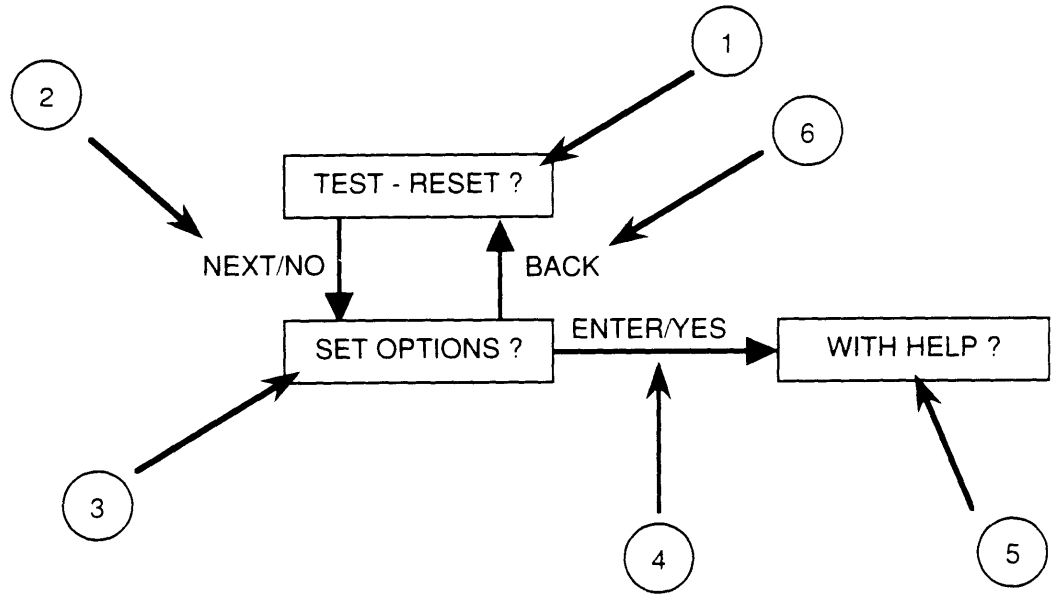


Figure 2: An Example of a Flowchart

Figure 2 shows a portion of a typical 7500 manual flowchart figure.

Callouts (1), (3), and (5) represent messages displayed on the 7500's front panel. Messages are always pictured in boxes.

Callouts (2), (4), and (6) represent the three button on the 7500's front panel: [NEXT/NO]. [ENTER/YES], and [BACK].

Beginning from the top of the flowchart **[TEST-RESET?]** is displayed on the front panel. Pressing [NEXT/NO] will display the message **[SET OPTIONS?].** Pressing [BACK] while **[SET OPTIONS?]** is displayed will return the display to **[TEST-RESET?].** Pressing [ENTER/YES] while **[SET OPTIONS?]** is displayed will display **[WITH HELP?].**

On “System Administrator”: An Important Note to All Users

Throughout this manual, we ask you to speak to your “system administrator.” To whom do we refer? In your company, it is the person who has been given the overall responsibility for ISDN — including all terminals as well as the switch. His or her own title will vary from business to business. It may be "system manager," "telecommunications manager," "data communications manager," or something less generic and more unique to your company.

You may wonder why this reference to a system administrator occurs so often. The answer lies in the sophisticated nature of ISDN. In addition, every ISDN is configured to meet the specific needs of each customer. Your system administrator knows the unique configuration of your particular ISDN system and can answer your questions based on this knowledge. Your installation can and should reflect the individual uniqueness of your company.

CHAPTER 2: PRODUCT OVERVIEW

Front Panel of the 7500

The front panel of the 7500 is shown in Figure 3.

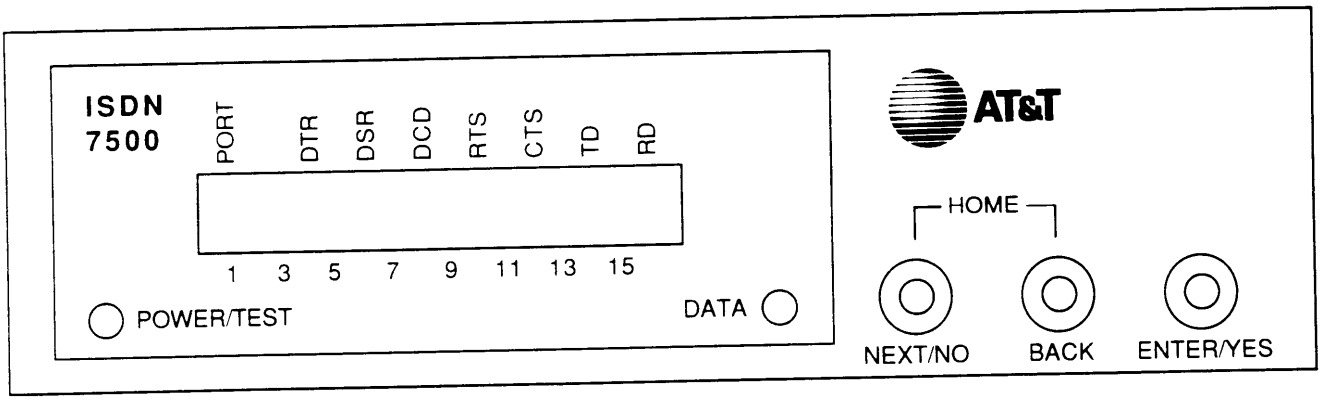


Figure 3: Front Panel of the 7500

The front panel has the following features:

- **Power/Test lamp** — The red **Power/Test** lamp lights when power is supplied to the 7500. The lamp flashes during all tests.

- **Data lamp** — The green **Data** lamp lights when a data call is in progress. The lamp flashes during self-test and when you are receiving an incoming data call that has not yet been answered.

- **Display** — The display has one 16-character line on which status information and option settings are displayed. The legend above the display identifies the character positions for display of the EIA Interface lead status. The legend below the display identifies the character positions for option settings. These settings are explained later in this manual.

- [NEXT/NO], [BACK], and [ENTER/YES] buttons — These buttons are used to step through each menu, set data communication options and functions, and adjust the contrast of the display.

Rear Panel of the 7500

The rear panel of the 7500 is shown in Figure 4.

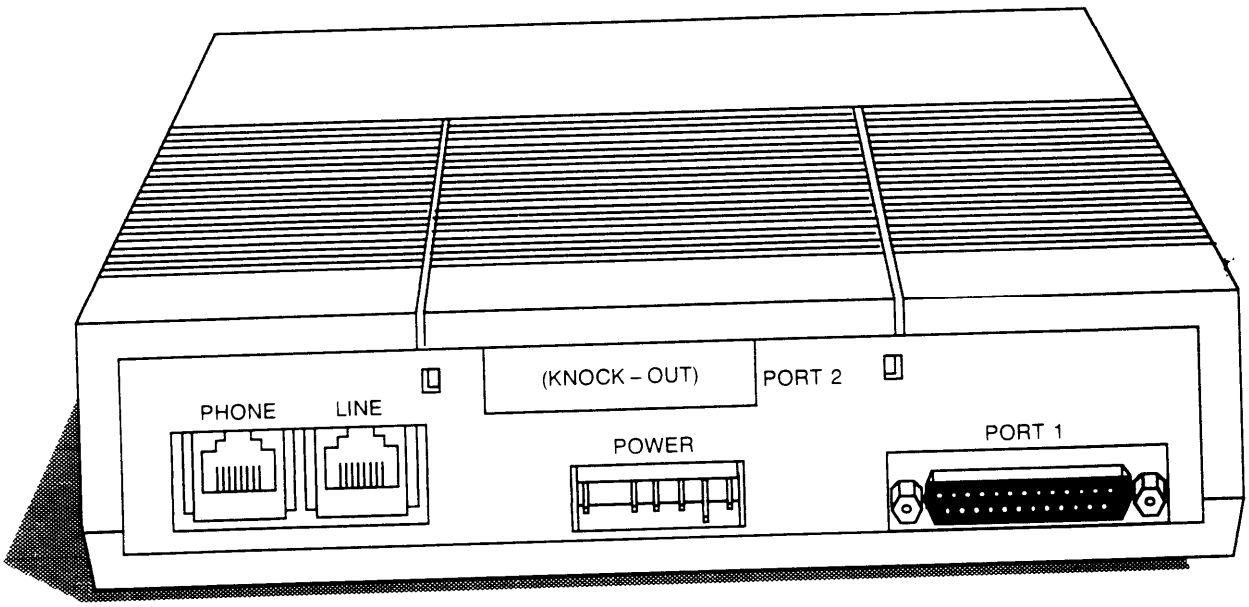


Figure 4: Rear Panel of the 7500

The rear panel has the following features:

- **Line Jack** — Used to connect the 7500 to the ISDN telephone network.
- **Phone Jack** — If your system supports multiple ISDN terminals on the same telephone line (see your systems administrator), you can use this phone jack to connect a second ISDN terminal.
- **Power Connector —** Used to connect the 7500 to its DC power supply. The power supply is connected in turn to the standard AC power.
- **Communications Ports 1 and 2** — Port 1 is used to connect the 7500 to a data terminal, computer, or modem. Depending upon which enhancement board is installed, Port 2 can be used to connect a second data terminal, an automatic calling equipment (RS-366 interface), or a data terminal equipment with a V.35 interface.

7500 Configurations and Features

Using the available hardware and software options, you can configure your 7500 as:

- Asynchronous DCE,
- Asynchronous DTE, or
- Synchronous DCE.

The procedures for changing the configuration are described in **CHAPTER 8: INSTALLING THE 7500.**

This manual is arranged in sections that reflect the operational differences in the configurations of the 7500. In all configurations, you may operate the 7500 using the buttons and display on its front panel. The front panel menu system is the first method of operation described.

If your 7500 is configured as an asynchronous DCE, and it is attached to a data terminal or personal computer, you will probably want to operate it from the keyboard of your attached terminal. This method of operation is described in **CHAPTER 5: ASYNCHRONOUS DCE CONFIGURATION.**

If your 7500 is configured as an asynchronous DTE used in a modem pool, refer to **CHAPTER 6: ASYNCHRONOUS DTE CONFIGURATION** to learn more about modem pooling operation. The primary mode of accessing asynchronous DTE features is through the front panel of the 7500.

The capabilities of the synchronous DCE configuration are accessed exclusively through the front panel of the 7500 (See **CHAPTER 7: SYNCHRONOUS DCE CONFIGURATION).**

A brief outline of the capabilities of the different configurations follows.

Features Common to All Configurations

The following operations can be controlled with buttons and display on the 7500:

- Data option settings
- Self-test, local, and remote loopback tests, EIA lead status
- Program ID
- Contrast adjustment.

Asynchronous DCE Features

- EIA-232D interface.
- Packet and circuit switched data communications.
- Data options can be changed and data calls can be setup via commands from the EIA-232D interface. These commands can be typed from the keyboard of an attached terminal or generated from a computer.
- Ability to change options without dropping a data call.
- Automatic or manual answering of incoming data calls.
- Data rates of 0.3, 1.2, 2.4, 4.8, 9.6, and 19.2 kilobits per second (kbps).
- Asynchronous full-duplex operation.

- One of the following two optional enhancements:
  - — RS-366 Automatic Calling Unit (ACU) interface.
  - — Second asynchronous EIA-232D interface. (Two D-channel packet data calls — or one D-channel packet call and one B-channel circuit call — can operate simultaneously. Two B-channel circuit switched calls, however, cannot operate simultaneously.)

Asynchronous DTE (Modem Pooling) Features

- EIA-232D interface.
- Packet or circuit switched data communications.
- Data rates of up to 19.2 kilobits per second (kbps).
- Asynchronous full-duplex operation.
- Automatic answering of incoming data calls.
- Data options set via the analog-side data terminal keyboard on a call by call basis.
- 5ESS® switch modem pooling feature support.

Synchronous DCE Features

The synchronous DCE features with the Multipurpose Enhancement Board are as follows:

- EIA-232D interface.
- Circuit switched or nailed-up data communication.
- Data rates of 1.2, 2.4, 4.8, 9.6, 19.2, 56 or 64 kilobits per second (kbps).
- Full-duplex operation at all the above speeds.
- Synchronous half-duplex emulation at 1.2 to 56 kbps.
- Automatic answering of incoming data calls.
- RS-366 Automatic Calling Unit (ACU) interface.
- Autodial.

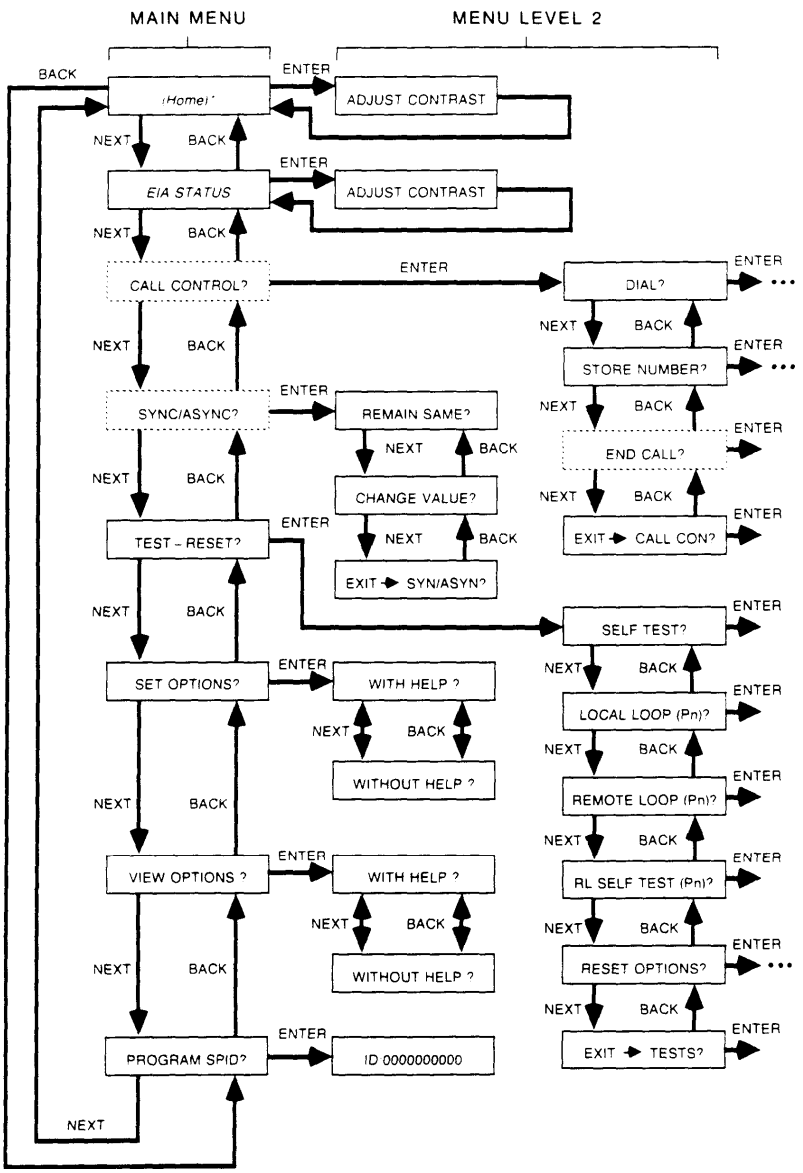
The synchronous DCE features with the High Speed Synchronous Enhancement Board are as follows:

- V.35 interface.
- Circuit switched or nailed-up data communication.
- Data rates of 48, 56 or 64 kilobits per second (kbps).
- Full-duplex operation at all the above speeds.
- Synchronous half-duplex emulation at 56 kbps only.
- Automatic answering of incoming data calls.
- Autodial.

CHAPTER 3: FRONT PANEL FEATURE ACCESS

Introduction

The 7500 has a structured menu that you can use to exercise its features as shown in Figure 5.



Note: The Call Control items appear only in synchronous circuit switched configurations. The Sync/Async items appear only in configurations supporting both modes.

* *(Home)* in this figure refers to one of the messages described in Table A.

Figure 5: 7500 Menu Map

The menu is displayed, one item at a time, on the 16-character display on the front of the unit. You can scroll through the menu using the [NEXT/NO] and [BACK] buttons. You can select the item by using the [ENTER/YES] button.

If you are using the 7500 as asynchronous DCE, you can do many of the same functions using the keyboard of your data terminal. The keyboard procedures are described in **CHAPTER 5** of this manual.

The menu consists of several menu levels that are described in this section. The main menu provides access to the categories of actions available on the 7500. The first item in the main menu is the *(Home)* display. Selections on the second and third level initiate actions such as changing options, performing tests, and placing calls (see Figure 5).

Main Menu

The *(Home)* display is the first item in the main menu level. The purpose of the *(Home)* display is to provide you with certain basic information about the current activity and configuration of the 7500.

Almost always, you can return to the *(Home)* display by pressing [NEXT/NO] and [BACK] at the same time. The 7500 will return to the *(Home)* display automatically if no buttons are pressed for 10 minutes (unless the 7500 is showing the Data Communications Port EIA Lead Status Display).

How the Buttons Work

- Press [NEXT/NO] to move forward through the menu or to answer “NO” to a question on the display.
- Press [BACK] to move backward through the current menu.
- Press [ENTER/YES] to select a menu item or to answer "YES" to a question on the display.
- Press [NEXT/NO] and [BACK] together to return to the *(Home)* display.

Adjusting Display Legibility

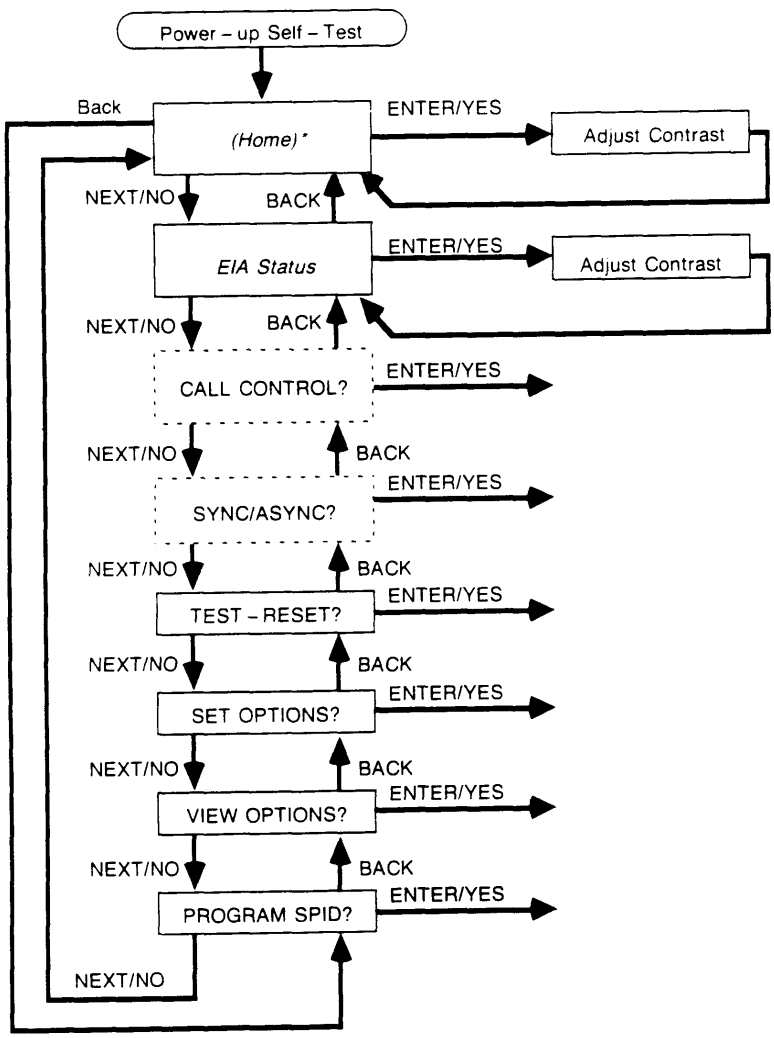
You can adjust the contrast of the display whenever the display is showing the *(Home)* or EIA Lead Status Display. These are the first two items in the main menu. To return to the *(Home)* display from anywhere in the menu system (except when you are setting options), press [NEXT/NO] and [BACK] at the same time.

The display offers eight levels of contrast. To increase the contrast (darken the display), press [ENTER/YES] for each change desired. When you reach the darkest point, the contrast will wrap around to the lightest point and then begin to darken again.

Main Menu Items

The main menu consists of from six to eight items depending upon the hardware configuration (see Figure 6):

1. *(Home)* Display
2. Data Communications Port 1 or Port 1 and 2 EIA Lead Status
3. Call Control (Synchronous Circuit Switched Modes only)
4. Synchronous / Asynchronous Setup (Synchronous Multipurpose Enhancement Board option only)
5. Test-Reset
6. Option Setting
7. Option Viewing
8. Service Profile Identifier (SPID) programming



* *(Home)* in this figure refers to one of the messages described in Table A.

Figure 6: Main Menu Items

The Home Display

The 7500 displays call status and configuration information whenever it is not involved in setting up or ending a call, and its display is not being used to select other actions. The *(Home)* display shows the fundamental configuration of the 7500 which depends on what hardware and software options are selected. The 7500's hardware options are described in detail in the **REFERENCE** chapter.

The *(Home)* display also provides the overall status of the unit, indicated by one of the following 12 terms (see Table A):

1. **[TEST]** means that a local loopback test, remote loopback test, or remote loopback self-test is in progress.
2. **[DOWN]** means that no link exists between the 7500 and the network. This may mean that the cords are disconnected, or that there is a loss of communication between the 7500 and the network. If this message appears, you should contact your system administrator.
3. **[NAIL]** means that data is permanently being transferred to or from a B-channel without use of signaling either to or from the network. The network must be administered properly for the data path to be established.
4. **[PVC]** means that a packet switched permanent virtual circuit (PVC) has been established.
5. **[ORIG]** means that a data call has been dialed but not yet connected. If this status persists, contact your system administrator.
6. **[DISC]** means a dialed call is being disconnected. If this status persists, contact your system administrator.
7. **[RING]** means that there is an incoming call but the 7500 is not answering.
8. **[DATA]** means that a dialed-up call is in progress.
9. **[PERM]** means the network has established a permanent circuit switched call.
10. **[OOS]** (Out of Service) means that the network has temporarily placed the 7500 in a maintenance mode.
11. **[RSTD]** (Restricted Service) means that there is no data call in progress and your 7500 has been programmed with an incorrect SPID. You will receive this indication of incorrect SPID only if you have subscribed to restricted service.
12. **[IDLE]** means that there is no data call in progress.

In some cases, it may be possible for more than one of these conditions to occur at the same time. For example, you could perform a remote loopback test while you have a data call in progress. In the cases where more than one state at a time could occur, the 7500 will display the most important or unusual information. The order of priority of the messages is TEST, DOWN, NAIL, PVC, ORIG, DISC, RING, DATA, PERM, OOS, RSTD, and IDLE. In the example given above, the word TEST would appear on the display.

Table A: *(Home)* Display Terms shows the messages that could appear on your *(Home)* display. Where the word "status" appears in the table, one of the 12 status terms defined above will appear on the display.

Table A: *Home* Display Terms

Home **DISPLAY**	**HARDWARE CONFIGURATION**	
	DCE/DTE Flipboard Position	**Enhancement Board**
Async DCE "Status" ** P1 "Status" P2 "Status"**	DCE DCE DCE	None Multipurpose (Async) Second Async
Async DTE "Status" **	DTE	None
Sync DCE "Status" **	DCE DCE	Multipurpose (Sync) High Speed Sync
Reverse DCE/DTE! †	DTE DTE DTE DTE	Multipurpose (Async) Multipurpose (Sync) High Speed Sync Second Async
Missing DCE/DTE!	None	Any

** One of the 12 status terms described on the previous page will appear on the display where you now see the "Status" variables.

† This configuration is not supported. Thus the 7500 display directs you to reverse the DCE/DTE flipboard (see **CHAPTER 8**).

An example of a display message using a status term is:

[ASYNC DCE DATA]

indicating that the 7500 is configured as asynchronous data communications equipment and a data call is in progress.

EIA Data Communication Port Status Display

The EIA Data Communication Port Status display shows the state of critical EIA-232D leads listed below:

- Data Terminal Ready (DTR)
- Data Set Ready (DSR)
- Data Carrier Detect (DCD)
- Request to Send (RTS)
- Clear to Send (CTS)
- Transmit Data (TD)
- Receive Data (RD).

Press [NEXT/NO] from the *(Home)* display to display EIA Port Status. The EIA port status is the second item in the main menu.

The display on the 7500 will look something like the EIA Status display that is depicted in Figure 7. The abbreviated names of the leads appear above the display.

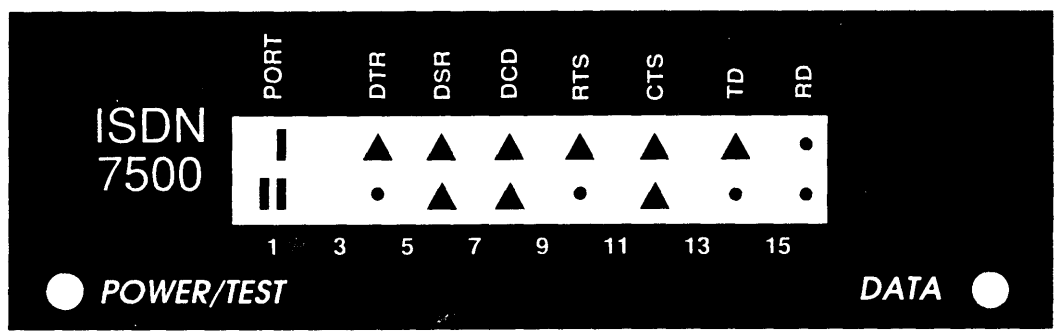


Figure 7: Typical EIA Status Display (Dual Port Async DCE Configuration)

The first display position, the Port ID position, indicates Port 1 status on the top half of the display and Port 2 status on the bottom half. Port 1 is the main port; Port 2 is the port on the optional Second Asynchronous Interface board. If you have only one port, the lower half of the display is left blank.

The DTR through CTS positions display the status of the EIA control leads DTR (Pin 20), DSR (Pin 6), DCD (Pin 8), RTS (Pin 4), and CTS (Pin 5). The display shows a triangle symbol when the lead is On, and a dot (.) when the lead is Off or not connected.

The TD and RD positions display the status of the EIA data leads TD (Transmit Data, Pin 2), and RD (Receive Data, Pin 3). The display shows a triangle symbol when asynchronous data is being transmitted or received. When asynchronous data is not being transmitted or received, the display shows a dot.

Synchronous Call Control Menu

Introduction

The Call Control menu is used only for synchronous circuit switched data calls. The system bypasses this function entirely if the 7500 is not configured for synchronous circuit switched data operation. To make data calls when the 7500 operates as asynchronous DCE, you must use the procedure described in **CHAPTER 5: ASYNCHRONOUS DCE CONFIGURATION.**

The Call Control menu can include the following items:

- Dial? — Dial a stored or unstored number.
- Store Number? — Store up to three 15-digit numbers.
- End Call? — End an active data call.

When dialing and storing numbers only digits **0-9, *, #,** and **P** (for pause) may be entered in a dialing string.

The display returns to the *(Home)* display after a data call is dialed or ended.

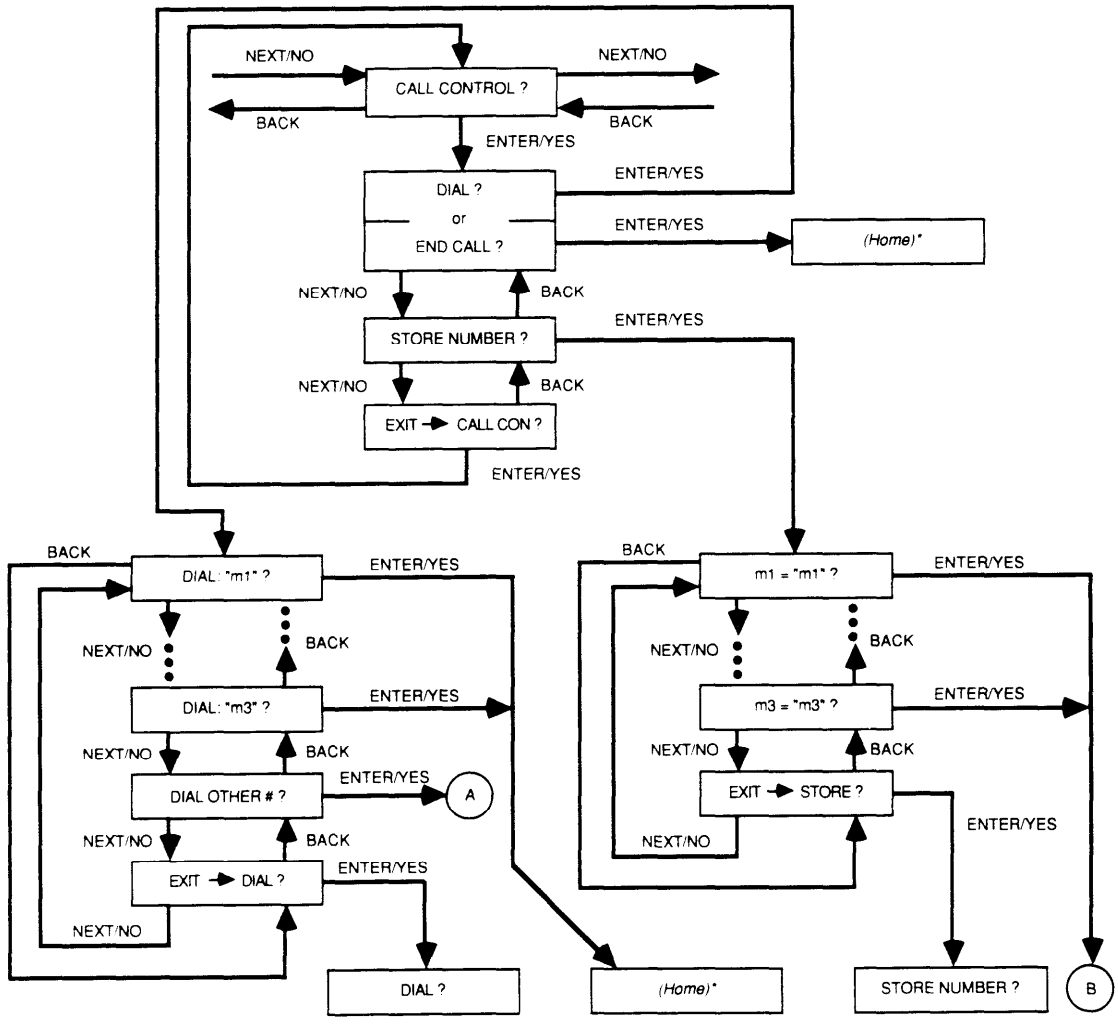
When you enter the Call Control menu, the choices you will be given depend on the current status of your 7500. If you have no call in progress, your choices will be to dial a number or to store a number. If you have a call in progress, your choices will be to end the call or store a number. Figure 8 shows the Call Control options. The following paragraphs outline the steps you will use to place and end calls and to store memory numbers.

Placing and Ending Synchronous Data Calls

As Figure 8 indicates, **[DIAL?]** is one of the items in the Call Control menu. Once you select **[DIAL?],** you must then indicate the number you want to dial. You can select either:

- A number previously stored in memory, or
- A number that has not been stored.

The following paragraphs describe these menu choices.



(A) — refers to instructions to Dial an Unstored Number.

(B) — refers to instructions to Store Numbers in Memory.

* *(Home)* in this figure refers to one of the messages described in Table A.

Figure 8: Synchronous Call Control Menu

All procedures outlined below begin from the *(Home)* display. If you are not at the (Home) display, press [NEXT/NO] and [BACK] together to return *(Home).*

To Dial an Unstored Number

In this example, the number to be dialed is **5551212.** (You can input up to 40 digits in this string.)

1. Starting from your *(Home)* display, press [NEXT/NO] two times.	**[CALL CONTROL ?]** displayed.
2. Press [ENTER/YES].	**[DIAL ?]** displayed.
3. Press [ENTER/YES] and then press [NEXT/NO] until the display shows **[DIAL OTHER # ?].**	**[DIAL OTHER # ?]** displayed.
4. Press [ENTER/YES].	**[DIAL:]** displayed.
5. Press [NEXT/NO] or [BACK] until the correct digit is displayed and then press [ENTER/YES]. Digits, ***, #, E, P,** and blank can be entered. See NOTE on the bottom of the page.	Correct digit entered and displayed; for example: **[DIAL:5]** (Note: once a digit is entered the cursor (_) moves one position to the right.)
6. Repeat Step 5 for each digit in the number.	For example: **[DIAL:5551212]**
7. After all digits have been entered press [NEXT/NO] or [BACK] until E (for end) is displayed. Press [ENTER/YES] and the call will be dialed. OR If you want to cancel the call, press [NEXT/NO] and [BACK] together to return to the *(Home)* display.	For example: **[DIAL:5551212E]** Note: for a null number, no digits are entered.

NOTE

P inserts a pause that is required for accessing special features. In most instances, however, pauses are not needed.

To Correct an Error

If while dialing or storing a number you make an error, press [NEXT/NO] or [BACK] until a blank appears; then press [ENTER/YES]. This places the cursor back in the first position of the display. Then press [ENTER/YES] until the cursor is under the erroneous digit. Press [NEXT/NO] or [BACK] until the correct digit appears; then press [ENTER/YES].

To Store Numbers in Memory

[STORE NUMBER?] is an item in the Call Control menu. The 7500 allows you to store up to three 15-digit telephone numbers (labeled m1, m2, and m3).

When you first enter the **[Store Number?]** menu, the system displays **[M1:]** and the stored number, if any. Press [NEXT/NO] to see m2, m3, and Exit. If the number is longer than 13 digits, the label (m1, m2, or m3) will not be displayed. Press [ENTER/YES] to move to the next position.

The procedure for entering numbers to be stored is similar to dialing an unstored number. To enter (or change) a number, press [NEXT/NO] or [BACK] until the correct digit appears; press [ENTER/YES], then continue this process until all digits are entered. The final selection should be **E** for exit.

To cancel the procedure at any point, press [NEXT/NO] and [BACK] to return *(Home).*

To Dial a Stored Number

In this example, the first number that has been stored (5551212) is dialed.

1. Starting from your *(Home)* display, press [NEXT/NO] two times.	**[CALL CONTROL ?]** displayed.
2. Press [ENTER/YES].	**[DIAL ?]** displayed.
3. Press [ENTER/YES] to display the first stored number.	**[DIAL:5551212?]** displayed.
4. To dial this number, press [ENTER/YES] again,	This number is dialed,
OR	OR
press [NEXT/NO] until the desired stored number is displayed and then press [ENTER/YES].	displayed number is dialed. Then the display returns to *(Home).*

To End a Data Call

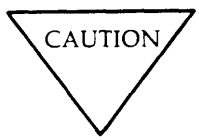
The 7500 displays **[END CALL ?]** (in the Call Control Menu) only when you have a call in progress. The following steps show how to end a data call from the front panel of the 7500.

1. Starting from the *(Home)* display, press [NEXT/NO] two times.	**[CALL CONTOL ?]** displayed.
2. Press [ENTER/YES].	**[END CALL ?]** displayed.
3. Press [ENTER/YES].	The call is ended and the *(Home)* display is shown.

Synchronous/Asynchronous Menu

Introduction

The Synchronous/Asynchronous (Sync/Async) menu appears only when the 7500 is configured with a Multipurpose Enhancement Board. The system bypasses this menu when the Multipurpose Enhancement Board is not installed. The Sync/Async menu is used to change the operation of the 7500 from synchronous to asynchronous and back again. What appears on the display depends on how the option is currently set. The choices will be to Remain at the current value or to Change to the other value. If you get into this menu by accident, press [NEXT/NO] until Exit appears on the display or press [NEXT/NO] and [BACK] at the same time to return *(Home).*



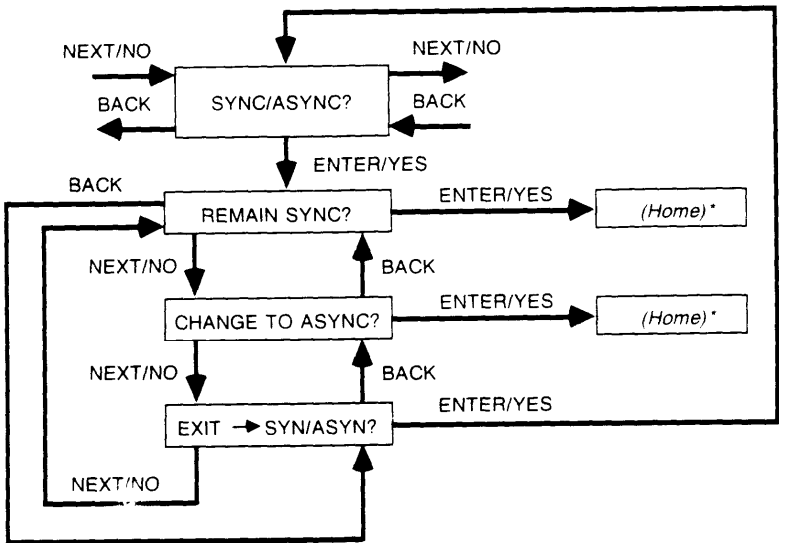
Changing from synchronous to asynchronous or vice versa will cause all stored and active options to be reset to their factory values. In addition, all stored numbers will be lost. Before making such a change, make sure this is what you really want to do.

The procedure outlined below is from the *(Home)* display. If you are not at the *(Home)* display, press [NEXT/NO] and [BACK] together to return to the *(Home)* display.

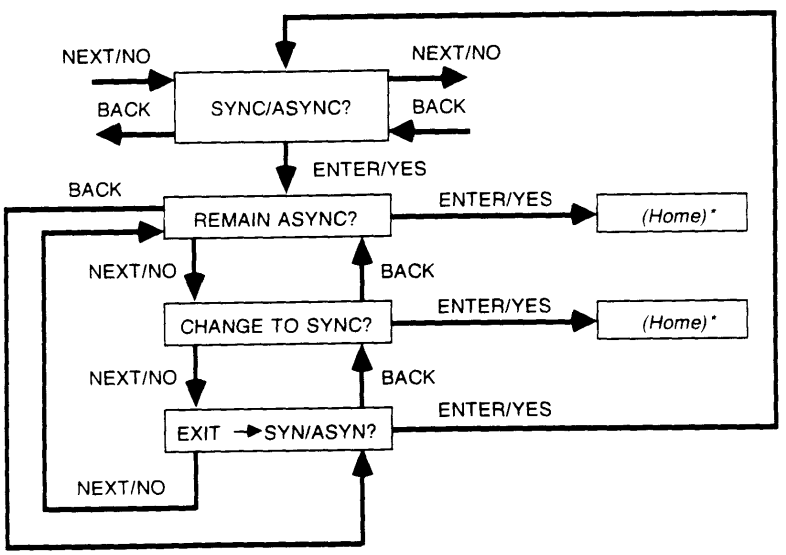
1. Starting from the *(Home)* display, press [NEXT/NO] three times.	**[SYNC/ASYNC?]** is displayed.
2. Press [ENTER/YES].	**[REMAIN ASYNC?]** appears on the display if you are currently set up for asynchronous operation; **[REMAIN SYNC?]** appears if you are currently set up for synchronous operation.
3. Press [NEXT/NO].	**[CHANGE TO SYNC?]** or **[CHANGE TO ASYNC?]** will appear on the display as appropriate.
4. Press [ENTER/YES].	**[EIA MODE CHANGED]** **[SELFTEST PASSED]** **[AT&T ISDN 7500]** **[FP2.X(X.X)]** is displayed. The change is made and the system returns to the *(Home)* display.

Figure 9 shows in diagram form what is displayed when changing from synchronous to asynchronous and vice versa.

CHANGING FROM SYNC TO ASYNC



CHANGING FROM ASYNC TO SYNC



* *(Home)* in this figure refers to one of the messages described in Table A.

Figure 9: Synchronous / Asynchronous Menu

Test-Reset Menu

Introduction

The Test-Reset menu is used to run any of the following four tests or to reset the options to their factory values:

- Self-test
- Local loopback test for Port 1 (and for Port 2 if installed)
- Remote loopback test for Port 1 (and for Port 2 if installed)
- Remote loopback self-test (asynchronous only) for Port 1 (and for Port 2 if installed)

Figure 10 shows the Test-Reset menu layout.

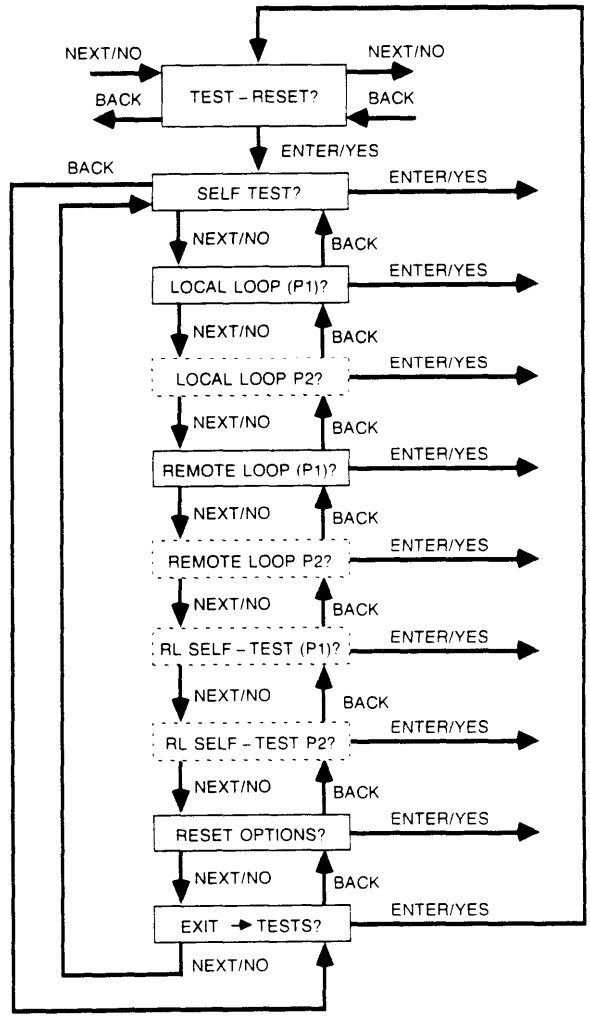


Figure 10: Test-Reset Menu

Self-Test

Self-test checks the functionality of the 7500's hardware and software.

To Run Self-Test

1. Starting from the *(Home)* display, press [NEXT/NO] until **[TEST-REST?]** is displayed.	**[TEST-RESET?]** is displayed.
2. Press [ENTER/YES] to select **[TEST-RESET?].**	**[SELFTEST?]** is displayed.
3. Press [ENTER/YES] to run the test.	If the test passes, the display shows **[SELFTEST PASSED]** alternating with **[END SELFTEST?]** If failed, the display shows **[SELFTEST FAILED]**
4. Press [ENTER/YES] to end the self-test.	Display returns to *(Home).*

NOTE If the self-test fails repeatedly, call your system administrator.

Local Loopback Test

The purpose of the local loopback test is to ensure that there are no data transmission errors in the local part of the data transfer circuit (between the data terminal and the 7500). When the local loopback test is initiated, data travels from the data teminal to the 7500, where it is looped back to the data terminal. You can do local loopback tests when the set is idle or when it is engaged in a data call.

To Run Local Loopback Test

1. Starting from your *(Home)* display, press [NEXT/NO] until **[TEST-RESET?]** is displayed.	**[TEST-RESET?]** is displayed.
2. Press [ENTER/YES], and then press [NEXT/NO] until **[LOCAL LOOP?]** is displayed or until the correct Local Loop test is displayed if you have a dual port configuration.	**[LOCAL LOOP?]** is displayed or **[LOCAL LOOP P1?]** or **[LOCAL LOOP P2?]** is displayed (dual port configuration).
3. Press [ENTER/YES]. Type characters on an attached terminal or have your computer generate test data and perform the test.	**[END LOC LOOP?]** is displayed.
4. Press [ENTER/YES] to end the test.	The display returns to *(Home).*

Remote Loopback Test

The remote loopback test ensures that no problems with data transmission are occurring in the data transfer circuit. When you initiate a remote loopback test, data is transmitted from the data terminal, through your 7500 and the network to the data module at the far-end, where it is looped back to your 7500.

To Run Remote Loopback Test

These instructions apply to all configurations **except** 48, 56, and 64 kbps synchronous (which is covered in the next section). To perform this test, you must have established a data call before you initiate the test. Attempting to run a Remote Loopback test without a data call will return you to the *(Home)* display.

1. Starting from your *(Home)* display, press [NEXT/NO] until **[TEST-RESET?]** is displayed.	**[TEST-RESET?]** is displayed.
2. Press [ENTER/YES], and then press [NEXT/NO] until **[REMOTE LOOP?]** is displayed or until the correct Remote Loop test is displayed if you have a dual port configuration.	**[REMOTE LOOP?]** is displayed or **[REMOTE LOOP P1?]** or **[REMOTE LOOP P2?]** is displayed (dual port configuration).

3. Press [ENTER/YES]. Type characters on an attached terminal or have your computer generate test data and perform the test.	**[END REM LOOP?]** is displayed.
4. Press [ENTER/YES] to end the test.	The display returns to *(Home).*

To Run Remote Loopback Test for High Speed Synchronous Configurations

These instructions apply to 48, 56, and 64 kbps synchronous. To perform this test, you must start the test before making the call. Once you have selected Remote Loopback, the 7500 will prompt you with the Dial menu.

1. Starting from the *(Home)* display, press [NEXT/NO] until **[TEST-RESET?]** is displayed.	**[TEST-RESET?]** is displayed.
2. Press [ENTER/YES], and then press [NEXT/NO] until the correct Remote Loop test is displayed.	**[REMOTE LOOP?]** is displayed.
3. Press [ENTER/YES].	For example, **[DIAL: 5551212 ?]** is displayed.
4. Press [ENTER/YES] to place a call to m1, or press [NEXT/NO] until the desired number or **[DIAL OTHER # ?]** is displayed. Press [ENTER/YES] to dial a stored numbered or specify a number to be dialed (see previous section, **Synchronous Call Control Menu).**	The call is established. The display returns to *HOME.*
5. Send data from the attached terminal or computer.	**[SYNC DCE TEST]** is displayed.
6. To end the test, press [NEXT/NO] until **[CALL CONTROL?]** is displayed	**[CALL CONTROL?]** is displayed
7. Then press [ENTER/YES].	**[END CALL?]** is displayed
8. Press [ENTER/YES] again.	The display returns to *HOME.*

Remote Loopback Self-Test (Asynchronous Only)

To Run Remote Loopback Self-Test (Asynchronous Only)

This remote loopback test has an internal data generator/checker. To perform this test, you must have established a data call before you initiate the test. Attempting to run a Remote Loopback Self-Test without a data call will return you to the *(Home)* display.

1. Starting from the *(Home)* display, press [NEXT/NO] until **[TEST-RESET?]** is displayed.	**[TEST-RESET?]** is displayed.
2. Press [ENTER/YES], and then press [NEXT/NO] until **[RL SELFTEST?]** is displayed or until the correct Remote Loop Selftest is displayed if you have a dual port configuration.	**[AL SELFTEST?]** is displayed or **[AL SELFTEST P1?]** or **[AL SELFTEST P2?]** is displayed (dual port configuration).
3. Press [ENTER/YES] to run the test.	If the test passes, the display shows **[TEST PASSED]** alternating with **[END SELFTEST?].** If test fails, the display shows **[TEST FAILED]** alternating with **[END SELFTEST?].**
4. Press [ENTER/YES] to end the test.	The display returns to *(Home).*

Resetting Options

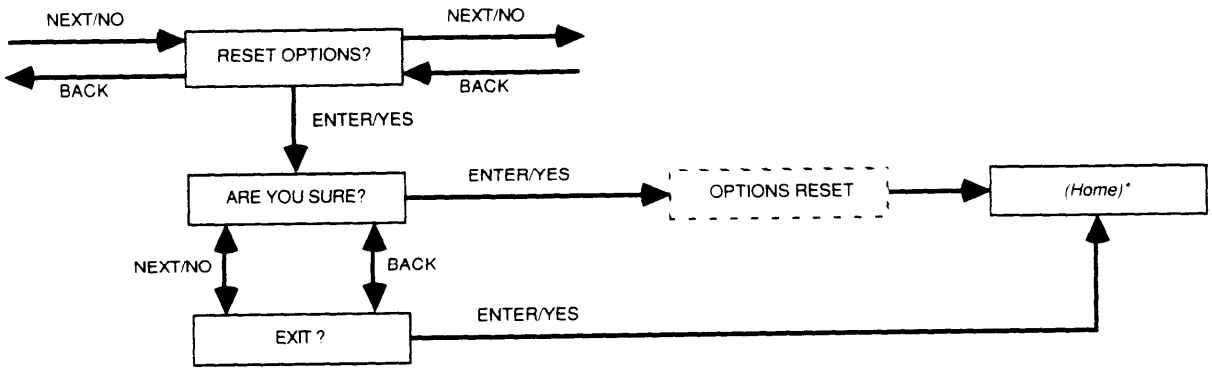
Single Port Configuration

The Reset Options menu allows you to reset all data options to the values set in the factory before the unit was shipped. See **CHAPTER 4** for the factory option settings.

1. Press [NEXT/NO] from the *(Home)* display until **[TEST-RESET?]** is displayed.	**[TEST-RESET?]** is displayed.
2. Press [ENTER/YES], and then press [NEXT/NO] until **[RESET OPTIONS?]** is displayed.	**[RESET OPTIONS?]** is displayed.
3. Press [ENTER/YES].	**[ARE YOU SURE?]** is displayed.

4. Press [ENTER/YES] to reset all options to their factory values	**[OPTIONS RESET]** is displayed briefly followed by the *(Home)* display.
OR	
press [NEXT/NO]. Press [ENTER/YES] to exit the Reset Options menu.	**[EXIT?]** is displayed. The display returns to *(Home)*.

Figures 11 and 12 show Reset Options menu layout.



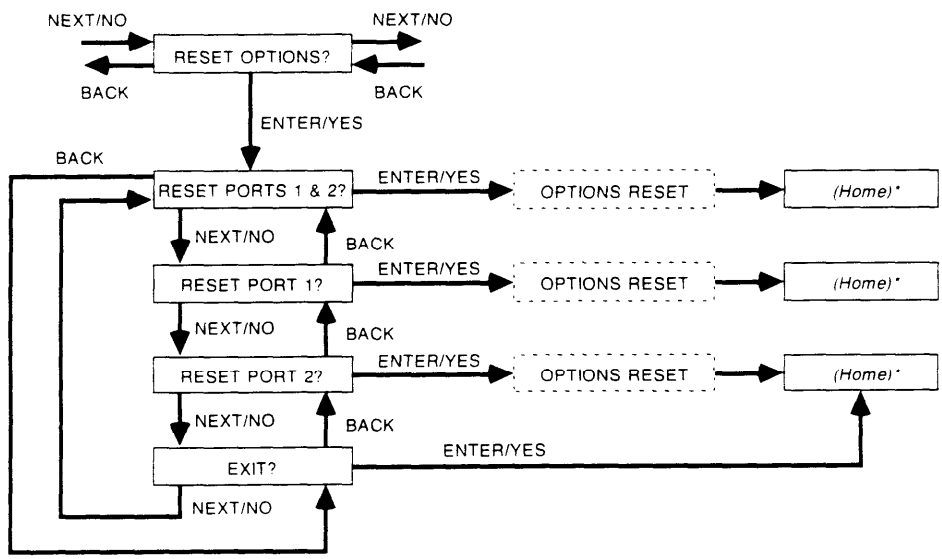
* *(Home)* in this figure refers to one of the messages described in Table A.

Figure 11: Reset Options Menu, Single Port Configuration

Dual Port Configuration

The procedure below describes how to reset options to their factory values when the Second Asynchronous Enhancement Board is installed.

1. Press [NEXT/NO] from the *(Home)* display until **[TEST-RESET?]** displayed.	**[TEST-RESET?]** is displayed.
2. Press [ENTER/YES], and then press [NEXT/NO] until **[RESET OPTIONS?]** is displayed.	**[RESET OPTIONS?]** is displayed.
3. Press [ENTER/YES].	**[RESET PORTS 1 AND 2?]** is displayed.
4. Press [ENTER/YES] to reset both ports' options OR	**[OPTIONS RESET]** is displayed briefly followed by the *(Home)* display.
press [NEXT/NO] to display **[RESET PORT 1?].** Press [ENTER/YES] to reset port 1's options. (Press [NEXT/NO] when **[RESET PORT 1?]** is displayed to display **[RESET PORT 2?].** Press [ENTER/YES] to reset port 2's options.)	**[RESET PORT 1?]** is displayed. **[OPTIONS RESET]** is briefly displayed followed by the *(Home)* display.



* *(Home)* in this figure refers to one of the messages described in Table A.

Figure 12: Reset Options Menu, Dual Port Configuration

Setting Options

Introduction

This section describes how to set your data options from the front panel of the 7500. There are two menu systems for setting your options (see Figure 13).

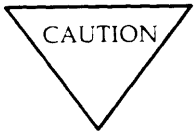
- The With Help Menu
- The Without Help Menu

Both menu systems provide the identical option setting functionality, but one system will be more useful than the other depending upon your particular needs.

The With Help menu displays each option name in alphabetical order with its current value and alternative values. In general, this is the preferred menu for setting options through the front panel of your 7500.

The Without Help menu displays each option's value as a number in a separate position on the display. Figure 17 shows each position of the display and its corresponding option. (There are index numbers below the display to help you identify the display positions.) Table D translates all the option settings into their numerical equivalents. This menu system is a compact method of setting options useful for quickly programming many 7500s identically. For example, use the With Help menu, described first, to program one 7500. Then, use the Without Help menu to record on paper the numeric values of the options you have set. Finally, use the Without Help menu to program the remaining 7500s accordingly.

If your 7500 is set up as asynchronous DCE, you may use the keyboard of an attached data terminal to set the option values. The procedure to set the option values from an attached data terminal is described in **CHAPTER 5: ASYNCHRONOUS DCE CONFIGURATION.** If your 7500 is set up as an asynchronous DTE, you should refer to **CHAPTER 6: ASYNCHRONOUS DTE CONFIGURATION.** You can find definitions of the options in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.**



To change options, use either the front panel or the attached data terminal. Do not attempt to use both simultaneously, because unpredictable option settings may result.

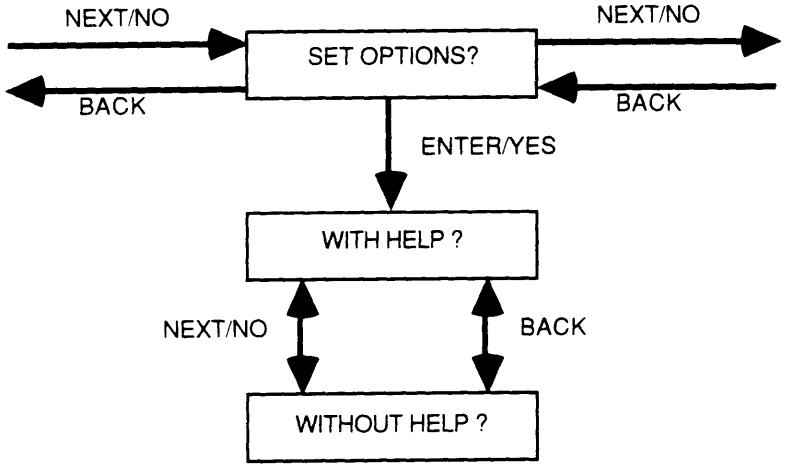


Figure 13: With and Without Help Menus

Setting Options With Help Menu

Figure 14 shows the operation of the Set Options With Help menu. The option and its value are separated by an equals sign (=) when the display shows the current value; the option and its value are separated by a right arrow (→) when it shows a possible alternative value. In both cases, a question mark is displayed after the value itself to indicate that you must make a choice.

Below we describe the front-panel operation for selecting which ports' options to set using the Asynchronous DCE configuration. If you do not have a second asynchronous board installed skip this section and proceed to the next section **(Setting Options With Help Menu Using Attention as an Example).**

If you have a second asynchronous board installed:

1. Press [NEXT/NO] from the *(Home)* display until **[SET OPTIONS?]** is displayed.	**[SET OPTIONS]** is displayed.
2. Press [ENTER/YES].	**[WITH HELP ?]** is displayed.
3. Press [ENTER/YES].	**[BOTH PORTS 1 AND 2?]** is displayed.
4. Press [ENTER/YES] to set both ports' options	The first option is displayed. (For example, **[SET ANSWER?])**
OR	
press [NEXT/NO] to display **[PORT 1 OPTIONS?].** Press [ENTER/YES] to set options on port 1 only. (Press [NEXT/NO] when **[PORT 1 OPTIONS?]** is displayed to display **[PORT 2 OPTIONS?].** Press [ENTER/YES] to set options on port 2 only.)	**[PORT 1 OPTIONS?]** is displayed. The first option is displayed. (For example, **[SET ANSWER?])**

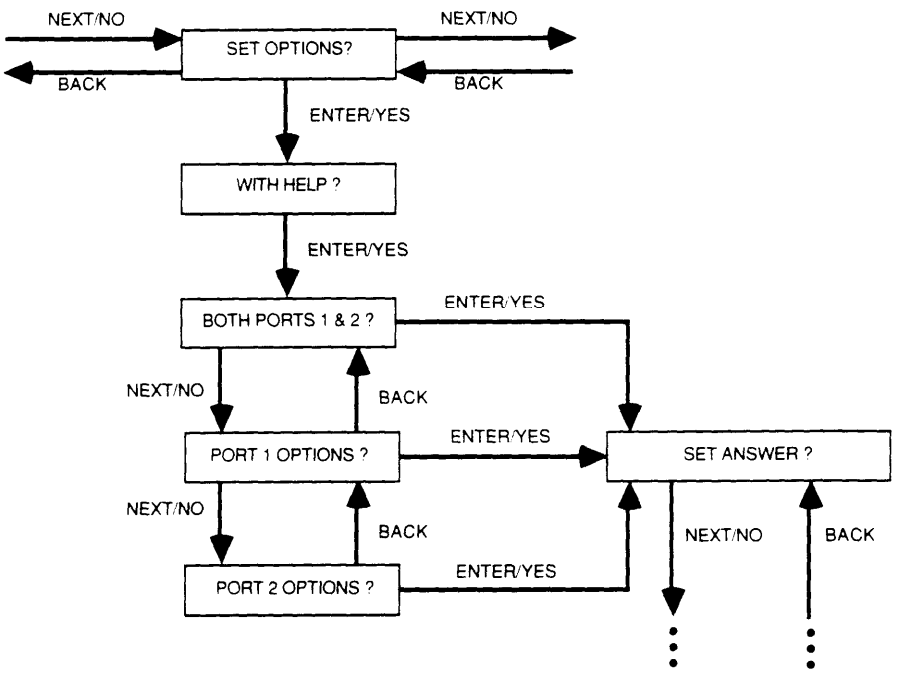
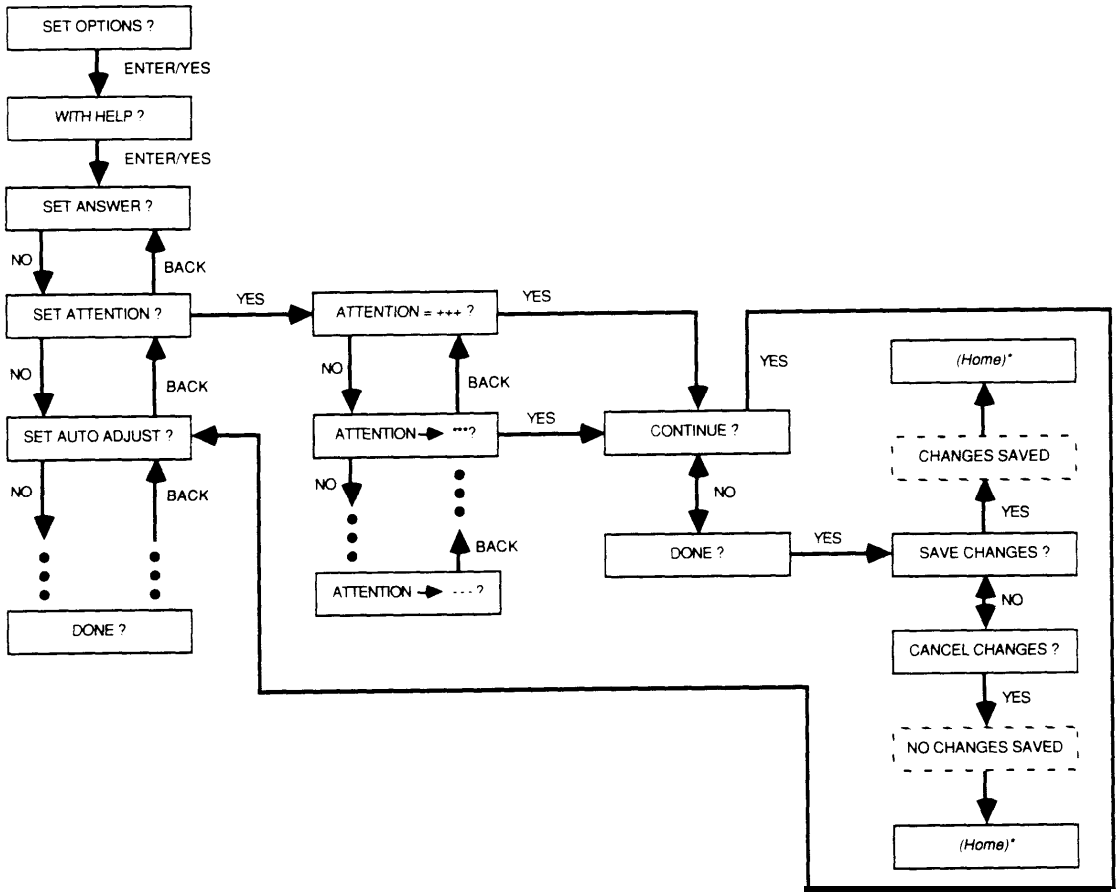


Figure 14: Set Options, With Help Menu, Dual Port Configuration

Setting Options With Help Menu — Using Attention as Example

Figure 15 shows how to set one option via the With Help Menu, using the Attention option as an example.

1. Press [NEXT/NO] from the *(Home)* display until **[SET OPTIONS?]** is displayed.	**[SET OPTIONS?]** is displayed.
2. Press [ENTER/YES].	**[WITH HELP?]** is displayed.
3. Press [ENTER/YES].	The first option is displayed. As in Figure 15, **[SET ANSWER?]**
4. Press [NEXT/NO] to move to the next option.	**[SET ATTENTION?]** is displayed.
5. Press [ENTER/YES] to select the Attention option.	**[ATTENTION = +++?]** is displayed. (+++ is the current value)
6. Press [NEXT/NO] to move to the next alternative value.	**[ATTENTION ➡ ***?]** is displayed. (*** is one alternative value.)
7. Press [ENTER/YES] to select *** as the new value.	**[CONTINUE?]** is displayed.
8. Press [NEXT/NO] to indicate that you are finished setting options. (To continue setting options, press [ENTER/YES] when **[CONTINUE?]** is displayed.)	**[DONE?]** is displayed.
9. Press [ENTER/YES].	**[SAVE CHANGES?]** is displayed.
10. Press [ENTER/YES] to save the change made to the Attention option	**[CHANGES SAVED]** is displayed briefly followed by the *(Home)* display.
OR	
press [NEXT/NO] followed by [ENTER/YES] to cancel the change made to the Attention option.	**[CANCEL CHANGES?]** **[NO CHANGES SAVED]** is displayed briefly followed by the *(Home)* display.



* *(Home)* in this figure refers to one of the messages described in Table A.

Figure 15: Setting an Option Via the With Help Menu, Using the Attention Option as an Example

Saving and Canceling Options, With Help

1. After making any changes you want, press [NEXT/NO] when **[CONTINUE?]** is displayed.	**[DONE?]** is displayed.
2. Press [ENTER/YES].	**[SAVE CHANGES]** is displayed.
3. To save the changes you made, press [ENTER/YES]	**[CHANGES SAVED]** is displayed briefly followed by the *(Home)* display.
OR	
To cancel the changes you made, press [NEXT/NO], and then press [ENTER/YES] when **[CANCEL CHANGES?]** is displayed.	**[CANCEL CHANGES?]** is displayed **[NO CHANGES SAVED]** is displayed briefly followed by the *(Home)* display.

NOTE

If you leave the unit before you finish making changes, after 10 minutes the system will automatically save any changes made.

Asynchronous and Synchronous Option Tables

The following tables list the options in the order they are presented in the menu, indicating the option name, how the option is displayed on the front panel, and its values. Table B lists asynchronous options; Table C lists synchronous options.

Table B: Asynchronous DCE and DTE Options, With Help

Option Name	Set Options Display	Abbreviated Options Name	Possible Values *
Answer (DCE only)	SET ANSWER?	ANSWER	**AUTO,** MANUAL
Attention (DCE)	SET ATTENTION?	ATTENTION	**+++,** ***, @@@, ###, --- ††
Attention (DTE)	SET ATTENTION?	ATTENTION	+++, ***, @@@, ###, **---** ††
Autoadjust	SET AUTOADJUST?	AUTOADJST	**ON,** OFF
Break	SET BREAK?	BRK	**BREAK,** OFF, ATTENTION, INTERRUPT, DISCARD, RESET
Busyout	SET BUSYOUT?	BUSYOUT	**OFF,** ON
Char.erase	SET CHAR ERASE?	CHARERASE	**BS,** OFF, DEL
DCD	SET DCD?	DCD	**IGNORE,** FOLLOW
DTR (DCE only)	SET DTR?	DTR	**IGNORE,** FOLLOW
Echo	SET ECHO?	ECHO	**OFF,** ON
Edit	SET EDIT?	EDIT	**OFF,** ON
Flow Control Parameter Negotiation	SET FCPN?	FCPN	**OFF,** ON
Forwarding	SET FORWARDING?	FORWARD	**OFF,** CR, CTRL
Idle.timer	SET IDLE TIMER?	IDLTIM	**OFF,** 0.05S, 0.10S, 0.20S, 1.00S, 5.00S, 12.75S ††
Line.erase	SET LINE ERASE?	LINERAS	**CTRLX,** CTRLU, OFF
Local Mode	SET LOCAL MODE?	LOCALMODE	**CMD,** OFF, AT

* Factory values are bolded.

†† Other values can be set from an attached data terminal keyboard or via the front panel's Without Help Menu.

Table B: Asynchronous DCE and DTE Options, With Help (Cont)

Option Name	Set Options Display	Abbreviated Options Name	Possible Values *
Match.speed (DCE) Match.speed (DTE)	SET MATCH SPEED? SET MATCH SPEED?	MATCHSPD MATCHSPD	**ON,** OFF ON, **OFF**
Min.timer	SET MIN TIMER?	MIN TIMER	**ON,** OFF
Mode	SET MODE?	MODE	**B2,** BA, DX
Parity	SET PARITY?	PARITY	**SPACE,** MARK, EVEN, ODD
Rec.Flow (DCE) Rec.Flow (DTE)	SET REC FLOW? SET REC FLOW?	RECFLOW RECFLOW	**XON,** OFF, EIA XON, **OFF,** EIA
Setup (DTE only)	SET SETUP?	SETUP	**1-SPEED,** 2-SPEED, 3-SPEED
Speed	SET SPEED?	SPEED	300, 1200, 2400, 4800, **9600,** 19200
Text	SET TEXT?	TEXT	**VERBAL,** OFF, DIAG
Trans.flow (DCE) Trans.flow (DTE)	SET TRANS FLOW? SET TRANS FLOW?	TRANSFLOW TRANSFLOW	**XON,** OFF, EIA XON, **OFF,** EIA
Zero Called Address (DTE only)	SET ZEROADDRESS?	ZCA	ON, **OFF**

* Factory values are bolded.

Table C: Synchronous DCE Options, With Help

Option Name	Set Options Display	Abbreviated Options Name	Possible Values
Autodial	SET AUTODIAL?	AUTODIAL	**OFF,** ON
Busyout	SET BUSYOUT?	BUSYOUT	**OFF,** ON
Data.rest	SET DATA REST?	DATAREST	OFF, **ON**
DTR	SET DTR?	DTR	**IGNORE,** FOLLOW
Duplex	SET DUPLEX?	DUPLEX	HALF, **FULL**
Mode	SET MODE?	MODE	**CS,** NAILB1, NAILB2, BXLOCAL, BXREMOTE
Speed (Multipurpose Board)	SET SPEED?	SPEED	1200, 2400, 4800, 9600, 19200, 56000, **64000**
Speed (High Speed Sync Board)	SET SPEED?	SPEED	48000, 56000, **64000**

Setting Options, Without Help Menu

If the 7500 is configured for only one port (i.e., no Second Asynchronous Enhancement Board is installed), follow the instructions in the next section, **Setting Options Without Help Menu Using Speed as an Example** to set your options.

If you have a Second Asynchronous Enhancement Board installed, the option named Setup determines which port's options are changed when using the Without Help menu. As Table D indicates, the Setup option is in the fourth display position of List 1 (L1). Follow the instructions in the next section, **Using Speed as an Example** to first change the Setup option to your desired setting. The settings work as follows:

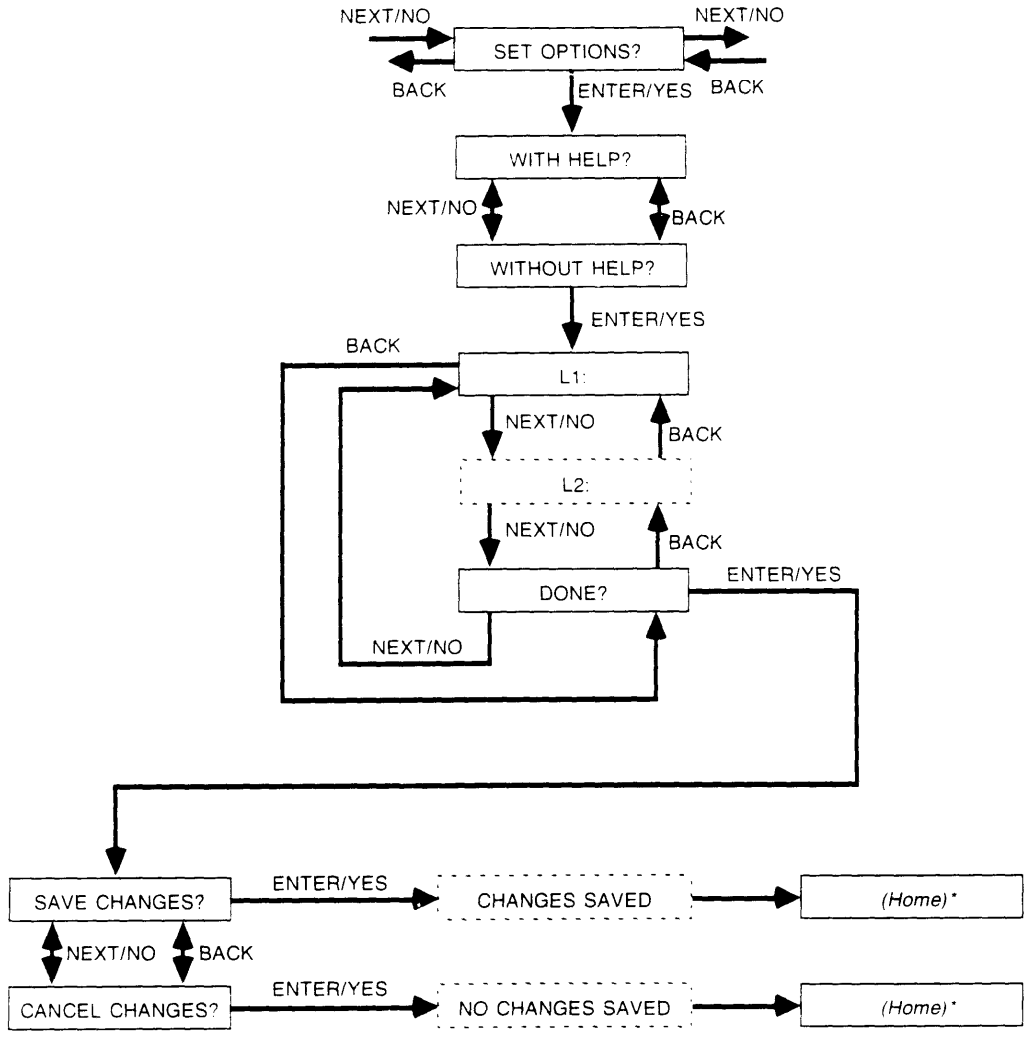
- If Setup = B or 1, port 1's options will be displayed.
- If Setup = 2, port 2's options will be displayed.
- If Setup = B, port 1's options will be displayed, but any changes will affect both ports.

Setting Options Without Help Menu — Using Speed as Example

1.	Press [NEXT/NO] from the *(Home)* display, until **[SET OPTIONS?]** is displayed.	**[SET OPTIONS?]** is displayed.
2.	Press [ENTER/YES].	**[WITH HELP?]** is displayed.

3. Press [NEXT/NO].	**[WITHOUT HELP?]** is displayed.
4. Press [ENTER/YES].	**[L1:B350110000011]** is displayed with the cursor under the L1. (Depending upon your options settings, your list may look slightly different.)
5. Press [ENTER/YES] three times until the cursor is in display position number 6 which corresponds to the Speed option.	**[L1:B350110000011]** with the cursor in display position number 6.
6. Press [NEXT/NO] or [BACK] until the number which represents your desired Speed is displayed. (In this example, the value has been changed to 1 which corresponds to 300 bps.)	**[L1:B310110000011]** The 5 has been changed to a 1 in display position number 6.
7. After you have changed the option to the desired value, press [ENTER/YES] until the cursor is under L1.	**[L1:B310110000011]** is displayed with the cursor under the L1.
8. Press [NEXT/NO] once or twice to display **[DONE?].**	**[DONE?]** is displayed.
9. Press [ENTER/YES].	**[SAVE CHANGES?]** is displayed.
10. To save the change, press [ENTER/YES].	**[CHANGES SAVED]** is displayed briefly followed by the *(Home)* display.
OR	
To cancel the change, press [NEXT/NO], and then press [ENTER/YES] when **[CANCEL CHANGES?]** is displayed.	**[CANCEL CHANGES?]** is displayed. **[NO CHANGES SAVED]** is displayed briefly followed by the *(Home)* display.

Tables with the values for all options (Tables D and E) appear on the next two pages. The definitions of the options are in the **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.**



* *(Home)* in this figure refers to one of the messages in Table A.

Figure 16: Set Options, Without Help Menu

Asynchronous and Synchronous Option Tables

All of the possible option settings for each display position are shown in the next two tables. A detailed description of each option is included in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.** Table D lists asynchronous options; Table E lists synchronous.

Table D: Asynchronous DCE and DTE Options, Without Help

Display Position	Option	Possible Values††† 0	1	2	3	4	5	6	B
1-3	L1:	-	-	-	-	-	-	-	-
4	Setup (DCE)†	-	Port 1	Port2	-	-	-	-	**Both**
4	Setup (DTE)	-	**1-Speed**	2-Speed	3-Speed	-	-	-	-
5	Mode	-	BA	DX	**B2**	-	-	-	-
6	Speed	-	.3k	1.2k	2.4k	4.8k	**9.6k**	19.2k	-
7	Parity	**Space**	Mark	Even	Odd	-	-	-	-
8	Local Mode	Off	**Command**	AT	-	-	-	-	-
9	Answer (DCE)	Manual	**Auto**	-	-	-	-	-	-
9	ZCA (DTE)	**Off**	On	-	-	-	-	-	-
10	DTR (DCE)	**Ignore**	Follow	-	-	-	-	-	-
10	Blank (DTE)	-	-	-	-	-	-	-	-
11	Busyout	**Off**	On	-	-	-	-	-	-
12	FCPN	**Off**	On	-	-	-	-	-	-
13	DCD	**Ignore**	Follow	-	-	-	-	-	-
14	Echo	**Off**	On	-	-	-	-	-	-
15	Match.speed	**Off††**	**On****	-	-	-	-	-	-
16	Autoadjust	Off	**On**	-	-	-	-	-	-
1-3	L2:	-	-	-	-	-	-	-	-
4	Edit	**Off**	On	-	-	-	-	-	-
5	Char.erase	Off	**BS**	DEL	-	-	-	-	-
6	Line.erase	Off	**CtrlX**	CtrlU	-	-	-	-	-
7	Text	Off	**Verbal**	Diag	-	-	-	-	-
8	Trans.flow	**Off††**	**Xon/Xoff****	EIA	-	-	-	-	-
9	Rec.flow	**Off††**	**Xon/Xoff****	EIA	-	-	-	-	-
10	Forwarding	**Off**	CR	Ctrl	-	-	-	-	-
11	Break	Off	Attn	Int	**Break**	Discard	Reset	-	-
12	Min.timer	Off	**On**	-	-	-	-	-	-
13-14	Attention	Hexadecimal Values* See this option's description in CHAPTER 4: DEFINITONS OF 7500 OPTIONS							
15-16	Idle.timer								

* Refer to Appendix for translation of hexadecimal values for ASCII character.
† Dual port configuration only, otherwise blank.
** DCE default.
†† DTE default.
††† Factory values are bolded.

Table E: Synchronous DCE Options, Without Help

Display Position	Option	Possible Values††† 0	1	2	3	4	5	6	7	8	9
1-3	L1:										
4	Blank	-	-	-	-	-	-	-	-	-	-
5	Mode	-	**CS**	NailB1	NailB2	BXLocal	BXRemote	-	-	-	-
6	Speed†	-	-	1.2k	2.4k	4.8k	9.6k	19.k	-	56k	**64k**
6	Speed††	-	-	-	-	-	-	-	48k	56k	**64k**
7	Duplex	Half	**Full**	-	-	-	-	-	-	-	-
8	Data.rest	Off	**On**	-	-	-	-	-	-	-	-
9	Autodial	**Off**	On	-	-	-	-	-	-	-	-
10	DTR	**Ignore**	Follow	-	-	-	-	-	-	-	-
11	Busyout	**Off**	On	-	-	-	-	-	-	-	-
12	Blank	-	-	-	-	-	-	-	-	-	-
13	Blank	-	-	-	-	-	-	-	-	-	-
14	Blank	-	-	-	-	-	-	-	-	-	-
15	Blank	-	-	-	-	-	-	-	-	-	-
16	Blank	-	-	-	-	-	-	-	-	-	-

† Multipurpose Board

†† High Speed Synch Board

††† Factory values are bolded.

Saving and Canceling Options, Without Help

1. After making any changes you want, press [ENTER/YES] until the cursor is under L1 or L2.	For example: **[L1:B350110000011]**
2. Press [NEXT/NO] once or twice until **[DONE?]** is displayed.	**[DONE?]** is displayed.
3. Press [ENTER/YES] .	**[SAVE CHANGES?]** is displayed.
4. To save the changes you made, press [ENTER/YES]	**[CHANGES SAVED]** is displayed briefly followed by the *(Home)* display.
OR	
To cancel the changes you made, press [NEXT/NO], then press [ENTER/YES] when **[CANCEL CHANGES?]** is displayed.	**[CANCEL CHANGES?]** is displayed **[NO CHANGES SAVED]** is displayed briefly followed by the *(Home)* display.

Asynchronous DCE Factory Options

L	1	:	B*	3	5	0	1	1	0	0	0	0	0	1	1
1		3		5		7		9		11		13		15	
	List #		Setup	Mode	Speed	Parity	Loc Mode	Answr	DTR	Busy out	FCPN	DCD	Echo	Match Spd	Auto adj

L	2	:	0	1	1	1	1	1	0	3	1	2	b	0	0
1		3		5		7		9		11		13		15	
	List #		Edit	Char Erase	Line Erase	Text	Tx Flow	Rx Flow	Fwd	Break Rsp	Min Timer	Attention		Idle	Timer

Asynchronous DTE Factory Options

L	1	:	1	3	5	0	1	0		0	0	0	0	0	1
1		3		5		7		9		11		13		15	
	List #		Setup	Mode	Speed	Parity	Loc Mode	ZCA		Busy out	FCPN	DCD	Echo	Match Spd	Auto adj

L	2	:	0	1	1	1	0	0	0	3	1	2	d	0	0
1		3		5		7		9		11		13		15	
	List #		Edit	Char Erase	Line Erase	Text	Tx Flow	Rx Flow	Fwd	Break Rsp	Min Timer	Attention		Idle	Timer

Synchronous DCE Factory Options

L	1	:		1	9	1	1	0	0	0					
1		3		5		7		9		11		13		15	
	List #			Mode	Speed	Duplex	Data Rest	AD	DTR	Busy out					

* b is the factory option for dual port configuration, otherwise it's left blank.

Figure 17: Factory Option Settings, Without Help Menu

Viewing Options

Introduction

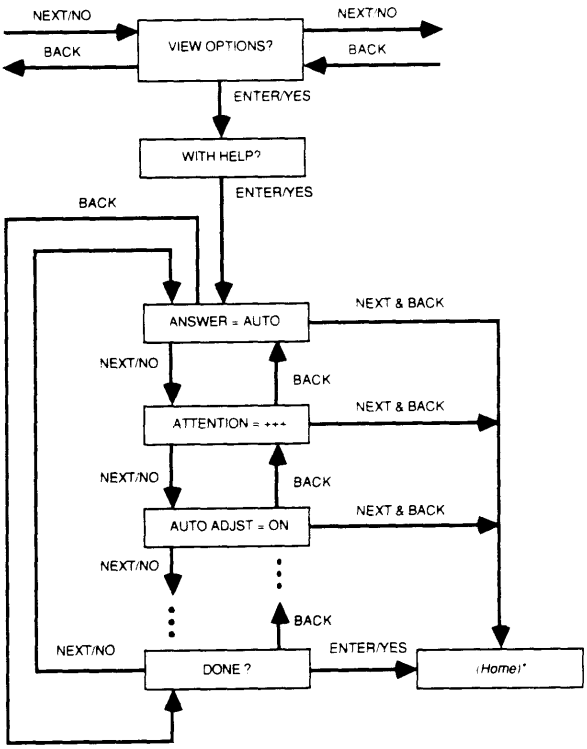
Like setting options, there are two ways to view current option settings from the 7500 front panel. These menus only allow you to see the current value; they do not let you change them. The two menus are:

- With Help
- Without Help

With Help Menu: Like setting options, this menu lists the name of each option and its current value in alphabetical order (Figure 18).

Without Help Menu: Like setting options, this menu lists each option as a number on the display (Figure 20). Use Tables D and E to translate options and their values. This method is particularly useful if you want to compare all the option settings on several 7500s.

If your 7500 is set up as asynchronous DCE, you may use the keyboard of an attached data terminal to view your options. See **CHAPTER 5: ASYNCHRONOUS DCE CONFIGURATION** for procedures on viewing options.



* *(Home)* in this figure refers to one of the messages on Table A.

Figure 18: Viewing Options, With Help Menu

Viewing Options, With Help Menu

Figure 18 illustrates the With Help Menu for viewing the option values currently in effect. You can only view the options from this menu; you cannot change any of them. Each option and its value are displayed in the same order as they are shown in Tables B and C.

View Options With Help — Single Port Configuration

1. Press [NEXT/NO] from the *(Home)* display until **[VIEW OPTIONS?]** is displayed.	**[VIEW OPTIONS?]** is displayed.
2. Press [ENTER/YES].	**[WITH HELP?]** is displayed.
3. Press [ENTER/YES].	The first option and its value is displayed as in Figure 18, **[ANSWER = AUTO].**
4. Press [NEXT/NO] to move forward through the options list or [BACK] to move backwards through the list.	
5. To finish viewing options: Press [NEXT/NO] or [BACK] until **[DONE?]** is displayed. Press [ENTER/YES] to exit.	**[DONE?]** is displayed. The display returns to *(Home).*
OR	
Press [NEXT/NO] and [BACK] together to exit.	The display returns to *(Home).*

View Options With Help — Dual Port Configuration

1. Press [NEXT/NO] from the *(Home)* display until **[VIEW OPTIONS?]** is displayed.	**[VIEW OPTIONS?]** is displayed.
2. Press [ENTER/YES].	**[WITH HELP?]** is displayed.
3. Press [ENTER/YES].	**[PORT 1 OPTIONS?]** is displayed.
4. Press [ENTER/YES] to view port 1's options OR press [NEXT/NO] when **[PORT 1 OPTIONS?]** is displayed to display **[PORT 2 OPTIONS?].** Press [ENTER/YES] to view port 2's options.	The first option is displayed. For example, **[ANSWER = AUTO].** **[PORT 2 OPTIONS?]** is displayed.

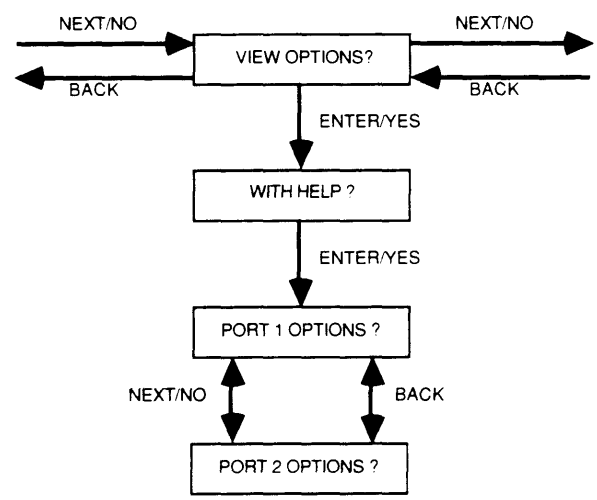


Figure 19: Viewing Options, With Help, 2 Ports

Viewing Options, Without Help Menu

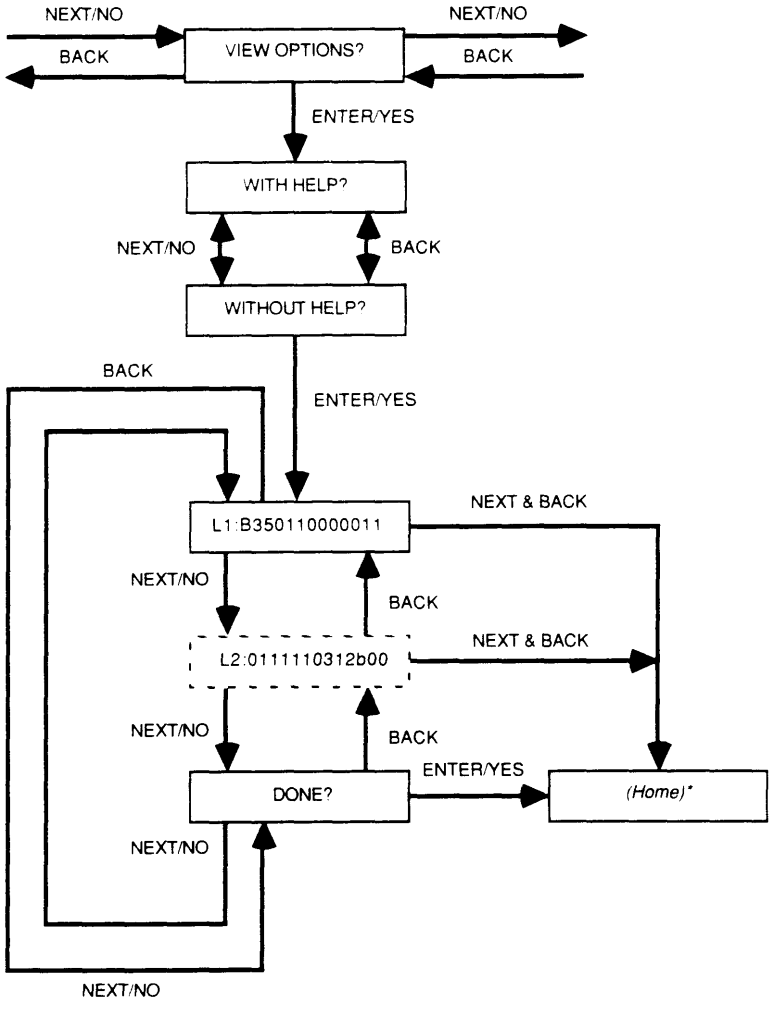
If the 7500 is configured for only one port (i.e., no Second Asynchronous Enhancement Board installed), follow the instructions below.

If you have a Second Asynchronous Enhancement Board installed, the option named Setup determines which port's options are viewed when using the Without Help menu. As Table D indicates, the Setup option is in the fourth display position of List 1 (L1). When using the Without Help menu to view options, make sure to check the status of the Setup option to determine which port's options you are viewing. The Setup option values are as follows:

- If Setup = B or 1, port 1's options will be displayed.
- If Setup = 2, port 2's options will be displayed.

Figure 20 illustrates the Without Help Menu for viewing the option values currently in effect. You can only view the options from this menu; you cannot change any of them.

1. Press [NEXT/NO] from the *(Home)* display until **[VIEW OPTIONS?]** is displayed.	**[VIEW OPTIONS?]** is displayed.
2. Press [ENTER/YES].	**[WITH HELP?]** is displayed.
3. Press [NEXT/NO].	**[WITHOUT HELP]** is displayed.
4. Press [ENTER/YES].	**[L1:XXXXXXXXXXXXX]** is displayed. If you are configured as asynchronous DCE or DTE, press [NEXT/NO] to display list 2's options.
5. When you are finished viewing your desired options, press [NEXT/NO] once or twice until **[DONE?]** is displayed.	**[DONE?]** is displayed.
6. Press [ENTER/YES] to exit.	The display returns to *(Home).*

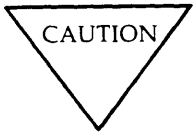


* *(Home)* in this figure refers to one of the messages in Table A.

Figure 20: View Options, Without Help Menu

Service Profile Identifier (SPID)

Use this display to enter the Service Profile Identifier (SPID) for each unit; your system administrator will give you the 7500's SPID number. Your SPID number must be entered exactly as it is given to you — including all 0s.



This number identifies your 7500 to the network and should not be changed unless your system administrator so indicates. Changing the value could result in loss of service.

The following steps show how, from the front panel of the 7500, to store the SPID you have been given by your system administrator. The steps shown are from the *(Home)* display. If you are not at the *(Home)* display, press [NEXT/NO] and [BACK] at the same time to return to the *(Home)* display. In the example below, the SPID to be stored is 234567.

To Enter the SPID

1. Starting from the *(Home)* display, press [NEXT/NO] and **[PROGRAM SPID?]** is displayed.	**[PROGRAM SPID?]** is displayed.
2. Press [ENTER/YES].	**[ID:0000000000]** is displayed.
3. Press [NEXT/NO] or [BACK] until the correct digit is displayed and then press [ENTER/YES] to move the cursor one position to the right. (Note: 0-9, blank, and **E** can be entered.)	The correct digit is entered and displayed; for example: **[ID:2000000000]**
4. Repeat the previous step for each digit in a number.	For example: **[ID:2345670000]**
5. After all digits have been entered, press [ENTER/YES] to place the cursor in the next position. Press [NEXT/NO] or [BACK] until E is displayed. Press [ENTER/YES].	For example: **[ID:234567E000]** (Note: **E** stores the number in memory and then returns to the *(Home)* display.)

NOTE

Entering a Blank (pressing [NEXT/NO] or [BACK] until a blank appears and then pressing [ENTER/YES]) places the cursor back in the first display position. This enables you to correct any errors you may have made.

CHAPTER 4: DEFINITIONS OF 7500 OPTIONS

The options used with 7500 asynchronous DCE, asynchronous DTE, and synchronous DCE are defined in this chapter. In the tables “Front Panel” columns list options values that appear on the 7500. One of two Front Panel modes can be used: "Without Help" (which uses numbers) and With "Help" (which uses words). “CMD” Mode values are used to set options from the keyboard of an attached terminal.

For a complete description of the data protocols listed under each option, see the definition of “Mode” later in this chapter.

Answer

- Configurations: Asynchronous DCE
- Data Protocols: X.25, Mode 2, Mode 3

Set Answer to **auto** if you want incoming data calls to be answered automatically. Select **manual** if not. If you set Answer to **manual,** you can answer data calls manually if your 7500 is attached to an asynchronous data terminal by typing **y** in response to the prompt **[ANSWER?].**

Asynchronous DCE			
Option Values For Answer			
Front Panel		**CMD Mode**	**Factory Value**
Without Help	**With Help**		**DCE**
0	MANUAL	manual	
1	AUTO	automatic	X

Interactions with DTR: If the DTR option is set to **follow** and Answer is set to **auto,** then the 7500 checks to make sure that the DTR lead is on (usually indicating that your terminal is turned on) before automatically answering the call. If you have set the DTR option to **ignore** and Answer to **auto,** the 7500 will answer data calls whether or not the DTR lead is turned on. If the DTR option is set to **follow** and Answer is set to **manual,** the 7500 will not let you manually answer the call unless DTR is on.

Attention

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 2, Mode 3

The Attention sequence is used to take the 7500 out of Data Mode and enables you to get the **[CMD:]** prompt. The default setting is **+++.** You must always type the sequence rapidly (all three characters within 1.5 seconds).

Before entering the Attention sequence, there must be—at least— a one second delay after typing your last character. Then the three characters composing the sequence must be typed within 1.5 seconds. Finally, no additional characters should be typed for one second after typing the Attention sequence. Failure to comply with these guidelines will result in the Attention sequence characters being sent to the far-end as data.

To change the Attention sequence to @@@, for example, type **set attention @** . Note that you need only type the new character once while changing the value.

Asynchronous DCE and Asynchronous DTE				
Option Values For Attention				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
2b	+ + +	+	X	
2a	* * *	*		
40	@ @ @	@		
23	###	#		
2d	- - -	–		X
00	N/A	off		
02 - 7E hexadecimal	N/A	See note below		

N/A = Not available

NOTE Possible values include any printable or control characters except NUL(Ctrl@), SOH(CtrlA), CAN (CtrlX), NAK (CtrlU), BS (CtrlH), DC3 (CtrlS), DC1 (CtrlQ), and DEL.

Autoadjust

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 2, Mode 3

If Autoadjust is **on,** the 7500 automatically adjusts to the Speed and Parity of your attached data terminal when you press [BREAK], then type **AT.** Pressing [RETURN] after this sequence will display the **[CMD:]** prompt (providing local mode is set to **CMD).**

NOTE Failure to complete this sequence within 15 seconds may result in improper speed setting.

If Autoadjust is **off,** you must set Speed and Parity with the **set** command from an attached terminal from the available menus on the 7500 front panel.

Asynchronous DCE and Asynchronous DTE				
Option Values For Autoadjust				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	OFF	off		
1	ON	on	X	X

Autodial

- Configurations: Synchronous DCE

The Autodial option applies to all synchronous configurations, when the mode option is set to circuit switched.

This option allows an attached synchronous device to place a data call to the address stored in memory number “m1” without the use of an RS-366 autodialer.

When the Autodial option is set to **1 (on)** and no data call is in progress, the 7500 automatically initiates a data call to the number stored in "m1" when the attached synchronous device turns on its DTR lead.

NOTE

Setting the DTR option to **ignore** when Autodial is set to **on** will cause the 7500 to keep initiating a data call to “m1” at all times even if no synchronous device is attached.

Synchronous DCE			
Option Values For Autodial			
Front Panel		CMD Mode	Factory Value
Without Help	With Help		DCE
0	OFF		X
1	ON		

Break

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3

This option determines what the 7500 does when you press the [BREAK] key on your attached data terminal during data transfer.

If you select **off,** the 7500 does not respond to the [BREAK] key. If you select **interrupt,** the 7500 sends an interrupt packet to the remote Packet Assembler Disassembler (PAD). If you select **break,** an interrupt packet is sent followed by an indication of break X.29 message. If you select **discard,** the 7500 sends an interrupt packet, an indication of break X.29 message, and discards any incoming data from the network. If you select **reset,** the 7500 sends an X.25 reset packet.

Asynchronous DCE and Asynchronous DTE Option Values For Break				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	OFF	off	X	X
1	ATTENTION	attention		
2	INTERRUPT	interrupt		
3	BREAK	break		
4	DISCARD	discard		
5	RESET	reset		

Interactions with Attention: You can also select [BREAK] as an Attention sequence in addition to the three character sequence specified by the Attention option. If you do select [BREAK] as the Attention sequence, you cannot use [BREAK] for any of the functions described above.

NOTE In Mode 2, Break is transported to the far-end regardless of the option setting.

Busyout

- Configurations: Asynchronous DCE, Asynchronous DTE, Synchronous DCE

This option provides a method for taking 7500's out of service temporarily. When this option is set to **on,** you can make the 7500 appear "busy" to some networks* during a local loopback test. When set to **off,** local loopback testing will not cause the set to appear "busy" to the network.

This option may be used to prevent hunt group lock-up during local loopback testing or for 7500 maintenance.

* Networks which support AT&T ISDN Basic Rate Interface (BRI) Specification's Endpoint Service State Maintenance and Management Procedures (document number 801-802-100).

Asynchronous DCE and Asynchronous DTE Option Values For Busyout				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	OFF	off	X	X
1	ON	on		

Synchronous DCE			
Option Values For Busyout			
Front Panel		CMD Mode	Factory Value
Without Help	With Help		DCE
0	OFF		
1	ON		X

Char.erase (Character Erase)

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3

This option allows you to choose the character you will use as an erase character when Edit is **on.**

Choose **bs** if you want to use backspace or CtrlH to erase characters. Choose **del** if you prefer the [DEL] key. The Char.erase character is not sent out in the data packet, even if Forwarding is set to any control character or Delete. You need not set Char.erase to **off** when you want to disable local editing. Instead, simply set Edit to **off.**

Asynchronous DCE and Asynchronous DTE					
Option Values For Char.erase					
Front Panel		CMD Mode	Option Description	Factory Value	
Without Help	With Help			DCE	DTE
0	OFF	off			
1	BS	bs	Backspace key (or CtrlH)	X	X
2	DEL	del	Delete key		

Data.rest (Data Restriction)

- Configurations: Synchronous DCE

This option causes the 7500 to request either a restricted or an unrestricted data channel when setting up a 64 kbps data call.

Restricted data channels are those which do not allow the transmission of occurrences of more than seven contiguous zero bits. Unrestricted channels, sometimes called clear channels, are not limited by this constraint. If your data contains occurrences of more than seven contiguous zero bits, you must select Data.rest **off,** i.e., you must request an unrestricted (clear) data channel. If you do request an unrestricted (clear) data channel and the network has only restricted channels available, the network will reject your call.

If you select a restricted channel (Data.rest **on),** the 7500 does not enforce the data restriction i.e., it will not check your data to ensure that you do not send more than seven contiguous zero bits.

Synchronous DCE			
Option Values For Data.rest			
Front Panel		CMD Mode	Factory Value
Without Help	With Help		DCE
0	OFF		
1	ON		X

DCD (Data Carrier Detect)

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 2, Mode 3

Asynchronous DCE

This option determines whether the 7500 turns on the Data Carrier Detect (DCD) lead when a data call is in progress, and off when one is not **(follow),** or whether it keeps DCD on essentially all the time **(ignore).**

If your data terminal transmits data only when the Data Carrier Detect lead is on, set DCD to **ignore.** When the DCD lead is set to **ignore,** it appears to your terminal that a data call is always present, except for one second following termination of a call. This will enable your data terminal to transmit commands to the 7500 even when a data call is not present. This setting is appropriate for most users.

Set the DCD lead to **follow** only if your data terminal requires that Data Carrier Detect be off when a data call is not present. Select **follow** also if your terminal will not enter data mode unless it sees the Data Carrier Detect go from off to on.

See the instruction manual for your data terminal to determine which setting is appropriate.

Asynchronous DTE

This determines how the 7500-DTE responds to changes in the state of the attached modem's DCD lead.

Many modems use the DCD lead to indicate the presence or absence of carrier. During power interruptions, carrier may be momentarily absent without disconnecting the data call. These modems use Data Set Ready (DSR) to indicate that a call has been disconnected. Other modems drop DCD only when a call has been disconnected. In addition, such modems may keep DSR on whether a call is present or not. The DCD option allows you to select the method of automatically ending data calls that is appropriate to your attached modem.

If your modem uses DCD to indicate presence or absence of carrier, regardless of the state of the call, you should set this option to **ignore.** This will prevent undesired disconnections when momentary interruptions in carrier occur.

If your modem drops DCD only when a call is disconnected and does not drop DSR, set DCD to **follow.** The 7500-DTE always disconnects the call if DSR is dropped.

Asynchronous DCE and Asynchronous DTE				
Option Values For DCD				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0 1	IGNORE FOLLOW	ignore follow	X	X

DTR (Data Terminal Ready)

- Configurations: Asynchronous DCE, Synchronous DCE
- Data Protocols: X.25, Mode 2, Mode 3

Data Terminal Ready (DTR lead) is an electrical signal sent from your data terminal to the 7500. The DTR option determines how the 7500 will respond to the presence or absence of this electrical signal. The DTR lead is used by your data terminal to indicate to the 7500 that it is ready for communications. Many data terminals turn the DTR lead on whenever the data terminal is turned on. If your data terminal works this way, setting the DTR option to **follow** enables you to end data calls by turning off your data terminal. If you want to retain active data calls when your data terminal is turned off or while you change EIA cables, set the DTR option to **ignore.**

If your data terminal turns the DTR lead off during file transfer, set the DTR option to **ignore.**

Asynchronous DCE			
Option Values For DTR			
Front Panel		CMD Mode	Factory Value
Without Help	With Help		DCE
0 1	IGNORE FOLLOW	ignore follow	X

Synchronous DCE			
Option Values For DTR			
Front Panel		CMD Mode	Factory Value
Without Help	With Help		DCE
0 1	IGNORE FOLLOW		X

Interactions with Answer: If the DTR option is set to **follow** and Answer is set to **auto,** the 7500 will automatically answer data calls only when the DTR lead is on. If the DTR option is set to **ignore** and Answer is set to **auto,** the 7500 will automatically answer whether the DTR lead is turned on or off.

Duplex

- Configurations: Synchronous DCE

The setting of this option determines whether the 7500-Synchronous operates in full duplex or half-duplex emulation. Select **full** if you want full duplex operation; select **half** if you want half duplex emulation. This option only applies to speeds from 1.2 through 19.2 kbps, and 56 kbps.

Synchronous DCE			
Option Values For Duplex			
Front Panel		**CMD Mode**	**Factory Value**
Without Help	**With Help**		**DCE**
0	HALF		
1	FULL		X

Echo

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 2, Mode 3

This option determines whether characters sent from the data terminal in Data Mode are echoed by the 7500.

If you select **on,** the 7500 will echo all characters sent by your data terminal during Data Mode. However, the Rec.flow, Trans.flow, Char.erase, and Line.erase characters are not echoed.

Select **on** if your host computer or other data endpoint does not echo characters. In addition, you will want to turn your data terminal's echo capability off.

If you select **off,** the 7500 will not echo characters sent during the Data Mode. Thus, if your host computer or other data endpoint echoes characters for you, select **off.** Otherwise, each character you type will be displayed twice. If you are transferring files, you will want to turn Echo **off.**

Asynchronous DCE and Asynchronous DTE				
Option Values For Echo				
Front Panel		**CMD Mode**	**Factory Value**	
Without Help	**With Help**		**DCE**	**DTE**
0	OFF	off	X	X
1	ON	on		

Edit

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3

This option is used with the Forwarding option and allows you to correct characters and lines of text before sending out packets.

Select **on** if you want to be able to edit packets before you send them; select **off** otherwise. Note that Forwarding must be set to something other than **off** for Edit to work.

The characters that you can use for editing are selected with the Char.erase and Line.erase options. These characters are acted on locally and are not sent out in packets. If you type more than a full packet of data, then a packet will be sent out automatically.

Asynchronous DCE and Asynchronous DTE				
Option Values For Edit				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0 1	OFF ON	off on	X	X

Interactions with Char.erase and Line.erase: At least one of these options must be set to a value other than **off** for editing to work.

FCPN (Flow Control Parameter Negotiation)

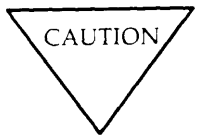
- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25

A FCPN selection of **off** is used to request default values of the window and packet sizes (2 and 128, respectively) in the X.25 Flow Control Parameter Negotiation facility.

A FCPN selection of **on** is used to request a window size of 3 and a packet size of 256 in the X.25 Flow Control Parameter Negotiation facility. Check with your system administrator to find out if **on** is a selection that is available to you.

If this option is changed during an active data call, it will not take effect until the next data call.

Asynchronous DCE and Asynchronous DTE				
Option Values For FCPN				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0 1	OFF ON	off on	X	X



An FCPN setting of **off** is recommended when more than four ISDN terminals connected to the same line are simultaneously using DX25 packet data communications. Otherwise, under worst case load, packet congestion on the line may cause your data call to be dropped.

Forwarding

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3

The 7500 sends data through the network in packets if the data mode is X.25 or Mode 3. This option allows you to select a data-forwarding character, a character used to signal that a data packet should be sent.

Set Forwarding to something other than **off** if you want a way to signal the 7500 to send a less-than-full data packet. For example, if you set Forwarding to **carriage return,** the characters that you type will be stored until you press [RETURN] or [ENTER] on your data terminal keyboard. At that time, the characters will be put into a packet and sent out.

If you set Forwarding to **any,** when you press a control character or the [DEL] key, a packet will be sent out. Of course, if enough characters to fill a packet are typed before you enter the Forwarding character, the full packet will be sent. The Forwarding character is included in the packet.

Typically, if you enable Forwarding, you will want some way to display characters at your data terminal as you type them, and you will want a way to do local editing. These could be features of your data terminal or you could use the Echo and Edit options provided by the 7500.

Forwarding cannot be **off** if you wish to use Edit, Char.erase, or Line.erase.

Asynchronous DCE and Asynchronous DTE

Option Values For Forwarding

Front Panel		CMD Mode	Option Description	Factory Value	
Without Help	**With Help**			**DCE**	**DTE**
0	OFF	off		X	X
1	CR	CR	carriage return		
2	CTRL	any	All control characters and del		

Interactions with Rec.flow: If Forwarding is set to **any** and **xon/xoff** flow control is being used, then the **xoff** character (CtrlS) and the **xon** character (CtrlQ) are used for flow control and will not cause packets to be sent.

Idle.timer

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3

When the Data Mode is set to X.25 or Mode 3, the 7500 sends data through the network in packets. Idle.timer determines how long the 7500 waits after receiving a character from the data terminal before it sends out a packet which is not full.

Setting Idle.timer to 0 turns it Off which means that a less than full packet will never be sent out.

Asynchronous DCE and Asynchronous DTE				
Option Values For Idle.timer				
Front Panel		**CMD Mode**	**Factory Value**	
Without Help	**With Help**		**DCE**	**DTE**
(hexadecimal value)				
00	OFF	0		
01	0.05s	0.05	X	X
02	0.10s	.1		
04	0.20s	.2		
14	1.00s	1		
64	5.00s	5		
FF	12.75s	12.75		
[in units .05 seconds]		[0 to 12.75 seconds]		

On the Without Help Menu, Idle.timer takes up two columns and the values are **00** through **FF** hexadecimal.

Interaction with Forwarding and Min.timer: Both options, Forwarding and Min.timer have higher precedence than Idle.timer. For example, if Forwarding is set to a value other than **off,** the Min.timer and Idle.timer options are ignored. Similarly, if Forwarding is set to **off** and Min.timer is set to **on,** Idle.timer is ignored.

Line.erase

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3

This option allows you to choose the character that will erase the entire contents of the editing buffer.

Like Char.erase, Line.erase is enabled only when Edit is enabled. Select the character that best meets your needs. If you do not have a [CANCEL] key on your data terminal, you can hold down [CONTROL] and press [X]. To use NAK, hold down [CONTROL] and press [U].

The Line.erase character is not sent out in the data packet.

Asynchronous DCE and Asynchronous DTE					
Option Values For Line.erase					
Front Panel		CMD Mode	Option Description	Factory Value	
Without Help	With Help			DCE	DTE
0	OFF	off		X	X
1	CTRLX	can	Cancel key or CtrlX		
2	CTRLU	nak	Cancel key or CtrlU		

Local Mode

- Configurations: Asynchronous DCE, Asynchronous DTE

This option determines how you may access the Local Mode commands from data equipment attached to the 7500.

The available options are **off, cmd,** and **at.** When this option is set to **off,** the user may access features via the 7500 front panel only. This is the recommended setting for applications that cannot accept text messages from the 7500.

When this option is set to **cmd,** you will be able to perform most of the front panel functions by typing commands on a terminal attached to the 7500. This is the correct setting for most users who will be attaching the 7500 configured as Asynchronous DCE, to a data terminal or personal computer.

Setting this option to **at** allows the 7500 to use the set of commands commonly used with many popular modems. The **at** setting is appropriate for users who use software packages PCs, or those using attached data terminals that communicate only using **at** commands.

Asynchronous DCE and Asynchronous DTE					
Option Values For Local Mode					
Front Panel		CMD Mode	AT Mode	Factory Value	
Without Help	With Help			DCE	DTE
0	OFF			X	X
1	CMD		AT&&T		
2	AT	&&H			

Match.speed

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: Mode 2

This option permits endpoints running at different speeds to communicate via the Mode 2 protocol. To establish a Mode 2 data call:

- both endpoints must be at the same speed or
- the Match.speed option must be **on** at the endpoint with the higher speed.

The terminal adaptor connected to the higher-speed endpoint buffers the data and meters it toward the network at the rate of the lower-speed endpoint. This terminal adaptor also controls the data flow from the attached equipment using the Trans.flow control mechanism. If Trans.flow is **off** or if the attached terminal does not support Flow Control, then you cannot transmit data faster than the rate of the lower-speed endpoint. The lower-speed endpoint must not attempt to perform end-to-end flow control on the higher-speed endpoint, because data may be lost. For example, typing Flow Control characters (e. g., CtrlS or CtrlQ) may cause loss of data.

If the conditions in the above paragraph cannot be met, then Mode 3 is the recommended data protocol.

When Match.speed is set to **off,** a Mode 2 call to another endpoint can only be achieved if the other endpoint is running at the same speed.

Asynchronous DCE and Asynchronous DTE				
Option Values For Match.speed				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	OFF	off		X
1	ON	on	X	

Min.timer (Minimum Delay Timer)

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3

Turning on this option optimizes packet data transmission initiated from either a person typing or a computer.

If characters received from the attached data equipment are separated in time by more than 10 milliseconds or one character time at 300 bps (roughly 30 milliseconds), then packets are transmitted to the network without artificial delay. This is the case for a person typing.

If characters are received more closely spaced in time than as described above, characters are assembled into packets. This may be the case of a computer answering a data base query or transferring a file. In general, the size of the packet equals the number of characters received prior to a gap in the reception or a full packet whichever is less. An exception to the above occurs when the first packet transmitted after a gap may contain fewer characters (possibly only one character).

Asynchronous DCE and Asynchronous DTE				
Option Values For Min.timer				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	OFF	off		
1	ON	on	X	X

Interaction with Forwarding and Idle.timer: The Forwarding option has precedence over Min.timer. For example, if Forwarding is set to a value other than **off,** Min.timer is ignored. Similarly, if Forwarding is set to **off** and Min.timer is set to **on,** Idle.timer is ignored.

Mode

- Configurations: Asynchronous DCE, Asynchronous DTE, Synchronous DCE

Asynchronous DCE

Mode selects the preferred data protocol your 7500 will use to originate a data call. This option only refers to data call origination. Incoming calls, in contrast, are always answered with the data protocol specified by the caller. To find out which values of the Mode option you can select, contact your system administrator. Data calls will not work unless your telephone line has been administered for the data service you will be using (that is, X.25 for D-Channel packet switched data service and Mode 2 or Mode 3 for B-Channel circuit switched data service). The values of this option are described as follows:

BA:	B-channel adaptive from Modes 3 and 2 (BA). For outgoing calls, if you select this value, the 7500 will attempt to establish a circuit switched Mode 3 call. If the system you are calling can not accept this type of call, the 7500 will attempt to establish a circuit switched Mode 2 data call. Mode 3 can cause slightly higher delays on transmitted and received data than Mode 2, but it provides automatic error correction. Mode 3 also uses the Packet Assembler Disassembler (PAD) options in the same manner as X.25.
DX25:	X.25 (DX25) packet data on the D-channel.
B2:	Mode 2 circuit switched data on the B-channel. If you select this value for outgoing calls, the 7500 will attempt to establish a Mode 2 call. Mode 2 provides the least amount of delay on transmitted and received data, but it does not provide error correction. As such, this mode emulates conventional analog data transmission.

Mode 2 and Mode 3 are defined in the AT&T Digital Multiplexed Interface (DMI) Technical Specification. (For a copy of this manual, Document number 500-029, call the Customer Information Center, at 1-800-432-6600.)

The Mode option only refers to data call origination. Also: a Mode 2 data call cannot be established between two Mode 2 DTE endpoints.

If the user escapes to Local Mode while the far end is transmitting Mode 2 data, this data may be lost.

If this option is changed during an active data call, it will not take effect until the next data call.

Asynchronous DCE and Asynchronous DTE				
Option Values For Mode				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0 1 2	BA DX B2	BA DX25 B2	X	X

Synchronous DCE

The following description should guide you in selecting the one option value that is the appropriate one for your application.

1. **Circuit switched:** This mode allows you to make a circuit switched data call between two endpoints.
2. **Nailed-up B1:** This mode is the provisioned B-1 channel data service.
3. **Nailed-up B2:** This mode is the provisioned B-2 channel data service.
4. **BX Local:** This mode is the circuit switched B-channel X.25 data service to the local X.25 packet-handler.
5. **BX Remote:** This mode is the circuit switched B-channel X.25 data service to a remote X.25 packet-handler.

Synchronous DCE				
Option Values For Mode				
Front Panel		CMD Mode	Option Description	Factory Value
Without Help	With Help			DCE
1 2 3 4 5	CS NAILB1 NAILB2 BXLOCAL BXREMOTE		Circuit switched Nailed-up B1 Nailed-up B2 Local X.31 Remote X.31	X

Parity

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 2, Mode 3

The 7500 ignores parity received from your terminal in Local Mode except for the xon and xoff flow control characters. If a terminal connected to the 7500 requires parity to display Local Mode CMD prompts, match the parity of the 7500 with your terminal.

NOTE

The Parity setting of the 7500 only affects local mode. The 7500 never adjusts Parity of data transmitted to or from the network in data mode.

To set this option from an attached terminal do the following:

1. Type **set parity** *value* (for example, **set parity odd).**
2. Change your data terminal's Parity to match this value. (See your data terminal's operating manual for instructions.)

You can also change the Parity option setting of the 7500 (when the Autoadjust option is **on)** by pressing the [BREAK] key, then typing **AT.**

Asynchronous DCE and Asynchronous DTE				
Option Values For Parity				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	SPACE	space	X	X
1	MARK	mark		
2	EVEN	even		
3	ODD	odd		

Rec.flow (Receive Flow Control)

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3

This option determines which method is used to control the flow of data from the 7500 to your data terminal.

When you select **xon/xoff,** your data terminal sends the 7500 an xoff character when it is not ready to receive data. When it is ready to receive data, it sends an xon character to the 7500 to restart the flow of data. This setting is appropriate for most users.

Select **eia,** if your data terminal uses the Request-to-Send lead to indicate whether it is ready to receive data. When it is not ready, your data terminal turns off Request-to-Send. When it is ready to receive data, it turns Request-to-Send on.

When you select **off,** your data terminal has no way to control the flow of data from the 7500.

Asynchronous DCE and Asynchronous DTE				
Option Values For Rec.flow				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	OFF	off	X	X
1	ON	xon / xoff		
2	EIA	eia		

Setup

- Configurations: Asynchronous DCE, Asynchronous DTE

Asynchronous DCE

If the second asynchronous DCE enhancement board is installed, this option enables you to set the following options:

- Both ports = **B** (Default)
- Port 1 only = **1**
- Port 2 only = **2.**

The setting of this option determines which port's options are displayed and which port any changes will affect. The default value is **B** to facilitate the identical setting of options in both ports at hosts in computer centers.

When the option is set to **B,** port 1 is displayed, but changes are stored for both ports 1 and 2. If the option is set to **1** or **2,** values will be displayed and changed for only that port.

Asynchronous DCE Dual Port Configuration			
Option Values For Setup			
Front Panel		CMD Mode	Factory Value
Without Help	With Help		DCE
1	PORT 1		
2	PORT *2*		X
3	BOTH		

Asynchronous DTE

The Multispeed option determines how the 7500 will react to speed change requests sent over the EIA speed leads (pins 12 and 13).

If set to **1,** the 7500 will ignore the leads and remain the speed to which it's set. If set to **2,** the 7500 will support 2-speed modems and will drop to the lower speed on request. If the option is set to **3,** the 7500 will support 3-speed modems and will drop to the middle or lower speed on request. The exact

speed lead information that causes the speed to drop is explained in **CHAPTER 9: TECHNICAL INFORMATION.**

Asynchronous DTE			
Option Values For Setup			
Front Panel		CMD Mode	Factory Value
Without Help	With Help		DTE
1	1-SPEED		X
2	2-SPEED		
3	3-SPEED		

Interaction with Autoadjust: If Setup is set to either 2-speed or 3-speed, then Autoadjust should be set to **off.**

Speed

- Configurations: Asynchronous DCE, Asynchronous DTE, Synchronous DCE
- Data Protocols: X.25, Mode 2, Mode 3

Use this option to change the speed at which data communications take place. To set this option from an asynchronous attached terminal, do the following:

1. Type **set speed** *value* (for example, **set speed 9600)** to tell the 7500 the speed at which you want to communicate.
2. Change your data terminal speed. (See your terminal's operating manual for instructions.)
3. Press [RETURN].

You can also change the speed from your asynchronous data terminal (when the Autoadjust option is **on)** by pressing the [BREAK] key, then typing **AT.**

Asynchronous DCE and Asynchronous DTE					
Option Values For Speed					
Front Panel		CMD Mode	Option Description	Factory Value	
Without Help	With Help			DCE	DCE
1	300	300	300 bps		
2	1200	1200	1200 bps		
3	2400	2400	2400 bps		
4	4800	4800	4800 bps		
5	9600	9600	9600 bps	X	X
6	19200	19200	19.2 kbps		

Synchronous DCE				
Option Values For Speed				
Front Panel		CMD Mode	Option Description	Factory Value
Without Help	With Help			DCE
2	1200	1200	1200 bps	
3	2400	2400	2400 bps	
4	4800	4800	4800 bps	
5	9600	9600	9600 bps	
6	19200	19200	19.2 kbps	
7	48000	48000	48 kbps	
8	56000	56000	56 kbps	
9	64000	64000	64 kbps	X

Text

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 2, Mode 3

This option determines whether the 7500 provides call progress and error messages to your attached terminal during call setup and disconnection.

Call progress and error messages describe the status of your call. Select **verbal** if you want verbal messages to appear on your attached terminal during call progress. Select **diagnostic** if you want only a numeric diagnostic code to appear in addition to the progress message. Select **off** if you do not want to see these messages.

Asynchronous DCE and Asynchronous DTE				
Option Values For Text				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	OFF	off		
1	VERBAL	verbal	X	X
2	DIAG	diagnostic		

Trans.flow (Transmit Flow Control)

- Configurations: Asynchronous DCE, Asynchronous DTE
- Data Protocols: X.25, Mode 3, and Mode 2*

This option determines which method is used to control the flow of data from your data terminal to the 7500.

When you select **xon/xoff,** the 7500 sends your data terminal an xoff character when it is not ready to receive data. The 7500 sends an xon character to your data terminal when it is ready to receive data. This setting is appropriate for most users.

Select **eia,** if you want the 7500 to use the Clear-to-Send (CTS) lead to indicate whether it is ready to receive data from your data terminal. When it is not ready to receive data from your terminal, the 7500 turns off CTS. When it is ready to receive data, it turns on CTS.

When you select **off,** the 7500 cannot control the flow of data from your data terminal.

Asynchronous DCE and Asynchronous DTE				
Option Values For Trans.flow				
Front Panel		CMD Mode	Factory Value	
Without Help	With Help		DCE	DTE
0	OFF	off		X
1	XON	xon/xoff	X	
2	EIA	eia		

*For a Mode 2 call, this option is in effect only at the high-speed endpoint (see Match.speed).

ZCA (Zero Called Address)

- Configurations: Asynchronous DTE

This option is used exclusively with 5ESS switch DX.25 modem pooling feature.

When the 7500 initiates a data call, with this option on, it uses a called address consisting of 10 zeroes.

The 5ESS switch modem pooling feature uses a special telephone number consisting of 10 zeroes when it is setting up the call from the 7500 to the network. The network automatically routes the call to the appropriate data endpoint. This special telephone number is called the "Zero Called Address." The capability for using Zero Called Address is controlled through option setting on the front panel of the 7500. Set ZCA to **on** only if you are installing a 5ESS modem pool.

Asynchronous DTE			
Option Values For Zero Called Address			
Front Panel		CMD Mode	Factory Value
Without Help	With Help		DTE
0	OFF		X
1	ON		

CHAPTER 5: ASYNCHRONOUS DCE CONFIGURATION

Feature Access From an Attached Data Terminal

This chapter explains how to use a data terminal attached to your 7500, preparing the terminal for data operations and making data calls. How to set up and program your 7500 to suit your particular needs is also described.

General Information About Data Calls

Data calls have different requirements from voice calls. The information you need to set up your equipment to make a variety of data calls is explained in this part. Commands are used to perform functions such as dialing and programming. The 7500 will respond with messages to inform you of the results of your actions.

The following information is explained:

- How to get help on your data terminal screen when you need information about a data option or a command.
- The commands that you use to operate your data-transmission system
- Data option profiles that you maintain for the data numbers that you dial
- The data options that make up those profiles
- Programming an option profile
- Programming telephone numbers for memory dialing of data calls
- X.25 Call Options

Automatic Speed and Parity Adjustment

The 7500 data module can automatically adjust to the Speed and Parity of your data terminal. If you are not sure the 7500 and your data terminal are operating at the same speed, or if you need to change your 7500's Speed or Parity, follow the procedure below.

ACTION	PROCEDURE
Automatic Speed and Parity adjustment	1. Turn on your data terminal or PC. If you are using a PC, make certain your communications software is configured properly at the speed and parity you want to use. 2. Press [BREAK], type **AT,** and press [RETURN]. The 7500 will automatically adjust to the Speed and Parity of your data terminal, and the **[CMD:]** prompt will appear on your terminal screen.

NOTE

If the **[CMD:]** prompt does not appear, refer to the definition of Autoadjust in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.**

Making a Data Call

You can make a data call from your data terminal. In many cases, you will be able to make data calls using the options that were set at the factory (factory options are data profile 0 or p0). There might be cases in which you will need a different set of option settings for particular data calls. **Creating a Data Option Profile,** describes how to set up your own personal set of data option settings.

ACTION	PROCEDURE
From Your Data Terminal **To make a data call**	1. Turn on your data terminal or PC. If you are using a PC, make certain your communications software (that is, your terminal emulation program) is configured properly (see section on options). 2. If the **[CMD:]** prompt does appear on your screen, proceed to step 3. If the **[CMD:]** prompt does not appear on your screen, then: Press [BREAK], type **AT,** and press [RETURN] to make certain that Speed and Parity are correct. The 7500 will automatically adjust Speed and Parity. 3. At the **[CMD:]** prompt, type **dial** and the telephone number. For example, type **dial 1234567.** NOTE When dialing, type **dial;** then one (and only one) space; then the number. Strict adherence to this format is necessary. For example, typing **dial,** two spaces, and the string will result in the second space being transmitted as the first character in the dialed string.

ACTION	PROCEDURE
To make a data call (Contd)	4 Press [RETURN]. **[CALLING 1234567]** **[Type E to end call:]** (Once you see the **[CONNECT]** message, you should ignore the **[Type E to end call.].)** Note at this point, additional information may appear on your screen. This information may include the name of the person being called, the date and time, and other miscellaneous call information. Regardless of how much or little information appears on your data terminal, you will eventually see one of the following sequences displayed under normal conditions: **[CONNECT - MODE 2]** OR **[CONNECT]** **[FAR END SPEED - 9600]** **[DATA MODE]** 5 You are now ready to communicate with the far end. Enter data to be transmitted.
From Your Data Terminal **To end a data call**	1. Rapidly type the Attention sequence: **+++** (See the description of the Attention option in **CHAPTER 4: DEFINITION OF 7500 OPTIONS.)** The **[CMD:]** prompt displayed. 2. Type **end** to end the call

Other Ways of Dialing From Your Attached Data Terminal

Other ways of dialing from your attached data terminal are summarized below. The elements of such calls are explained later in this manual.

Redialing the Last Data Call Made

At the **[CMD:]** prompt, type **redial** and press [RETURN] to redial the last data call made.

Alphanumeric Dialing

In making a data call, your system may be configured to used numbers, letters, special characters, or a combination of these. Check with your system administrator for verification as to whether this feature is available.

At the **[CMD:]** prompt, type **dial** *string*

For example, **dial abcdefg**

In addition, when you are in AT mode (discussed later in this chapter), you can use a valid AT mode command **(ATD, ATDT,** or **ATDP)** to dial. No space is needed before the string is added in this case.

For example: **ATDTTOM** dials TOM; **ATDTOM** dials OM.

X.25 Call Options

Your organization may subscribe to certain X.25 call options through the local telephone company. The call options that can be used for data calls are listed below. Abbreviations and values are given in parentheses. They can be used only when the Data Mode option is set to DX25.

- Closed User Group (cug: 0000 - 9999)
- Reverse Charge (rc: yes or no)
- Registered Private Operating Agency (rpoa: 0000 - 9999) (1 or 2 RPOAs are allowed)
- Call User Data (cd: up to 12 characters)
- Flow control parameter negotiation

Your system administrator will tell you if you should use any of the above call options with your data calls.

To make a data call using cug, rc, rpoa, or cd call options:

At the **[CMD:]** prompt, type **dial** *number;option1 x;option2 y;* . . .

For example:

[CMD:] dial 5551212;cug 1234;rc yes

The format to specify two RPOAs is:

[CMD:] dial *number;* **rpoa 3333,4444;cug 1234;cd 5678**

The 7500 will reject incoming X.25 calls that use any of the following facilities:

- On-line facility registration
- Extended packet sequence numbering
- Packet retransmission
- Nonstandard default packet sizes
- Nonstandard default window sizes
- Incoming calls barred within a closed user group
- Outgoing calls barred within a closed user group
- All bilateral closed user group related facilities
- Local charging prevention
- Network user identification
- Charging information
- D-bit modification

The 7500 will ignore all other X.25 facility requests.

Memory Dialing

The system will automatically dial the number and load any data profile that was stored with the telephone number. For example, use the following command to dial a number stored at memory location 1:

At the **[CMD:]** prompt, type **dial m1**

Programming Telephone Numbers

You can program up to three telephone numbers for memory dialing of data calls. Up to 15 digits (or characters if alphanumeric dialing is supported by your system) can be entered. These numbers are labeled m1, m2, and m3. Programming memory dialing numbers is similar to programming data option profiles. The options associated with a memory dialing number include the telephone number, profile, and X.25 call options. The X.25 call options were described on the previous page. The only required option is the telephone number itself. To store a number in m1, do the following:

At the **[CMD:]** prompt, type **program m1.** The system will display the current values of m1 and prompt:

[MEMORY NUMBER m1]

[OPTION]	**[VALUE]**
[Number]	**[unspecified]**
[Profile]	**[active]**
[RPOA1]	**[unspecified]**
[RPOA2]	**[unspecified]**
[Closed user Group]	**[unspecified]**
[Reverse Charges]	[no]

[Type option name (or Q to quit):]

2. Type the name of the option (for example, **number)** for which you want to inset a value. The 7500 will respond:

   [Current value = unspecified]
   [Type new value (or Q to quit):]

3. Type the value for that option (for example, **5551212).** The 7500 will respond by displaying a table of all values for this memory location and will prompt again:

   [Type option name (or Q to quit:]

4. Type in the next option name for which you want to assign a value and repeat step 3.

5. Type **Q** when you are done. The 7500 will display:

   [Do you want to save the changes(s) you made (Y or N)?]

6. Type **y** to save the changes. The 7500 will save your changes and display the following message:

   [m1 updated]

   Type **n** to cancel the changes. The 7500 will display:

   [No changes made to m1]

Default or Hot Line Dialing

Your 7500 can automatically connect your terminal to one (and only one) predetermined endpoint. To use this feature, which is called default dialing or hotline dialing, your systems administrator must program the switch. Check with your system administrator to see what endpoint you can access via default dialing; then proceed.

ACTION	PROCEDURE
To Use Default or Hotline Dialing **From your terminal**	1. At the **[CMD]** prompt, type **dial,** press [RETURN].

Suspending and Continuing Data Transmission During a Data Call

This section describes how to switch between Local and Data Modes once a data call has been established (Figure 21).

To suspend data transmission and return to Local Mode:

- Rapidly type the Attention sequence: **+++.** You will see the **[CMD:]** prompt on your screen. This means that data transmission has been suspended; you can now issue commands to the 7500, using the commands explained later in this chapter.

To exit the Local Mode and return to Data Mode:

- At the **[CMD:]** prompt, type **continue.**

(To change the Attention sequence, see **CHAPTER 4: DEFINITION OF 7500 OPTIONS.)**

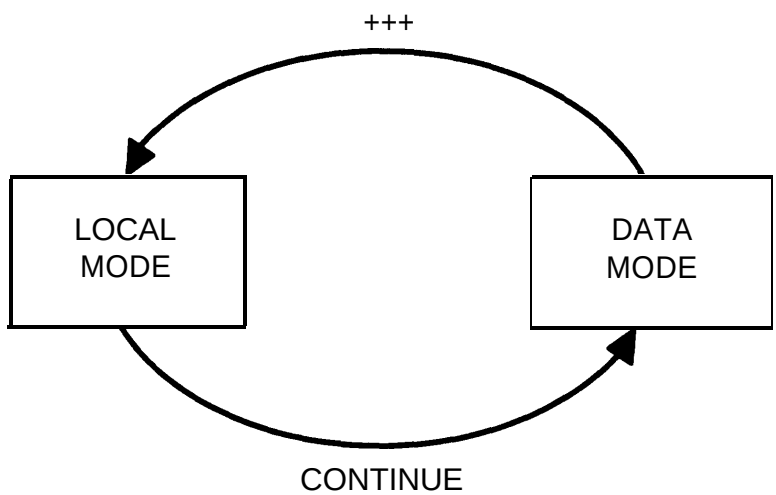


Figure 21: Going Between Local Mode and Data Mode During a Data Call

NOTE

If the user escapes to Local Mode while the far end is transmitting Mode 2 data, this data may be lost.

Commands

When to Type Commands

You can only type commands using the data terminal keyboard to dial calls, program, and maintain your system when you are in Local Mode. When in Local Mode you are not transmitting data, and your 7500 is interpreting and acting upon the instructions that you type. Your 7500 is in Local Mode when your data terminal displays the **[CMD:]** (command) prompt.

If you are not on a data call, the **[CMD:]** prompt should be on your terminal screen. (If it is not, press [BREAK], type **AT,** and then press [RETURN] to automatically match the Speed and Parity of the terminal)

If you are on a data call, rapidly type the Attention sequence (default value: **+++)** to display the **[CMD:]** prompt. This suspends your data call.

The following is a brief description of the commands that you can use with this system. The use of the commands is explained in more detail throughout this section.

Table F: Commands, Their Abbreviations and Descriptions

Command	Abbreviation	Description
continue	con	Returns the 7500 to Data Mode
copy	cop	Used to save active profiles, change a profile, store the last data number dialed
dial	d	Dial a data call
end	e	Disconnects the call
help	h	Displays Help menus
program	p	Puts the 7500 into program mode
redial	r	Dials the last data number dialed
set	s	Sets a data option to a value in the active profile (pA)
test	t	Enables local loopback or remote loopback tests
view	v	Displays an option profile or a memory profile
&&h	&&h	Used to invoke the AT mode which uses a different set of commands

How to Type Commands

You can type a command statement any time that you have the **[CMD:]** prompt on the screen.

To execute a command:

Type the command, then press [RETURN]. You can generally assume that after each command, you must press [RETURN] — even if [RETURN] is not explicitly stated in the text. An exception to this rule arises when you use the Attention sequence (no [RETURN]).

If you make an error while typing, use [BACKSPACE] to correct it before pressing [RETURN], or hold down the key labeled [CTRL] and type **x** to cancel the command line.

Abbreviating Commands

You can abbreviate command names. You need only type the "unique" part of the name (See Table F). For example, **dial** becomes **d,** and **continue** becomes **con.** You can abbreviate option names in the same way.

Data Option Profiles

List of Data Options

Voice calls require only that you dial a number. Data calls, however, require that your system be configured with the appropriate data-communication profile so that the data can be sent and received. Each profile that you use is composed of options that control the operation of the 7500.

The following is a list of the options that determine how the 7500 will operate. The possible values for each option are listed opposite each option. In most cases, the factory options (printed in bold) will allow for successful data communications.

Table G: Data Option Values (Highlighting Factory Settings)

Option	Possible Values
Answer	**auto,** manual
Attention	off, 3 of the same ASCII characters **(+++)**
Autoadjust	**on,** off
Break	off, attention, interrupt, **break,** discard, reset
Busyout	on, **off**
Char.erase	**bs (CtrlH),** delete (DEL), off
DCD	follow, **ignore**
DTR	follow, **ignore**
Echo	on, **off**
Edit	on, **off**
FCPN	on, **off**
Forwarding	**off,** cr, any (for all control characters and DEL)
Idle.timer	**0.0** to 12.75 seconds
Line.erase	**can (CtrlX),** NAK (CtrlU), off
Match.speed	**on,** off
Min.timer	**on,** off
Mode	**B2,** BA, DX25
Parity	odd, even, mark, **space**
Rec.flow	eia, **xon/xoff,** off
Speed	300, 1200, 2400, 4800, **9600,** 19200
Text	off, diagnostic, **verbal**
Trans.flow	eia, **xon/xoff,** off

Each of the above options is explained in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.**

The values of the entire set of data options make up a data option profile. The following pages describe how to create and use data option profiles.

Types of Data Option Profiles

A data option profile is a group of option settings. You create a profile by selecting values for each option. Option settings determine in precise and specific ways how your 7500 will operate. Your 7500 has the capability to access up to four profiles: profile 1 (p1, the power up profile); profile 2 (p2); active profile (pA); and the factory profile (p0). The very first time a 7500 is powered up, p1 and p2 will be the same as p0.

Active Profile, PA

The active profile, pA, contains the values of the options that are currently in use. To change the value of data options within pA, you must use the set command (see below); you cannot use the program command to change pA.

Factory Profile, p0

This profile, p0, contains the factory option settings. The option values associated with the factory profile are stored permanently in memory and cannot be changed or programmed. If you believe errors exist in your option settings or if you are repeatedly having problems with data transmission, replace pA with the factory profile. To do this, type:

copy p0 to pA

This command will activate the factory profile settings. Table G shows the option values for p0; the settings are bolded.

Stored Profiles, p1 and p2

Profile 1 (p1) contains the option settings that are automatically loaded into the 7500 each time it is powered up. Therefore, you need to put the option values in p1 that you will use most often. After a power failure, p1 automatically gets loaded into pA. Thus, you should always program p1 with your most commonly used options. Profile 2 (p2) can be used to store an additional profile.

To use the option settings in a stored profile like p2, you must activate them; at the **[CMD:]** prompt, type:

copy p2 to pA

The system will respond:

[pA updated]

To replace one stored profile with another, copy the replacement profile to the replaced profile; for example, type:

copy p2 to p1

The above command will copy the values of p2 into p1 so they are identical.

The following table summarizes the information that is described in detail in the following sections.

Table H: Data Option Profiles

Profile	Use	To view, type:	To edit, type:	To activate, type:
Active Profile, pA	Settings used for data calls	**view**	**set** *option value* (e.g., **set parity even** To Store: **copy pA to p1**	(Already activated)
p0	Stored Data Profile (Factory Profile)	**view p0**	Factory Profile (Cannot be changed)	**copy p0 to pA**
p1	Stored Data Profile (Copied to active after self-test or power failure)	**view p1**	**program p1**	**copy p1 to pA**
p2	Stored Data Profile	**view p2**	**program p2**	**copy p2 to pA**

Creating (Programming) a Data Option Profile

It is possible to program two option profiles. The 7500 calls these profile 1 (p1), and profile 2 (p2). Profile 1 (p1) is automatically loaded after your set starts up again after losing power. The values of p1 should be set to your most frequently used settings.

To change the option values of p1 or p2 use the program command. The program command provides a series of prompts to help you with this task.

The program command cannot be used to change option values in the active profile. To change the active profile, use the set command (see a later section in this chapter, **Setting Options: Changing Your Active Profile, pA).**

NOTE

Speed and Parity options can only be changed using the set command or by typing [BREAK] **AT** (providing the Autoadjust option is **on).**

1. At the **[CMD:]** prompt, type **program p1** and press [RETURN].

   The 7500 will display the current option values for p1 and prompt:

   [Type option name (or Q to quit):]

2. Type the name of the option (for example, **answer)** that you want to change and press **[RETURN].**

The 7500 will display the current value and the possible values for that option and prompt:

[Type new value (or Q to quit):]

3. Type the new value (for example, **auto)** and press [RETURN] when you are finished.

4. The 7500 will display the new values and prompt again:

[Type option name (or Q to quit):]

5. Type the name of the next option that you want to change and repeat Steps 2 and 3.

6. When you are finished changing options, type **q** to quit.

7. The 7500 will prompt:

[Do you want to save the change(s) you made (Y or N)?]
Type **y** to save new values.

The 7500 responds:

[p1 updated]

Type **n** to cancel new values.

The 7500 responds:

[No changes to p1]

8. The 7500 will prompt:

[Do you want to activate this profile now (Y or N)?]

Type **y** to activate p1.

The 7500 responds:

[p1 copied to pA]

Type **n** to not activate p1.

The 7500 responds:

[p1 not copied to pA]

NOTE

Another way to change options is to use the **set** command (see the next section in this chapter, **Setting Options: Changing Your Active Profile, pA).**

Setting Options: Changing Your Active Profile, pA

To change the option values in the active profile (pA), use the set command. The program command can not be used to change options in pA.

To change an option value in pA, at the **[CMD:]** prompt type:

set *option* **to** *value*

For example:

set echo to on
set text to diagnostic

NOTE

Values in pA are not automatically stored. It is important to save this change by copying pA to one of the stored profiles. In the event of a power failure, pA values will be overwritten by values in p1.

To store pA, at the **[CMD:]** prompt type:

copy pA to p1
or
copy pA to p2

NOTE

In all of the above procedures, the word "to" is optional. Examples of the command without "to" are:

set echo on
set text diagnostic

Storing an Active Profile, pA

If you want to save the active profile as a stored profile, type:

copy pA to p2

The above command will store your active profile in p2. The system will respond:

[p2 updated]

If you want to store your active profile in p1, repeat the steps above but substitute p1 for p2. Remember, in pA you cannot program your options; the settings in pA, therefore, are not automatically stored. You must copy pA to a stored profile (p1 or p2), so your active profile is not lost in the event of a power failure.

Activating a Stored Profile

To activate a stored profile, type the following command at the **[CMD:]** prompt:

copy *profile* **to pA**

For example, to activate p1, type:

copy p1 to pA

The 7500 will activate the profile requested and respond:

[pA updated].

See NOTE below.

Replacing One Stored Profile With Another

To replace one stored profile with another, type **copy** *replacement profile* **to** *replaced profile.* For example, type:

copy p0 to p1

replaces the values of p1 with the values of p0.

See NOTE below.

NOTE

In all of the above command procedures, the word "to" is optional. Examples of the command without “to” are:

copy p1 pA
copy pA p1
copy p0 p1

Viewing an Option Profile

To display the option values for any profile, use the view command. Type **view** to display the values of the active profile. Type **view p1** to display the values of stored profile p1. Replace p1 with p2 or p0 in the **view** command to display their values.

NOTE

Remember that you can display the options on your data terminal screen and change them whenever you are in local mode (that is, not transmitting data). To suspend data mode and enter local mode, rapidly type the Attention sequence: **+++.** The system will display the **[CMD:]** prompt.

Viewing Individual Option Values Within the Active Profile, pA

You can also use the view command to check the value of an option within the active profile. For example, to check the value of Parity, type **view parity.** Both the current and possible values will be displayed on your data screen, for example:

```
[ current value  = even ]
[ possible values = even  mark  odd  space ]
```

Typical Data Option Settings for Data Transfer

This section describes which options you will need to modify for three types of data transfer.

Character by Character Transmission

For typical character by character data transmission, activate the factory profile (p0). Depending upon the network's configuration, it may be necessary to change the Mode option to DX25. (Check with your system administrator for your system's configuration.)

Line/Block at a Time Transmission

You may want to either create or change a line or block of characters at a time before sending them to the far-end. (This feature is only applicable to X.25 or Mode 3 data connections; see Mode in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.)**

First, activate the factory profile, p0. Second, set the Mode option to **DX** or **BA.** Third, set the Edit option to **on.** Fourth, change the Forwarding option from **off** to the desired value; typically this should be **cr.** Make sure that the 7500's Echo option is set to **on** and the data terminal's echo option is set to off.

Binary (8-bit) File Transfer

Use the following recommended setting if you are transferring a binary (8-bit) data file between computers.

Activate the factory profile (p0). Set flow control (Rec.flow and Trans.flow) to either **off** or **eia.**

NOTE

Both endpoints must (1) either be operating at the same speed or (2) both support eia flow control.

Worksheet — Option Profile Settings

Complete the following worksheet to record your desired option profile settings for p1 and p2. Information entered in this worksheet will help you when you are programming an option profile.

Worksheet: Your Option Profile Settings

Option	p0 Value	p1 Value (most frequent settings)	p2 Value
Answer	automatic		
Attention	+ + +		
Autoadjust	on		
Break	break		
Busyout	off		
Char.erase	bs (CtrlH)		
DCD	ignore		
DTR	ignore		
Echo	off		
Edit	off		
FCPN	off		
Forwarding	off		
Idle.timer	0		
Line.erase	can (CtrlX)		
Match.speed	on		
Min.timer	on		
Mode	B2		
Parity	space		
Rec.flow	xon/xoff		
Speed	9600		
Text	verbal		
Trans.flow	xon/xoff		

NOTE

We strongly recommend that after you complete this worksheet, you copy it then post it where you can easily find it for reference.

Getting Help

You can ask for help any time that you have a **[CMD:]** prompt on the screen. When you type **help,** the system displays the following screen:

```
CMD:  HELP

  Type HELP and the topic you want to learn more about.
 Examples:  help test, h attention

 COMMANDS:  continue      copy          dial          end       help     &&H
            program       redial        set           test      view

 OPTIONS :  answer        attention     autoadjust    break           char.erase
            dcd           dtr           echo          edit            fcpn
            forwarding    idle.timer    line.erase    match.speed     min.timer
            mode          parity        rec.flow      speed           text
            trans.flow

 X.25 CALL OPTIONS:     cd            cug           rc          rpoa

 STORED DATA PROFILES:  p0            p1            p2

 STORED MEMORY NUMBERS: m1            m2            m3
```

You can get further help in any of the following ways:

1. Type **help** *option* to display the possible values for the option:

   [CMD:] help dtr

   The 7500 will respond:

   [current value = ignore]
   [possible values = follow ignore]

2. Type **help** *command* to list all commands or options that begin with the letters typed:

   [CMD:] help re

   The 7500 will respond:

   [redial rec.flow ?]

3. Type **help** *command* to get a brief description of how to use the command or a brief description of the options that are available with the command:

   [CMD:] help end

   The 7500 will respond:

   [Type END to end a data call in progress.]

Testing Your 7500 Data Module

In addition to the tests described in **CHAPTER 3: FRONT PANEL FEATURE ACCESS,** you can do two tests from your attached data terminal on your 7500. The two tests are the Local Loopback and the Remote Loopback test. To do these two tests, you will use the *test* command. Taken together, these two tests can help you isolate data communications problems.

Local Loopback Test

The purpose of the local loopback test is to ensure that there are no data transmission errors in the local part of the data transfer circuit (between the data terminal and the 7500). When the local loopback test is initiated, data travels from the data terminal to the 7500, where it is looped back to the data terminal. You can do local loopback tests when the set is idle (local-idle mode) or when it is engaged in a data call (local-data mode).

To initiate a local loopback test at the **[CMD:]** prompt:

1. Type **test local** on your data terminal.

   [LOCAL LOOPBACK TEST]
   [ENTER ATTENTION SEQUENCE TO END TEST]

2. Type characters on your terminal keyboard. They will be echoed on your screen.

   - If you find no errors, the 7500 passed the test.

3. Rapidly type the Attention sequence (default value is +++) to end the test.

   [LOCAL LOOPBACK TEST ENDED]

Remote Loopback Test

This test requires compatible AT&T equipment at the remote end.

The remote loopback test ensures that no problems with data transmission are occurring in the data transfer circuit. When you initiate a remote loopback test, data is transmitted from the data terminal, through your 7500 and the network to the data module at the far-end, where it is looped back to your 7500. A data call must be established before you initiate a remote loopback test.

To initiate a remote loopback test:

1. Establish a data call.
2. Rapidly type the Attention sequence (default value is +++).
3. Type at the **[CMD:]** prompt: **test remote.** The 7500 will display:

   [REMOTE LOOPBACK TEST]
   [ENTER ATTENTION SEQUENCE TO END TEST]

   Or, if you are not on a data call, the 7500's response is:

   [Test Remote cannot be used at this time]

4. Type characters on your terminal keyboard and check to see that they are being echoed as typed.
   - If you find no errors, the 7500 passed the test.
5. Rapidly type the Attention sequence (default value is +++) to end the test. Ending the test does not end the call. You will be in local mode, ready to transmit data as the 7500 usually does.

   [Call Status: Data Call Active]
   [Type H for help.]

6. At the **[CMD:]** prompt, type **continue** to return to Data Mode.

AT Mode Operation

The AT mode provides an interface similar to that available on many popular modems. In particular, the AT mode is appropriate when using a PC with communications software that uses AT commands. Since this mode is more limited than the CMD local mode, it should only be used when absolutely required by the communications software.

Switching From CMD Local Mode to AT Mode

To switch to the AT local mode from the CMD local mode:

At the **[CMD:]** prompt, type **&&h**

The 7500 will respond:

[AT COMMAND MODE]

The AT Mode does not provide a prompt. It acknowledges most commands with “OK”. Commands used with the CMD local mode will not be recognized in the AT mode.

Suspending and Continuing Data Transmission During a Data Call

To suspend data transmission and return to AT mode, rapidly type:

attention sequence (default value: **+++)**

Data transmission has been suspended and you can now type AT commands.

To exit AT mode and return to data mode:

Type **ato**

Exiting AT Mode and Returning to CMD Local Mode

To exit AT mode and return to the CMD local mode, type:

at&&t
or
at&&a

If there is no data call active, the system will respond:

[AT&& T]
[CALL STATUS: IDLE]
[Type H for help]
[CMD:]

If there is a data call active, the system will respond:

[AT&&T]
[DATA CALL ACTIVE]
[TYPE H FOR HELP]
[CMD:]

AT Commands

The AT mode is included in the 7500 primarily to support commonly used communication packages operating on PCs. The following table shows the commands which the AT mode supports. Note: in some cases, you may have to set compatible options for your particular communications package in command mode before entering AT mode.

Table I: AT Commands and Applications

Command*	Application
ata	To answer an incoming call
atd <string> or **atdt<string>** or **atdp<string>**	To dial the string
ate or **ate0**	To disable command echo
ate *n*	To enable command echo
ath	To disconnect data calls from the AT local mode
ati *n*	To request identification number for communication package
ato	To return to data state from AT mode
atq or **atq0**	To allow result codes of numeric and verbal options
atq*n*	To disable functionality of the numeric or verbal result codes
ats*m*=*value*	To program the S-register indicated by "m" to the value specified
at=*value*	To program the S-register pointed to with the value specified
ats*m*	To point to the *m* S-register (see next table)
at? or **ats***m?*	To read the value of an S-register
atv or **atv0**	To enable numeric result codes
atv*n*	To enable verbal result codes
a/	To repeat last AT command issued
atz	To return data options to default
at&c or **at&c0**	To set the DCD option to **ignore**
at&c*n*	To set the DCD option to **follow**
at&d or **at&d0**	To set the DTR option to **ignore**
at&d*n*	To set the DTR option to **follow**

* Where *n* is used, any digit other than 0 can be substituted. Where *m* is used, any digit from 0 - 5 can be substituted.

In addition, the S-registers provide a means of changing or reading selected 7500 options.

To select a particular S-register, type **ats***m*, and [RETURN] (where the value of "m" is the register you want). Until another register is specified, the value of S-register "m" can be read by typing **at?** [RETURN]. The value of the S-register "m" can be changed by typing **at**=*value* [RETURN].

Table J: S-Registers

S-Register Table			
Register	**Description**	**Default**	**Comments**
S0	Controls the Answer option	0	0 = **auto** 1 = **manual**
S1	-	-	not used
S2	ASCII value of the Attention sequence	43 (+++)	decimal value of ASCII character used for Attention sequence
S3	Defines carriage return	13 (carriage return)	decimal value of ASCII character; used to end command line and to end result code
S4	Defines line feed character	10 (line feed)	decimal value of ASCII character; used after carriage return only when verbal result codes are enabled (see **atv***n* command in Table D)
S5	Defines backspace character	08 (backspace)	decimal value of ASCII character used as backspace
All others			ignored

Dual Port DCE Operation

If your 7500 has a second asynchronous board, you may attach two data terminals or other devices to it. This enables two users to place data calls at the same time. There are, however, some restrictions on this capability:

- Only DX25 mode can be run on both ports simultaneously.
- Only one user at a time can use circuit-switched Mode 2 (B2) or Mode 2/3 (BA) adaptive.

NOTE

The dual port configuration does not simultaneously support two circuit-switched Mode 2 (B2) or Mode 2/3 (BA) adaptive calls. In addition, the dual port configuration provides independent sets of profiles (pA, p1, and p2) and memory dialing numbers (m1, m2, m3) for each port.

Asynchronous DCE With the Multipurpose Enhancement Board

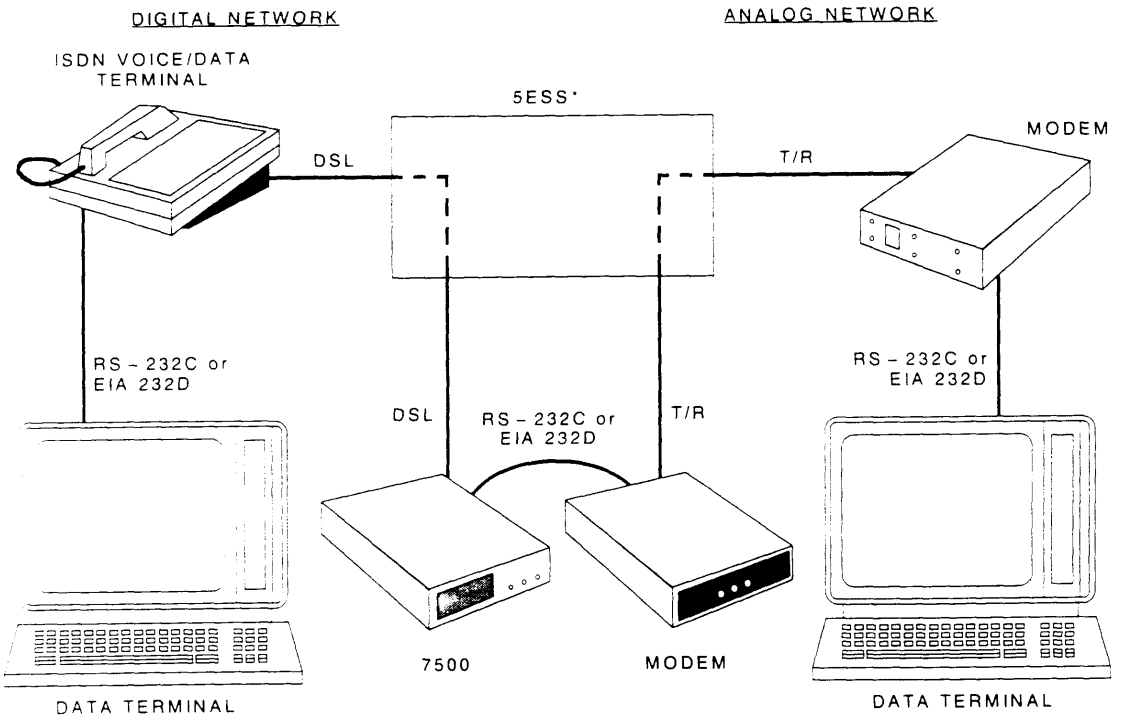
If you have installed a multipurpose enhancement board, you may dial calls using the RS-366 interface.

CHAPTER 6: ASYNCHRONOUS DTE CONFIGURATION

Modem Pooling Applications

The description of the 7500 in this chapter is directed at the technical user responsible for maintaining the modem pool. A description of the typical user's interaction with the 7500 is also included.

The most common application for the 7500 in the DTE configuration is in a modem pool. In this application, the 7500 serves as an interface between the digital network and the analog network. As the system diagram (Figure 22) illustrates, the 7500 receives the digital data, either circuit or packet switched, and sends it across an EIA interface to a modem. The modem receives the data coming across the EIA interface and sends it through the analog network to a remote modem. The reverse happens to data coming from the other direction.



DSL = Digital Subscriber Line
T/R = Tip and Ring (analog)

Figure 22: The 7500 Used in a Modem Pooling Application

Characteristics of Modems that can be Attached to the 7500

Modems that are to be used with the 7500:

- Must be full duplex.
- Must support 10 bit code (start bit, 8 data bits, plus at least one stop bit).
- Must use the asynchronous RS-232C or EIA-232D interface.
- Must support any or all of the following speeds: 300, 1200, 2400, 4800, 9600, 19200 bps.
- Must autodial to support calls from digital to analog network.
- Must turn on Clear-to-Send (or keep it on) in response to a Data Terminal Ready signal from 7500-DTE when it is ready to receive ASCII dialing sequences from the 7500-DTE.
- Must not transition the Data Set Ready lead from On to Off during the transition from interactive (dialing) mode to data mode.
- Must terminate a data call or dialing sequence when the 7500-DTE turns off its Data Terminal Ready lead.
- Must turn off Data Set Ready or Receive Line Signal Detect for a minimum of 50 milliseconds when going on-hook at the termination of a data call.
- Must turn on Ring Indicator lead for at least 100 milliseconds in presence of incoming analog call.
- Should support EIA signals CI and CI2 if the modem is multispeed modem.

Overview of 7500 Operation

In this application, users from both sides of the network will call through the 7500 in a modem pool. A method for controlling option settings from the analog network side is provided. The user on the digital side cannot change option settings.

7500 Modem Pool: Digital to Analog Network

We recommend that Local Mode be set to **off** for the 5ESS switch X.25 packet-data modem pooling and digital to analog only circuit switched modem pooling.

The role of the modem pool for calls coming from the digital network is as follows:

1. The user dials the call:

   A user with a ISDN voice/data terminal or other compatible data device dials the telephone number that is associated with the modem pool (typically a hunt group).

2. The 7500 checks for the availability of the attached modem and answers:

   When the 7500 receives a data call, it turns on Data Terminal Ready and checks for Data Set Ready, Clear to Send, or Carrier Detect from the modem. If one or more of the signals are present, the 7500 accepts the call. The Auto Answer function is always enabled.

3. The user dials through the attached modem:

   The user trying to place the call must know what the procedure for using the modem is, for after it connects the modem, the 7500 passes user information to the modem without interpreting it. Most likely, a second stage of dialing will occur at this point, and the user will be connected through the analog network to the desired far end.

4. The analog-end modem answers and completes the call:

   If the modems are compatible, the end-to-end connection will be complete, and data exchange can take place.

   If the modem in the modem pool is a multi-speed modem and the modem-to-modem handshake results in the modem pool modem falling back in speed, this indication is signalled to the 7500 via pins 12 and 13 of the EIA interface. See **CHAPTER 9: TECHNICAL INFORMATION** for pins 12 and 13.

5. After the call has been established, the user on the analog side can use the commands listed on the next page to change 7500 options for the duration of the call. The options that can be changed are described in complete detail in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.** If Local Mode is **off,** then options cannot be changed.

7500 Modem Pool: Analog to Digital Network

Local Mode must be set to **cmd** or **at** for analog to digital circuit switched modem pooling.

1. In the case of the 5ESS switch X.25 packet data modem pool, the user on the analog network dials the telephone number associated with the data device that is connected to the digital network. The digital user must subscribe to this number for receiving data calls. Otherwise, the analog user dials a modem pool hunt group telephone number.
2. The modem signals the 7500 that a call has arrived from the analog side by toggling the Ring Indicator lead.
3. The 7500 signals the modem to answer the call by turning on the DTR lead.
4. In the case of the 5ESS switch X.25 packet data modem pool, the modem answers and the 7500 initiates an X.25 packet data call (Zero Called Address option is **on).** The network automatically routes the call. Otherwise, the 7500 sends a **[CMD:]** prompt to the user on the analog side. The user must then type **dial** and the dialed number of the endpoint.

   If the modem in the modem pool is a multi-speed modem and the modem-to-modem handshake results in the modem pool modem falling back in speed, this indication is signalled to the 7500 via pins 12 and 13 of the EIA interface. See **CHAPTER 9: TECHNICAL INFORMATION** for pins 12 and 13.

5. The user on the analog side can use the commands listed on the next page to change 7500 options for the duration of the call, provided the Local Mode option is set to **cmd.** The options that can be changed are described in complete detail in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS**

Disconnecting a Data Call from Either Endpoint

Either the analog or the digital endpoint can terminate a data call, no matter who has initiated the call.

Analog Disconnect

When the analog side disconnects the call, the attached modem turns off the DCD (Data Carrier Detect) or DSR (Data Set Ready) lead and the 7500 clears the data call.

Digital Disconnect

When the user on the digital side disconnects the call, the data call is cleared, and the 7500 turns off the DTR (Data Terminal Ready) lead to notify the modem to end the analog side of the call.

Asynchronous DTE Data Options

The following table shows all options available in the asynchronous DTE configuration. The X's in the CMD and Front Panel columns indicate the method for setting each option. "CMD" indicates that you can type commands on the keyboard of an attached data terminal; "Front Panel" indicates you can use the 3 buttons and the LCD on the 7500.

Table K: DTE Options

Option	Value	CMD	Front Panel
Attention	off, 3 of the same ASCII characters (- - -)	X	X
Autoadjust	**on,** off		X
Break	off, attention, interrupt, **break,** discard, reset	X	X
Busyout	on, **off**		X
Char.erase	**bs (CtrlH),** delete (DEL), off	X	X
DCD	follow, **ignore**		X
Echo	on, **off**	X	X
Edit	on, **off**	X	X
FCPN	on, **off**	X	X
Forwarding	**off,** cr, any (all control characters and DEL)	X	X
Idle.timer	**0.0** to 12.75 seconds	X	X
Line.erase	**can (CtrlX),** NAK (CtrlU), off	X	X
Local Mode	off, **cmd,** at	X	X
Match. speed	on, **off**	X	X
Min.timer	**on,** off	X	X
Mode	**B2,** BA, DX25	X	X
Parity	odd, even, mark, **space**	X	X
Rec.flow	eia, xon/xoff, **off**	X	X
Setup	**1-speed,** 2-speed, 3-speed		X
Speed	300, 1200, 2400, 4800, **9600,** 19200		X
Text	off, diagnostic, **verbal**	X	X
Trans.flow	eia, xon/xoff, **off**	X	X

Value in bold (Table K) indicates factory values. Each of the above options are explained in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.**

NOTE

If the Setup option is set to **2-speed** or **3-speed,** the autoadjust option should be set to **off.**

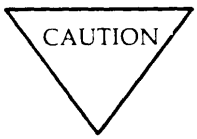
Using Commands

The use of CMD and AT commands are described in **CHAPTER 5: ASYNCHRONOUS DCE CONFIGURATION.** Several differences exist between the DCE and DTE operation. They are:

- Only the remote user who calls into the 7500 from the analog network can use the commands.

  For the 5ESS switch X.25 packet data modem pooling and digital to analog only circuit switched modem pools, it is recommended that Local Mode be set to **off.** Therefore the remote user does not have access to these commands.

- Option values changed through these commands remain only in effect for the duration of the call. Once the call has been disconnected, the options return to the values previously programmed at the front panel of the 7500.



Setting options from the front panel should only be performed when there is no call in progress.

- The DTE commands and options available are shown in the Help screen below. All of these options are described in detail in **CHAPTER 4: DEFINITIONS OF 7500 OPTIONS.**

```
CMD: HELP

  Type HELP and the topic you want to learn more about.
  Examples: help test, h attention

  COMMANDS: continue      dial          end      help    &&H
            set           test          view

  OPTIONS:  attention     break         char.erase    echo          edit
            fcpn          forwarding    idle.timer    line.erase    match.speed
            min.timer     mode          parity        rec.flow      text
            trans.flow

  X.25 CALL OPTIONS:    cd            cug           rc          rpoa
```

CHAPTER 7: SYNCHRONOUS DCE CONFIGURATION

The 7500 in the synchronous configuration is used for synchronous data transfer. In synchronous operation, all options are set from the front panel on the 7500. The 7500 can also originate data calls, answer incoming data calls, and disconnect data calls from the front panel.

Connection Types

The 7500 in the synchronous configuration can have either a nailed-up connection, a circuit switched connection (dialed up or permanent switched connection), or an On-Demand B-channel X.25 connection.

Nailed-Up Connections

If you have set the Mode option for **nailed B1** or **nailed B2,** the 7500 transfers data between the EIA-232D or V.35 interface and the specified channel (B1 or B2) regardless of any signaling for control of the channel. One application for this type of connection is to interface an external PAD/Multiplexer directly with the 5ESS X.25 packet switch.

Circuit Switched Connections (CS)

If you have set the Mode for circuit switched (CS), data calls are established and disconnected at the user's discretion, except that permanent switched connections are established automatically by the switch.

On-Demand B-Channel X.25 Connections (BX Local and BX Remote)

An On-Demand B-Channel X.25 connection is a special form of a circuit switched connection which is used exclusively for a B-Channel connection to an X.25 packet switch. Selection of **BX Local** is appropriate for establishing a B-Channel X.25 connection to the local X.25 packet switch, e.g., the 5ESS switch, while selection of **BX Remote** is appropriate for connection to a packet switch external to the 5ESS switch. BX Local operation requires that a null telephone number be dialed (analogous to a hot line call; see **CHAPTER 3: FRONT PANEL FEATURES ACCESS,** the section on dialing an unstored number).

Making a Data Call

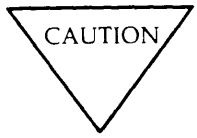
You can make a data call from the front panel of the 7500 as described in **CHAPTER 3: FRONT PANEL FEATURE ACCESS.** You can also make a data call using the Autodial option or the Multipurpose Enhancement Board RS-366 (see the **REFERENCE** chapter).

CHAPTER 8: INSTALLING THE 7500

Stand-Alone Installations

In this chapter, instructions for stand-alone installations are provided. For these installations, you will need different pieces of equipment depending on the configuration of your 7500 and of your network. A complete list is provided below. Asterisked (*) items are required for all installations.

- 7500 main housing*
- Power supply*
- D8W Telephone Line Cord*
- EIA-232D cable(s) or V.35 cable*
- Second Asynchronous Enhancement Board
- Multipurpose Enhancement Board
- High Speed Synchronous Enhancement Board with V.35 adapter cable
- NT1
- Terminating Resistor Adaptor



Changing the DCE/DTE flipboard or adding or removing any optional enhancement board will result in all options being reset to their factory values (p0).

Stand-Alone Single Port Asynchronous DCE Configuration

1. Remove the 7500 from the box.
2. Connect the telephone line cord to the jack labeled LINE.
3. Orient the power supply plug properly, then connect the cord to the 7500 into the connector labeled POWER.

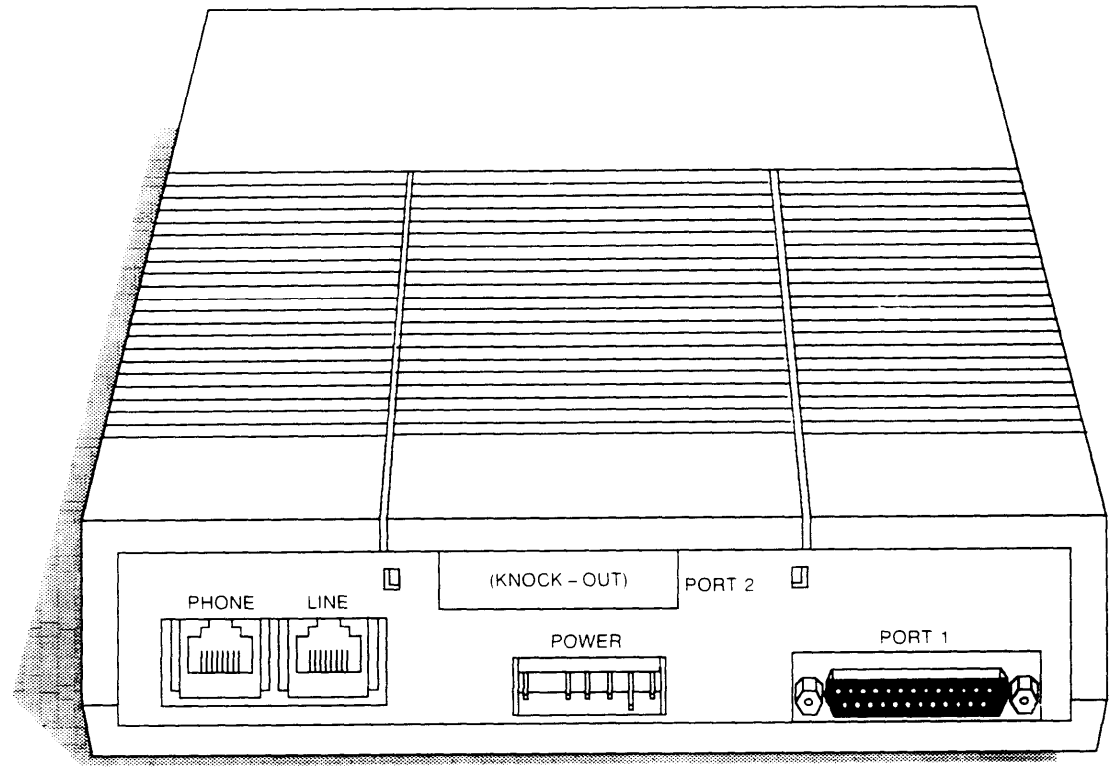


Figure 23: Rear Panel of the 7500

4. Connect the male end of the EIA-232D cable to the connector labeled Port 1.
5. Connect the other end of the EIA-232D cable to your data terminal.
6. Plug the power cord into an AC power outlet. Enter SPID. Perform a self-test.

NOTE Before attaching the telephone line to the wall jack, make sure that you do not need either the NT1 or the Terminating Resistor Adaptor. If you need either, see the special installation instructions provided at the end of this section.

7. Plug the telephone line cord into the telephone wall jack.

Stand-Alone Dual Port Asynchronous DCE Configuration

This configuration consists of the basic 7500 plus the Second Asynchronous Interface Enhancement Board.

1. Remove the 7500 from its box. For installed set, disconnect power cord.
2. Remove the Second Asynchronous Interface enhancement board from its box.
3. Open the door on the 7500.
   - First, insert a pen into the small hole located near the LINE label on the set's rear panel.
   - Next, push in on the tab in the hole while you pull up on that side of the door.
   - Repeat the procedure, sticking your pen into the small hole near the PORT 2 label.
   - Lift off the door and set it aside.

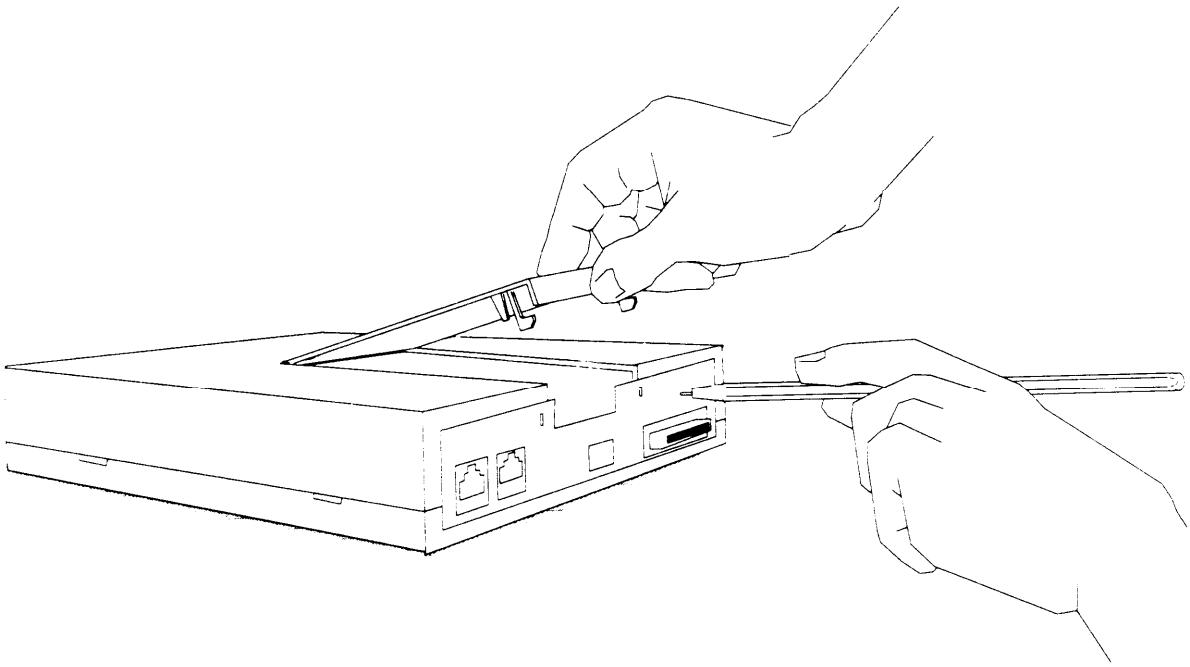


Figure 24: Removing the Door

4. Remove the knock-out from the Port 2 slot.
   - In the middle of the 7500's rear panel, the slot for the Port 2 connector is marked off. Holding the marked area in one hand and the rest of the rear panel in the other, gently push the two pieces in opposite directions until the knock-out separates from the rear panel.
   - Repeat this procedure at the other side of the knock-out.
   - Move the knock-out back and forth until it completely separates from the rear panel.
   - Discard the knock-out.

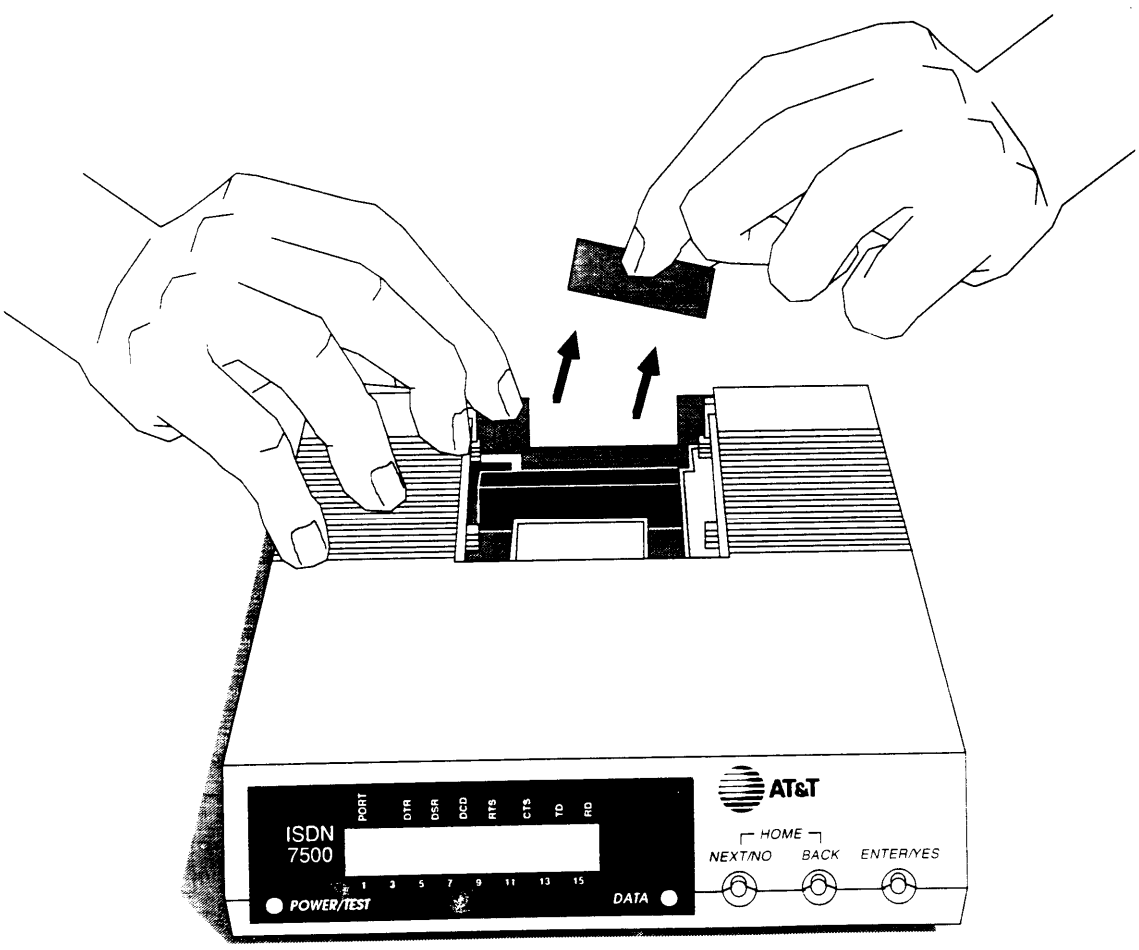


Figure 25: Removing the Knock-Out

5. Install the Second Asynchronous Interface enhancement board.
   - Holding the board with the EIA-232D connector pointed toward the back of the set and the component side down, position the board over the open area of the set.
   - Attach the pigtail connector to the pin located between the power connector and the screw for the EIA-232D connector.
   - Position the board so that its cutouts correspond to the notches in the plastic housing.

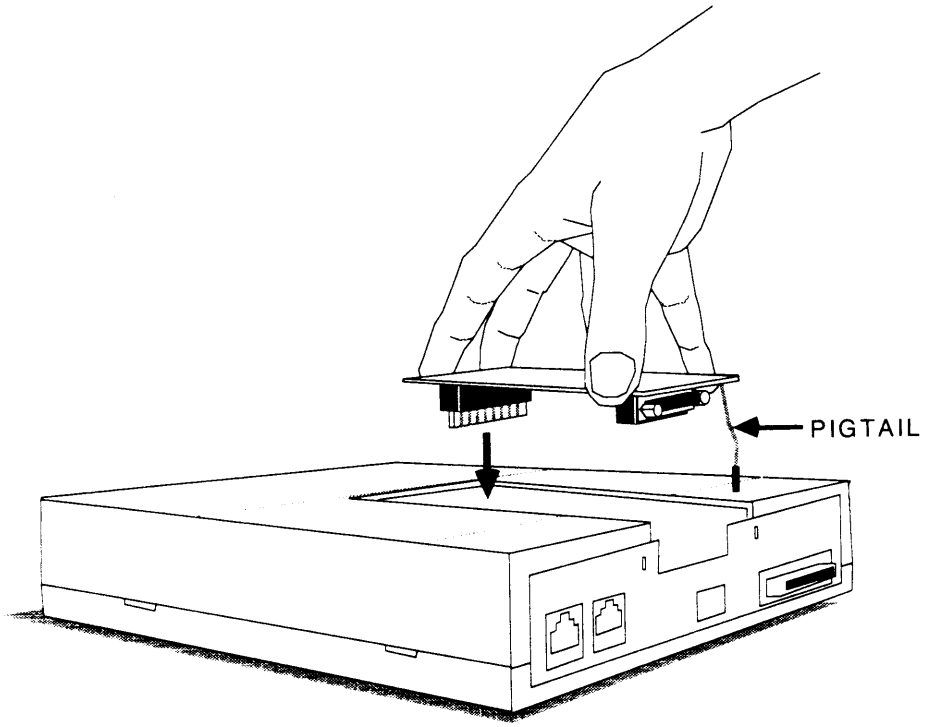


Figure 26: Installing the Second Asynchronous Interface Enhancement Board

- The vertical connector on the board should now be centered over its receptacle located in front of the firmware board already installed in the 7500.

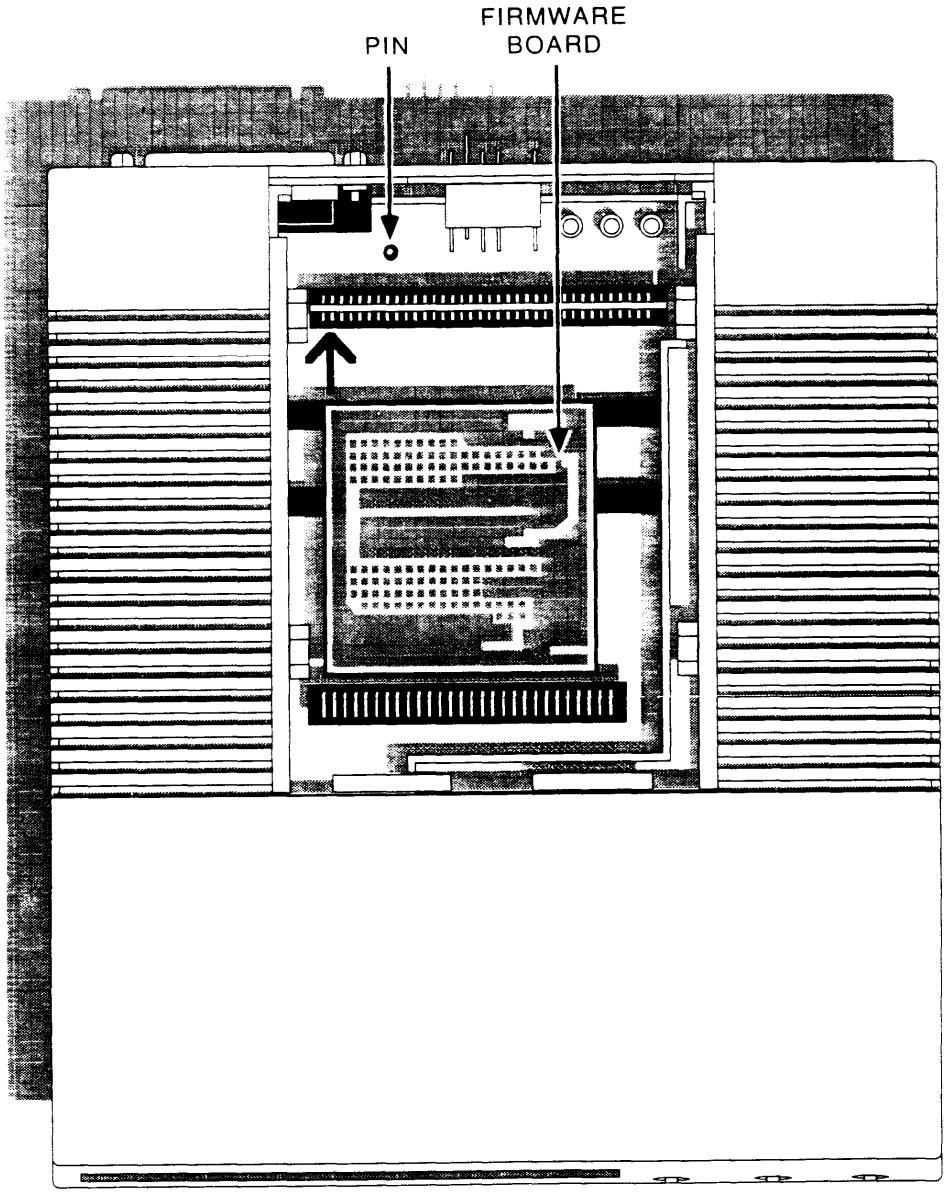


Figure 27: Top View

- Push gently but firmly on the board until it is firmly in place, and the edges of the board rest on the notches in the housing.

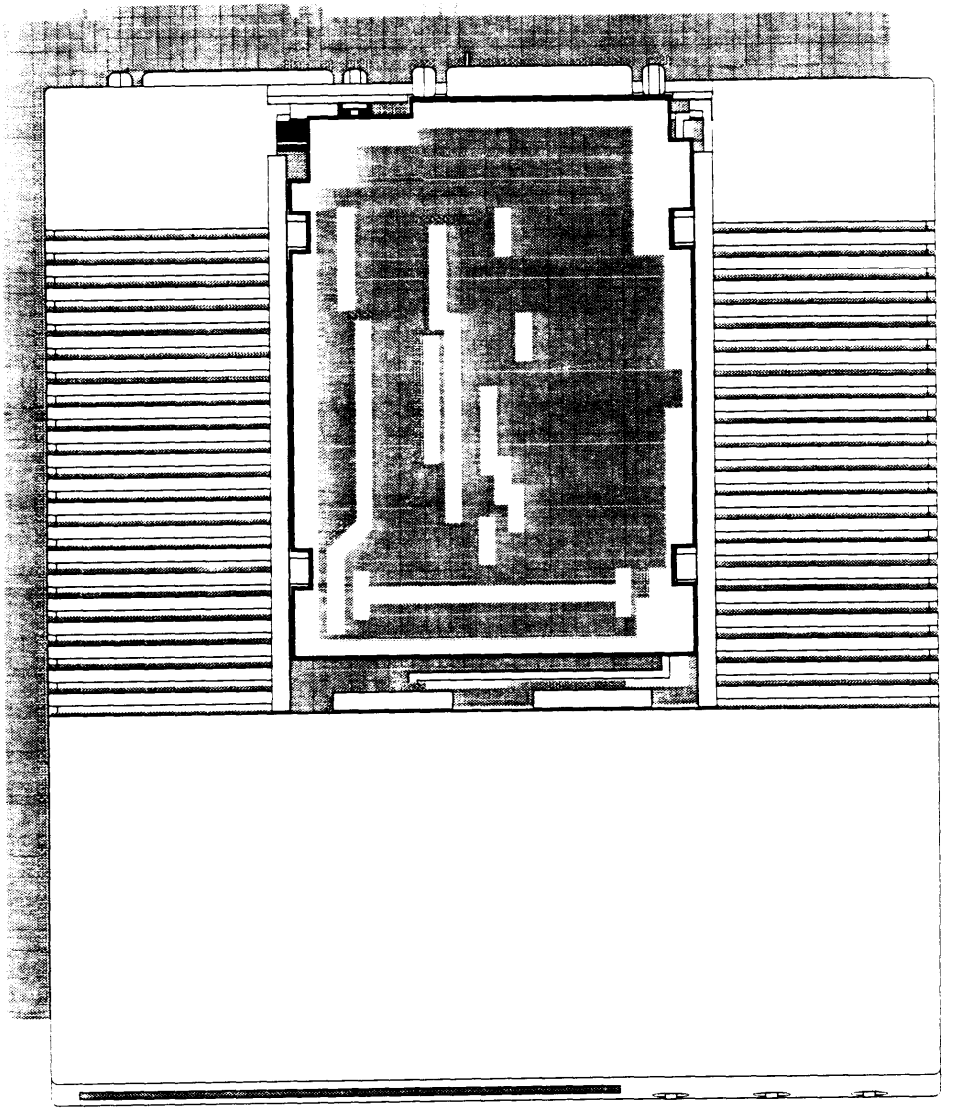


Figure 28: Top View with Second Asynchronous Interface Enhancement Board Installed

6. Close the door by hooking the hinges under the front housing, then snapping the rear tabs in place.
7. From the package in which your enhancement board came, remove the label indicating EIA-232D interface. Peel off the label and affix it to the rear panel underneath the Port 2 connector.

8. Connect the telephone line cord to the jack labeled LINE.
9. Orient the power supply plug properly, then connect the cord to the 7500 into the connector labeled POWER.
10. Connect the male end of the EIA-232D cable to the connector labeled Port 1.
11. Connect the male end of the EIA-232D cable from Port 2.
12. Connect the other end of the EIA-232D cable to your data terminal or computer port.
13. Plug the power cord into an AC power outlet. Enter SPID. Perform a self-test.
    - — The display will show **[ERROR-TRY AGAIN?].**
    - — Press [NEXT/NO]; the display will read **[ERASE & RESTART?].**
    - — Press [ENTER/YES]; all options will be reset to their factory values. the 7500 will automatically run a self test.

NOTE

Before plugging the telephone line into a wall jack, make sure that you do not need either the NT1 or the Terminating Resistor Adaptor. If you need either, see the special installation instructions provided at the end of this section.

14. Plug the telephone line cord into the telephone wall jack.

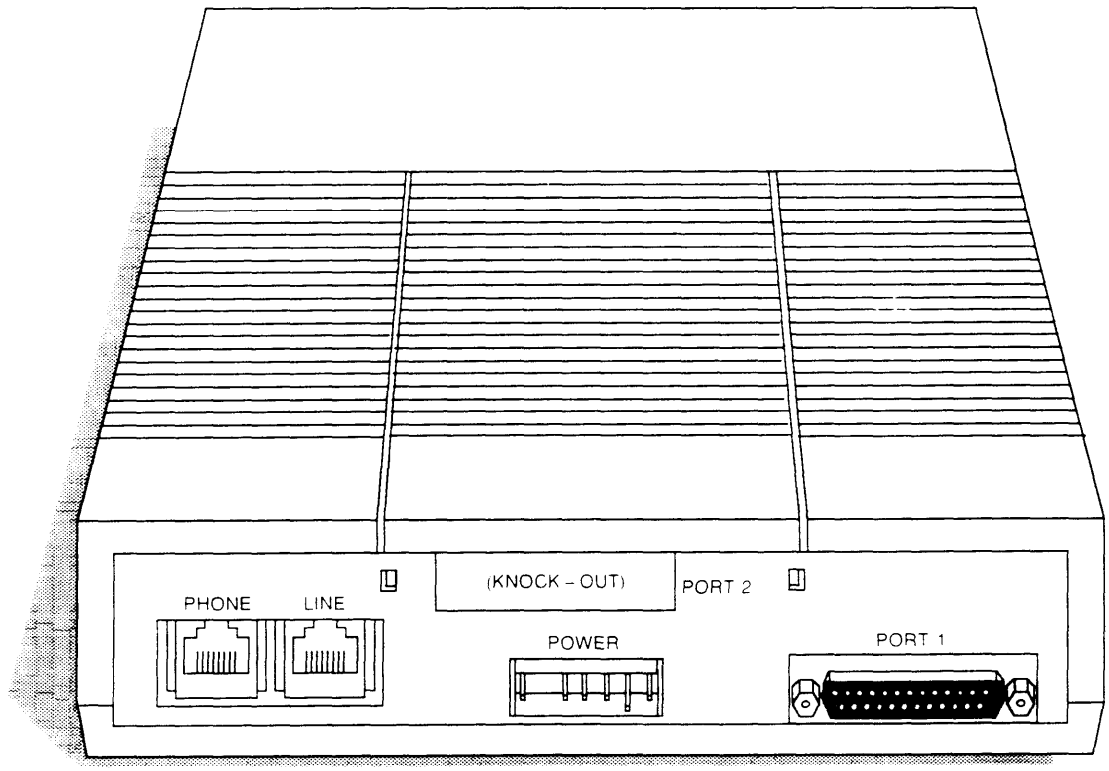


Figure 29: Rear Panel of the 7500

Stand-Alone Asynchronous DTE Configuration

1. Remove the 7500 from the box. For installed set, disconnect power cord.
2. Open the door on the 7500. First, insert a pen into the small hole located near the LINE label. on the set's back panel.
   - Next, push in on the tab in the hole while you pull up on that side of the door.
   - Repeat the procedure on the other side of the door.
   - Lift off the door and set it aside.

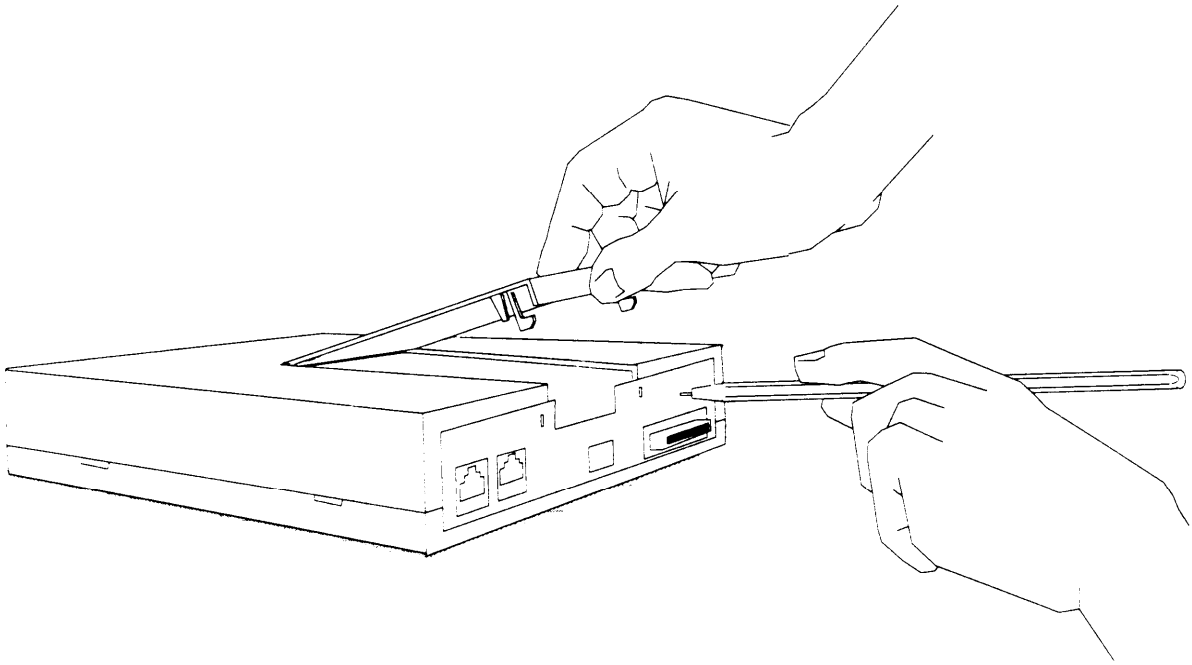


Figure 30: Removing the Door

3. Looking straight down at the inside of the 7500, locate the large silver arrow pointing toward the back of the set.

   This arrow points to the DCE/DTE flip board. (The flip board is perpendicular to the plane of the arrow.)

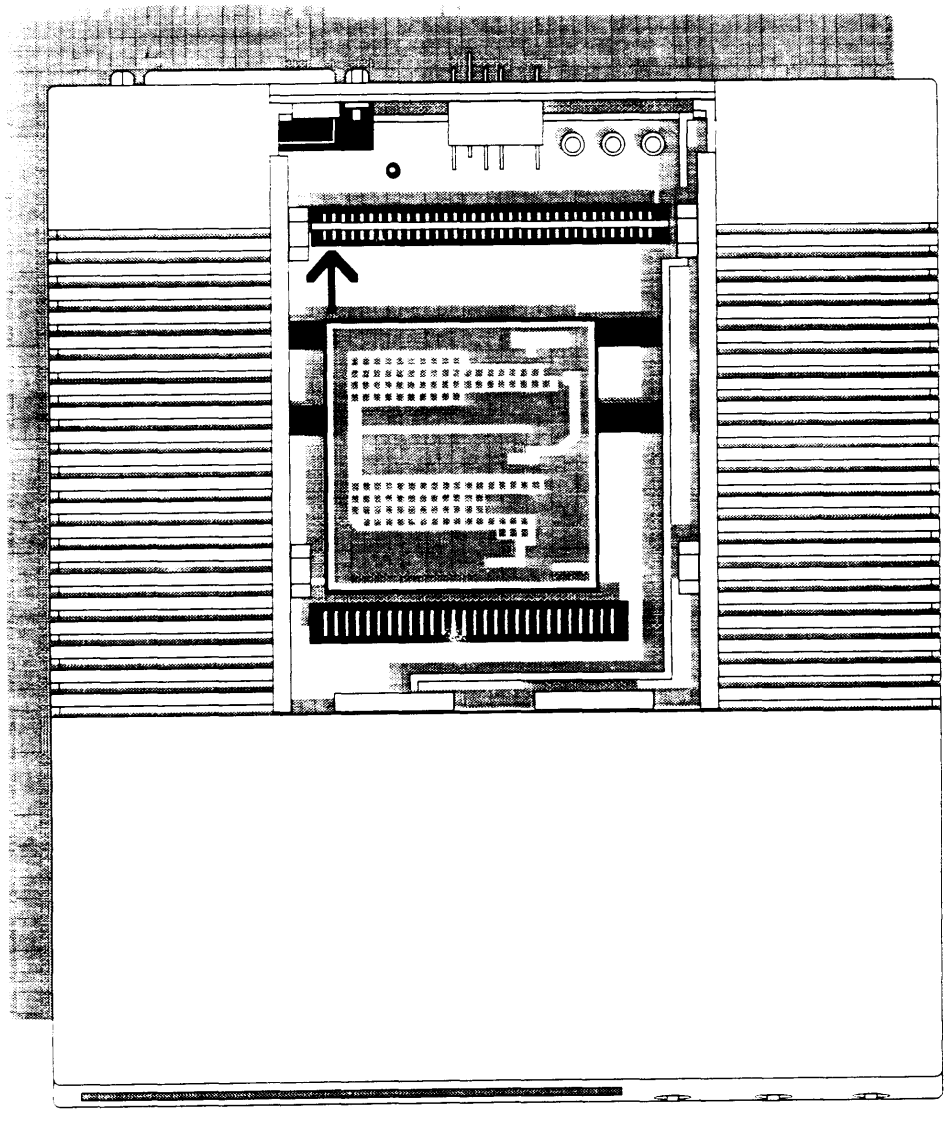


Figure 31: Top View Showing Silver Arrow

4. Look at the DCE/DTE Flip board from the front of the set. Either **DTE** or **DCE** will appear in the left hand corner of the board.

NOTE

Make sure you are looking at the board from the front of the set. The arrow should be on the left.

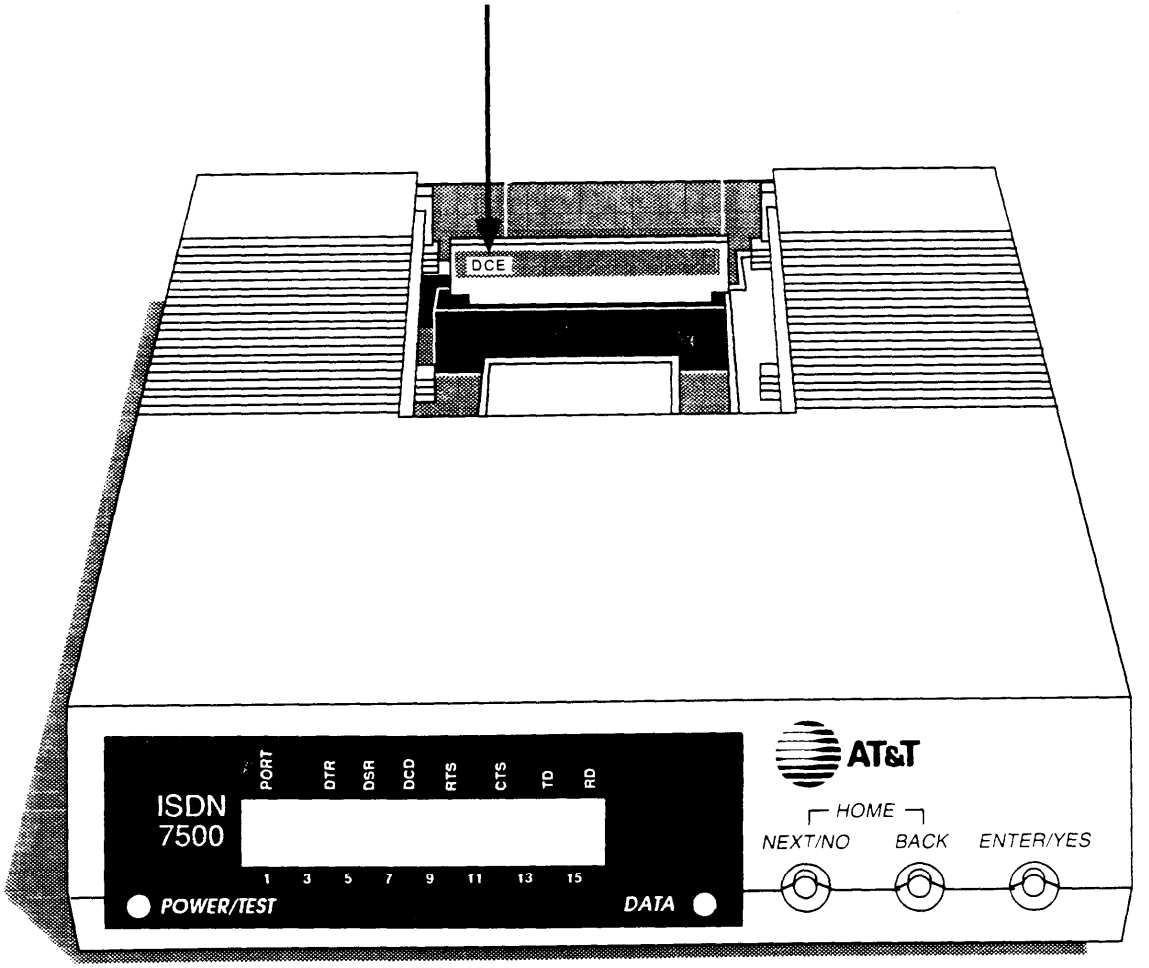


Figure 32: 7500 Showing Location of the DCE/DTE Flipboard

5. If the arrow points to **DTE,** then the 7500 is configured as a DTE. Proceed to Step 7.
6. If the arrow points to **DCE,** you must reposition the board.
   - Grasp the board firmly with both hands.
   - Pu1l up gently until the board is completely free.

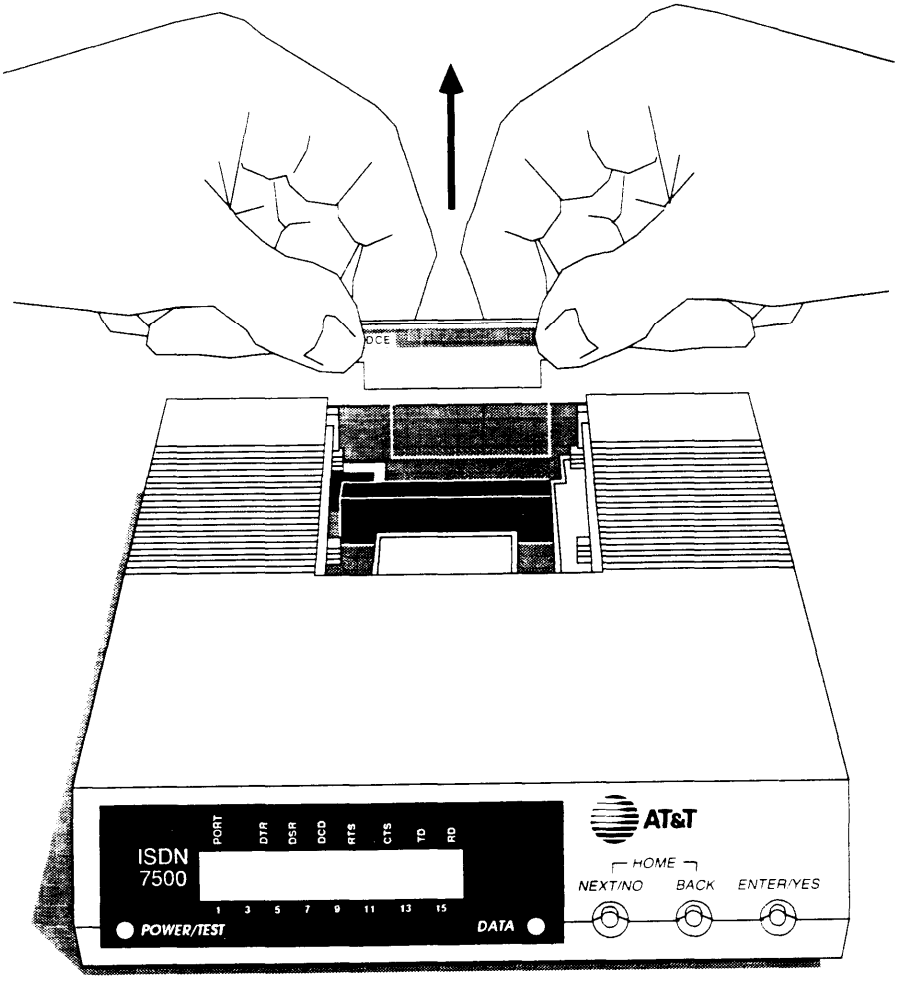


Figure 33: Removing the DCE/DTE Flipboard

- Turn the board around until **DTE** is facing the arrow.
- Replace the board into its slot.

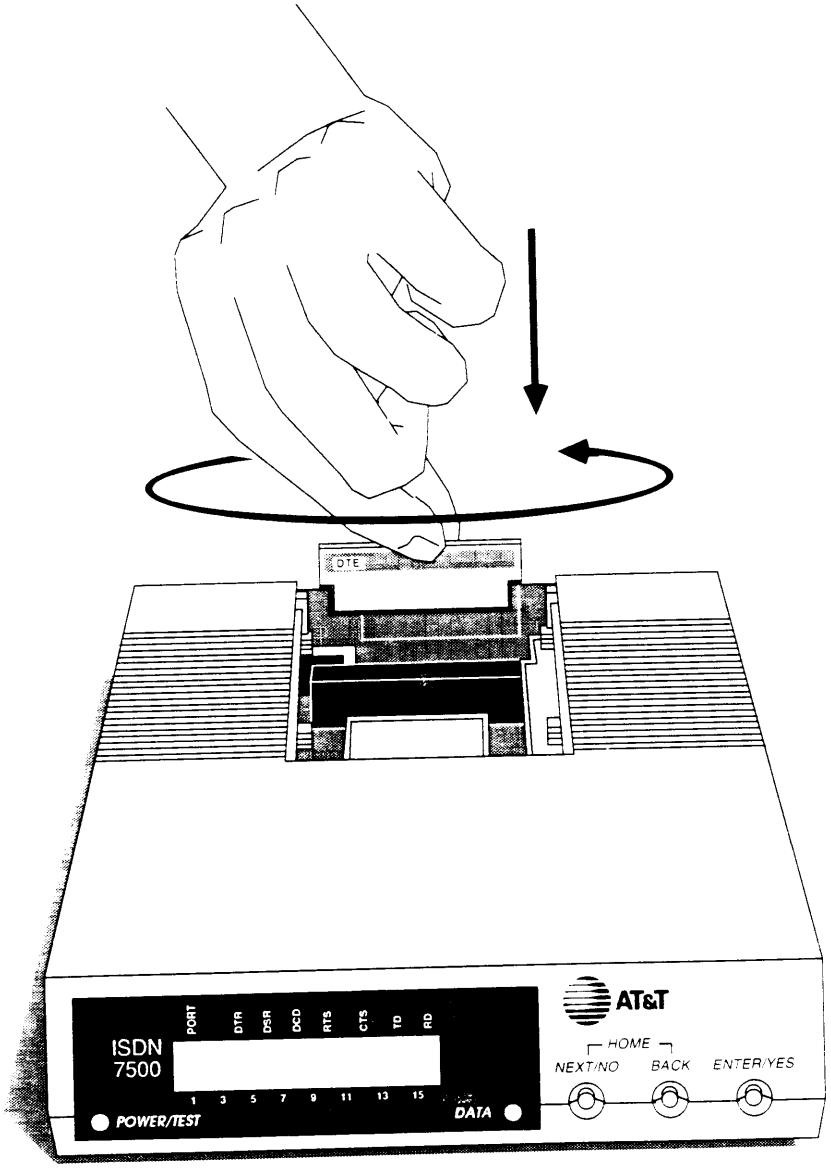


Figure 34: Reversing the DCE/DTE Flipboard

7. Close the door by hooking the hinges under the front housing, then snapping the rear tabs in place.
8. Connect the telephone line cord to the jack labeled LINE.
9. Orient the power supply plug properly, then connect the cord to the 7500 into the connector labeled POWER.
10. Connect the male end of the EIA-232D cable to the connector labeled Port 1.
11. Connect the other end of the EIA-232D cable to your modem.
12. Plug the power cord into an AC power outlet. The 7500 will automatically run a self test. For new sets, enter SPID and perform a self-test.

NOTE

Plugging attaching the telephone line into the wall jack, make sure that you do not need either the NT1 or the Terminating Resistor Adaptor. If you need either, see the special installation instructions provided at the end of this section.

13. Plug the telephone line cord into the telephone wall jack.

Stand-Alone Multipurpose Enhancement DCE Configuration

This configuration consists of the basic 7500 plus the Multipurpose Enhancement board. Follow Steps 1 through 9 listed in the **Stand-Alone Dual Port Asynchronous DCE Configuration** section and then continue steps listed below.

1. Connect the other end of EIA-232D cable (from Port 1) to data terminal or computer port.
2. If you are using the automatic calling unit functionality, connect a 25-pin EIA cable between the RS-366 interface (Port 2) and your computers RS-366 automatic calling interface.
3. Plug the power cord into the AC outlet. For new sets, enter SPID and perform a self-test.
4. Plug the telephone line cord into the telephone line jack.

Stand-Alone High Speed Synchronous DCE Configuration

This configuration consists of the basic 7500 plus the High Speed Synchronous Enhancement board. Follow Steps 1 through 9 listed in the **Stand-Alone Dual Port Asynchronous DCE Configuration** section and then continue steps listed below.

1. Connect a V.35 adapter cable (packaged with the enhancement board) to Port 2.
2. Connect a V.35 cable between the adapter and the V.35 data terminal.
3. Plug the power cord into the AC outlet. For new sets, enter SPID. Perform self-test.
4. Plug the telephone line cord into the telephone line jack.

Installing NT1 or Terminating Resistor Adaptor

The next two figures depict different configurations depending on what equipment is centrally located. “Centrally located” devices are located in a place other than where the 7500 is being installed and therefore are not included in each figure.

Use the following configuration when the NT1 is provided in a central location.

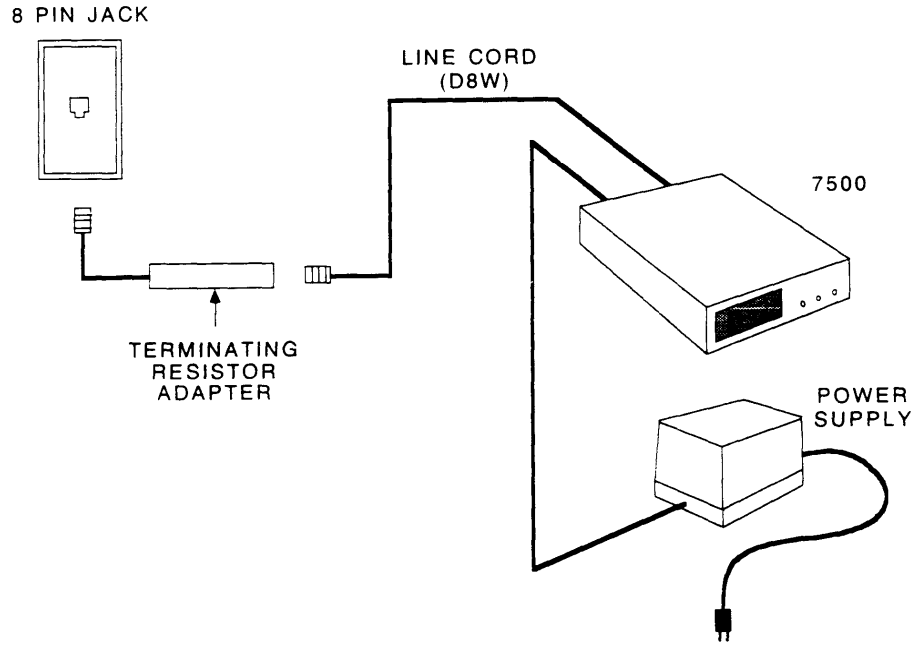


Figure 35: Installation Using a Power Supply and Terminating Resistor

Use the following configuration when nothing is provided in a central location.

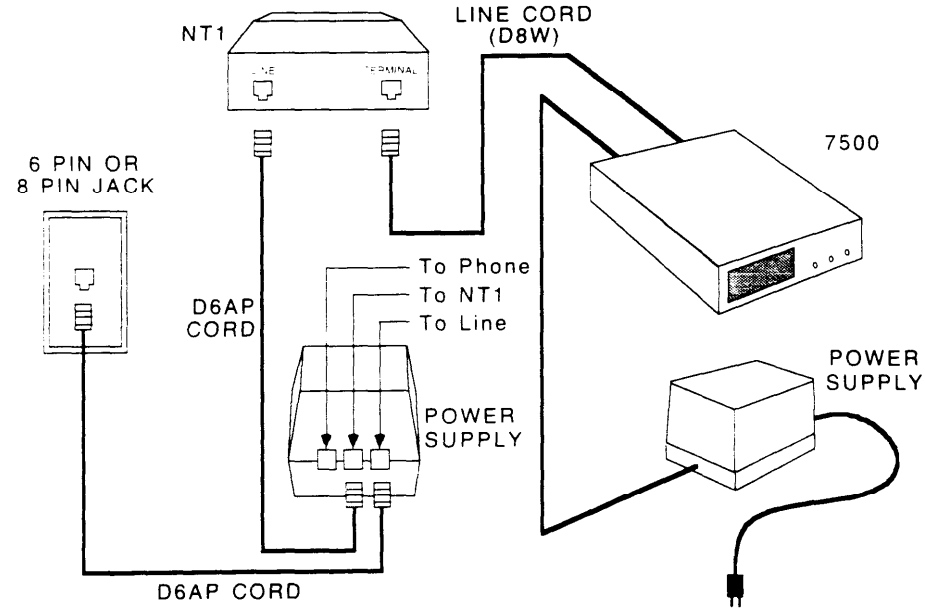


Figure 36: Installation Using a Power Supply and an NT1

Use the following configuration when both the NT1 and the terminating resistor are provided in a central location.

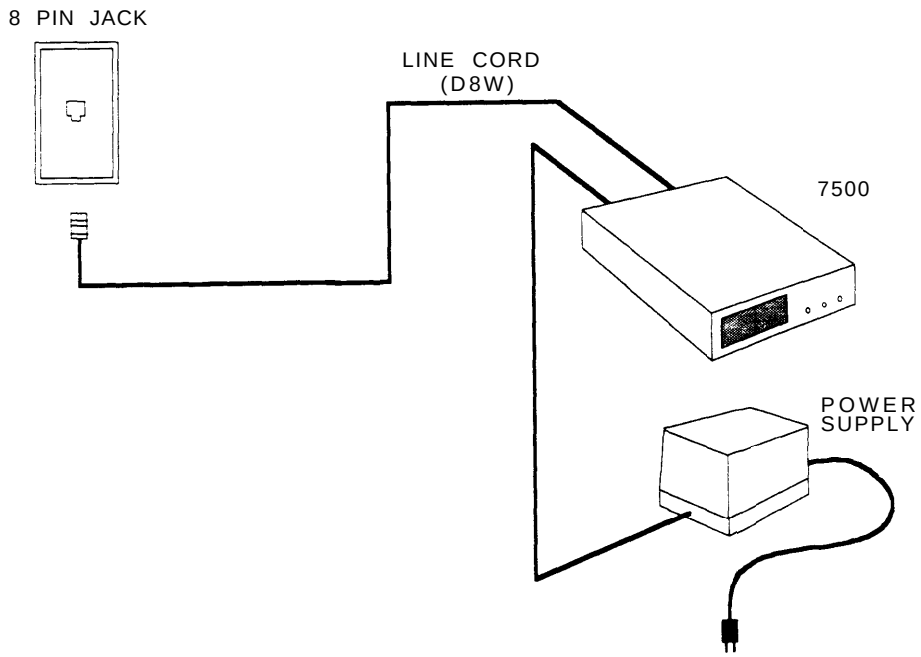


Figure 37: Installation Using a Power Supply

Installing the 7500 Data Module in a 77A Data Mounting

In this section, we explain how to install one or more data modules in an empty, unpowered — or partially filled, powered — 77A Data Mounting. The mounting comes from the factory with the power supply and DC power distribution cable installed.

Please do the following in order:

1. For new installations, place the 77A Data Mounting in the cabinet or frame where it will be used. Note that the 77A has mounting brackets (1) screwed to the outside of its left and right sides. Reposition those brackets as appropriate to fit a 19- or 23-inch cabinet.

   Locate the cabinet or rack within reach of your digital lines and AC power supply.

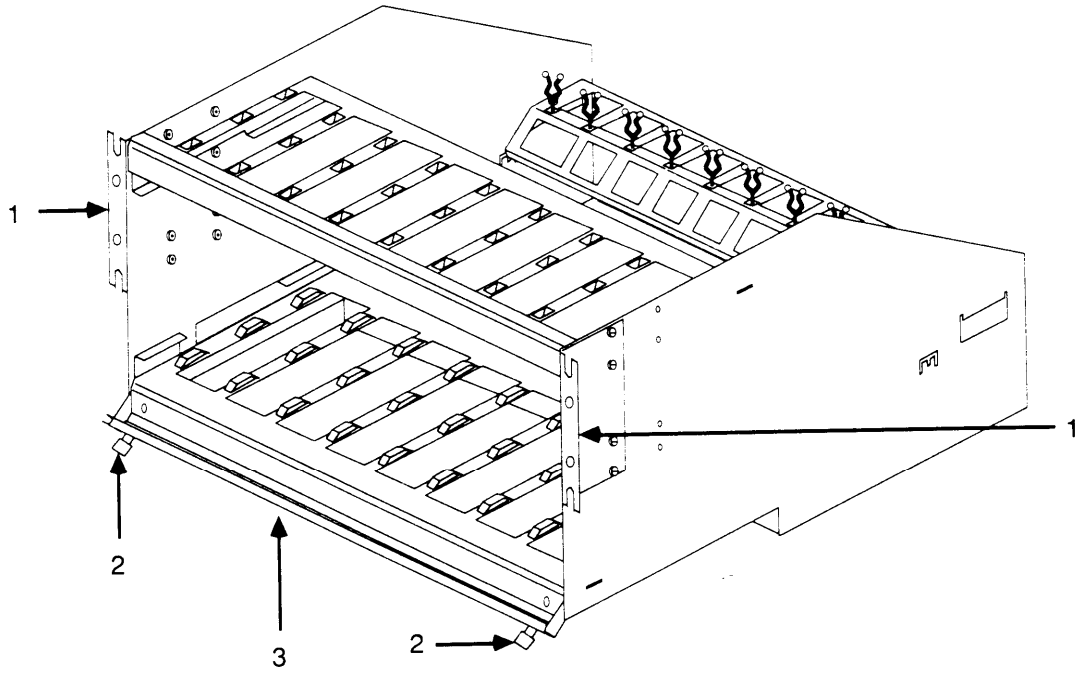


Figure 38: Installation of the 77A Data Mounting

2. From the front of the rack, pull out the left and right plungers (2) that hold the horizontal retaining bar (3) against the rack. Pull the retaining bar out and down so that you can insert the data modules.
3. Insert the data modules in their slots on end so that the display end is up. (Start with slot 1 or the first empty slot on the left and fill in each slot in order. You can insert as many as eight data modules in a mounting.)

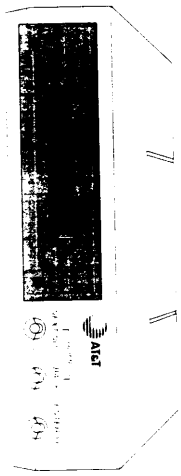


Figure 39: Data Module With Display End Up

4. Position the retaining bar against the rack and push the left and right plungers in to secure the data modules in the rack.
5. Go to the back of the rack. All cables must be connected from the back of the rack.

CAUTION

If adding data modules to an existing installation and the data mount already has power, do *not* turn off or disconnect the AC power, as doing so will shut off the functioning modules.

6. Plug one of the loose DC power cords into the **POWER** connector on the back of each data module.

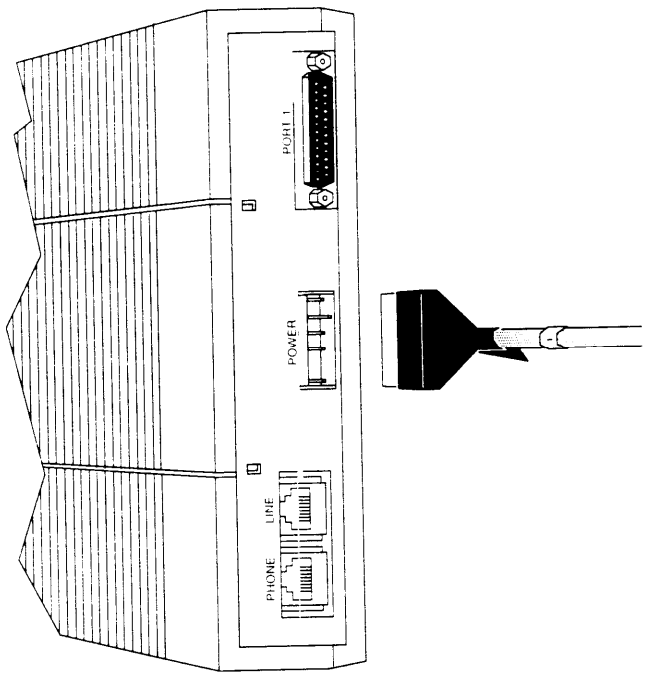


Figure 40: Plugging in the Power Connector to a Data Module

(Skip steps 7 and 8 if adding modules to an existing installation and the data mount already has power.)

7. Plug the AC power cord into the back of the power supply already mounted into the cabinet.

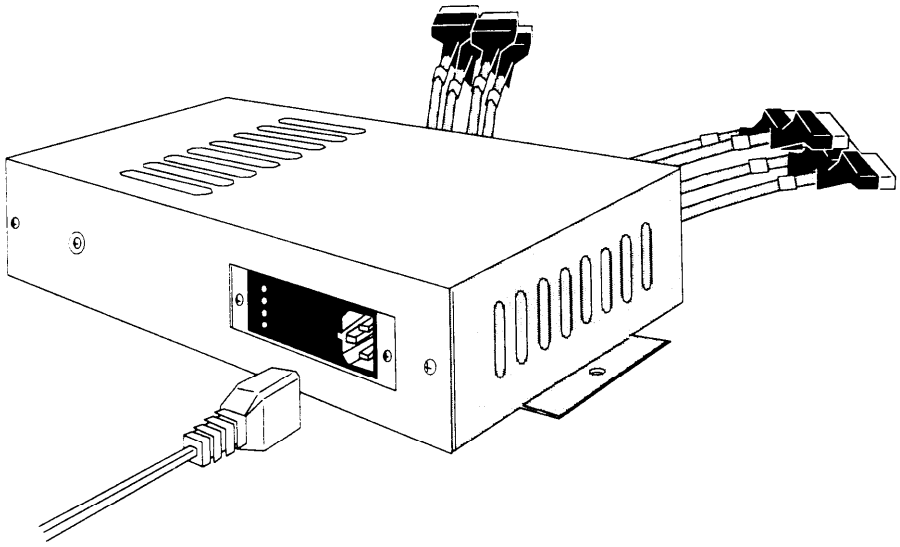


Figure 41: Plugging in the Power Cord to a Mounted Power Supply

8. Plug the free end of the AC power cord into the AC outlet in the station

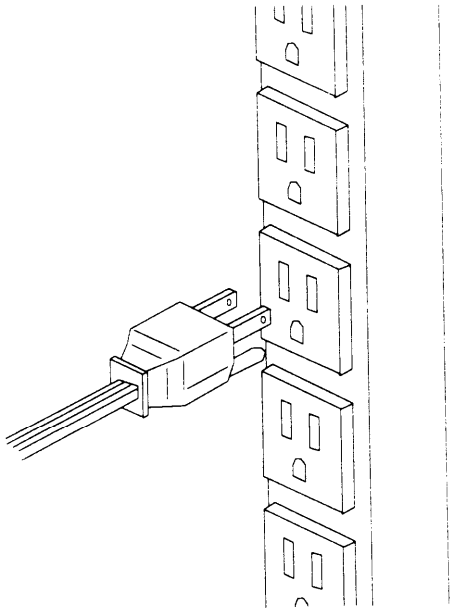


Figure 42: Plugging in the Power Cord to an Outlet

9. The data modules connect to the digital lines in one of the two ways:
   - Using WP90780 L3 (NT1) or WP90780 L4 (UWP) adapter
   - Using individual D8W line cords.
10. If you are using an L3 or L4 adapter to connect the modules to the digital lines, plug the adapter into the 25-pair cable coming from the switch. (This cable should be wired according to Table L or M, shown at the end of the instructions, as applicable.)

NOTE

The L3 and L4 adapters have eight loose ends (1) that are numbered to identify the numbered slots in the mount to which they belong.

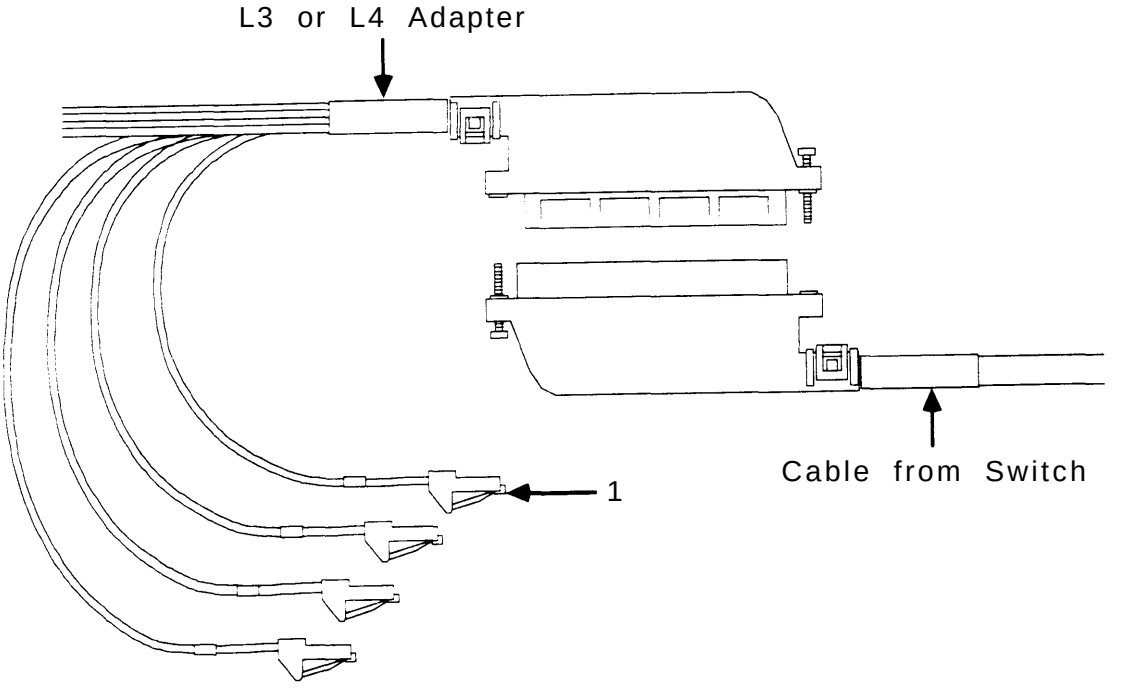


Figure 43: L3 or L4 Adaptor

11. If terminating resistor adapters (TRAs) are required for your installation, do this step; otherwise, do step 12 below.

    - If you are using the L3 or L4 adapter to connect the modules with the digital lines, plug one end of the TRA into the jack on the data module marked **LINE.** Plug the appropriately numbered loose end from the L3 or L4 adapter into the other end of the TRA (Figure 44).

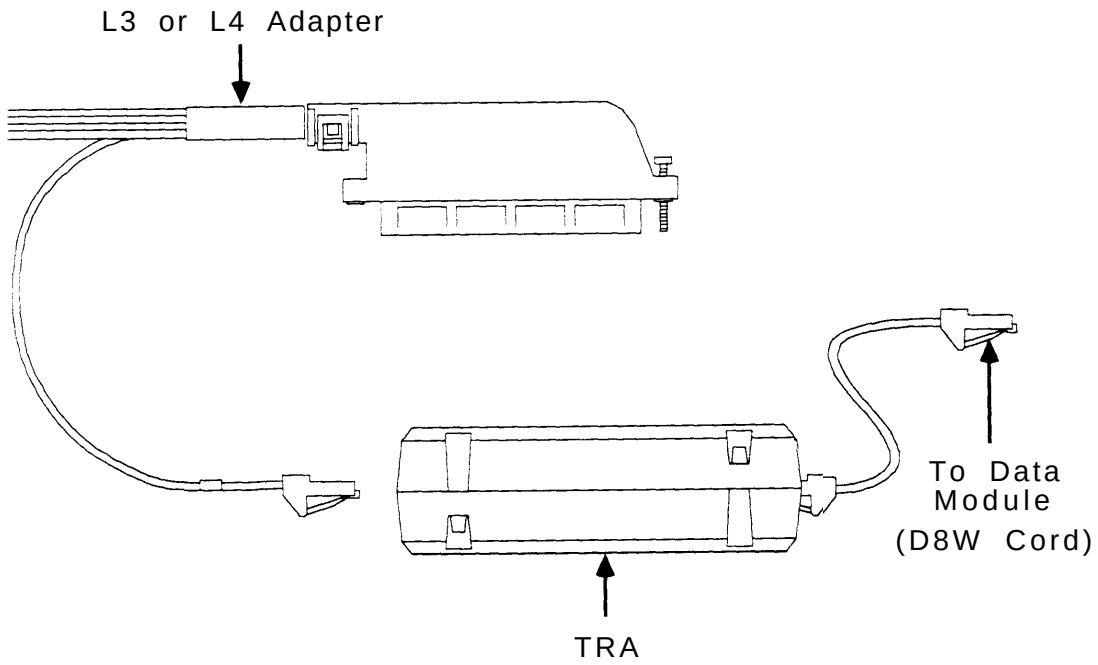


Figure 44: Terminating Resistor and The L3 or L4 Adaptor

    - If you are using individual D8W telephone line cords to connect the modules with the digital lines, plug one end of the TRA into the wall jack. Plug the D8W cord from the other end of the TRA into the **LINE** jack on the appropriate data module (Figure 45).

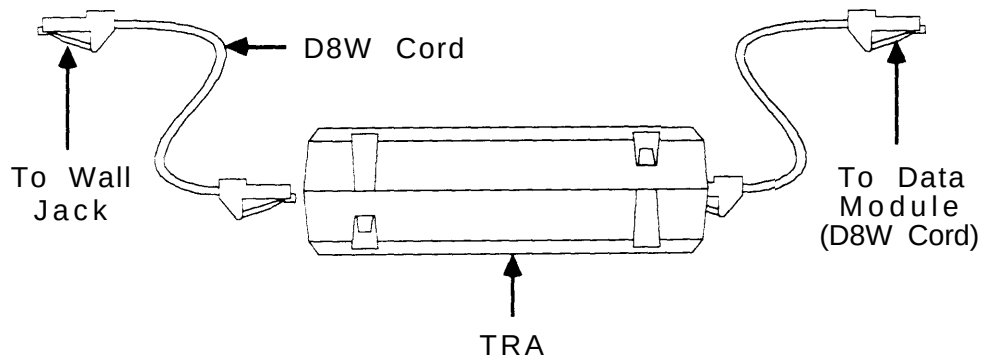


Figure 45: Terminating Resistor's Power Connections (Without an L3 or L4 Adaptor)

12. If you are not using terminating resistor adapters (TRAs), do the following:
    - If you are using the L3 or L4 adapter to connect the modules with the digital lines, connect the numbered loose ends of the adapter to the **LINE** jacks on the corresponding data modules.

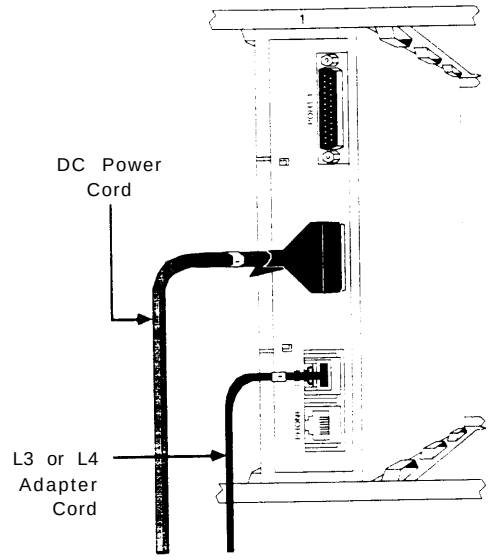


Figure 46: Data Module and Line Jack Connections

    - If you are using D8W line cords to connect the modules with the digital lines, connect the data modules with their appropriate wall jacks.

13. From the back of the rack, connect the appropriate data interface cable to its port on the back of each data module. Tighten the connector screws to hold the cables securely in place.

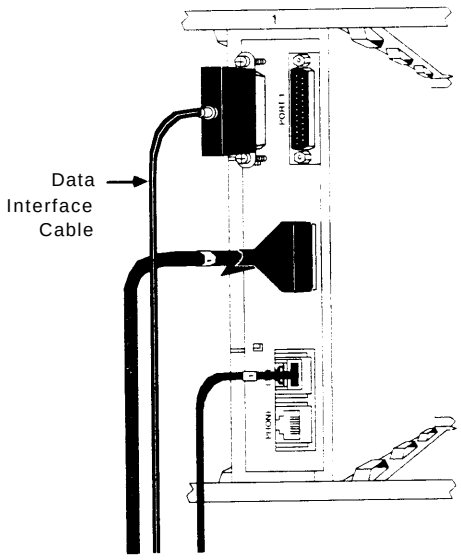


Figure 47: Data Interface Cables Connected to the Back of a Data Module

14. Drape each interface cable through its plastic twist lock and twist the top ends of the lock to secure each cable. The loose ends of the interface cables go out the back of the cabinet.

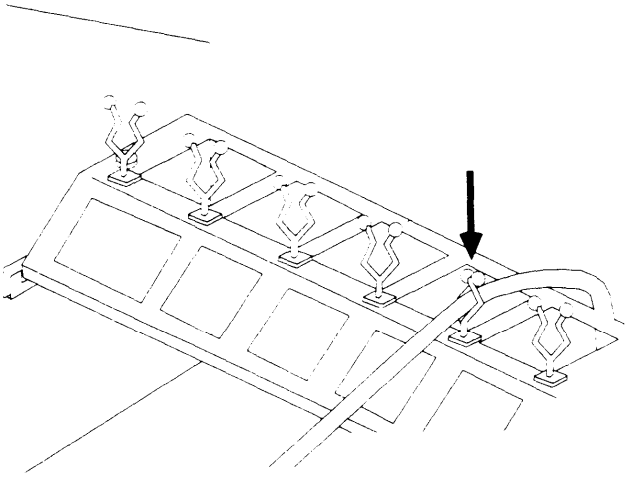


Figure 48: Securing Cable Through Plastic Twist Locks

15. From the front of the rack, do the self-test on each of the data modules to make sure that it is working properly.

The data modules are now installed and ready to be set up for use with your other equipment.

Table L: WP90780 L3 25-Pair Cable Adapter for use with Direct Cabling to Multiple Mount NT1

7500	Modular Plug Pin	Transmission Direction N=Network T=Terminal	Adapter Pin Number
1	5	N->T	26
	4	N->T	1
	3	T->N	27
	6	T->N	2
2	5	N->T	28
	4	N->T	3
	3	T->N	29
	6	T->N	4
3	5	N->T	30
	4	N->T	5
	3	T->N	31
	6	T->N	6
4	5	N->T	32
	4	N->T	7
	3	T->N	33
	6	T->N	8
5	5	N->T	34
	4	N->T	9
	3	T->N	35
	6	T->N	10
6	5	N->T	36
	4	N->T	11
	3	T->N	37
	6	T->N	12
7	5	N->T	38
	4	N->T	13
	3	T->N	39
	6	T->N	14
8	5	N->T	40
	4	N->T	15
	3	T->N	41
	6	T->N	16

Table M: WP90780 L4 25-Pair Cable Adapter for use with AT&T Uniform Wiring Plan

7500	Modular Plug Pin	Transmission Direction N=Network T=Terminal	Adapter Pin Number
1	5	N->T	26
	4	N->T	1
	3	T->N	28
	6	T->N	3
2	5	N->T	29
	4	N->T	4
	3	T->N	31
	6	T->N	6
3	5	N->T	32
	4	N->T	7
	3	T->N	34
	6	T->N	9
4	5	N->T	35
	4	N->T	10
	3	T->N	37
	6	T->N	12
5	5	N->T	38
	4	N->T	13
	3	T->N	40
	6	T->N	15
6	5	N->T	41
	4	N->T	16
	3	T->N	43
	6	T->N	18
7	5	N->T	44
	4	N->T	19
	3	T->N	46
	6	T->N	21
8	5	N->T	47
	4	N->T	22
	3	T->N	49
	6	T->N	24

CHAPTER 9: TECHNICAL INFORMATION

7500 — Asynchronous DCE

Attached Data Terminal Equipment Requirements

The 7500 requires attached data terminal equipment communicating via asynchronous 10-bit transmission including parity bit, 1 start bit, and at least 1 stop bit. For local mode operation and data call control, the character code set must be ASCII.

Data Rates

The 7500 operates at asynchronous full-duplex rates of 300, 1200, 2400, 4800, 9600, and 19200 bps.

DCE EIA Interface Information

The 7500 provides a female EIA-232D receptacle. Where this product employs the EIA-232D standard interface, older equipment which adheres to the RS-232C standard can also be connected. The EIA customer interface pin assignments are listed in the table below.

Table N: Asynchronous DCE Pin Assignments

PIN NO.	CIRCUIT MNEMONIC	DESCRIPTION
2	BA	Transmitted Data
3	BB	Received Data
4	CA	Request to Send
5	CB	Clear to Send
6	CC	Data Set Ready
7	AB	Signal Ground
8	CF	Received Line Signal Detect
9	—	Test +V
10	—	Test -V
18	L L	Local Loopback
20	CD	Data Terminal Ready
21	RL	Remote Loopback
22	CE	Ring Indicator
25	TM	Test Mode

Pin 2 - Transmitted Data (BA)

The data from the attached terminal must have one start bit, eight information bits, and at least one stop bit. The 7500 generally ignore parity in Local Mode and transports it transparently in Data Mode. (The exceptions are: 1) the 7500 is always sensitive to the parity of the xon/xoff characters; and 2) the 7500 always ignores the parity of the Attention sequence characters and the Forwarding characters.) The 7500 supports only ASCII-formatted data in the Local Mode. The 7500 recognizes a break signal as a SPACE received for at least 1 character time plus 20 msec. The setting of the Break option governs the 7500's response to the break signal in Data Mode.

Pin 3 - Received Data (BB)

Signals on this lead are generated by the 7500 in response to data received from the remote data equipment or to user commands from the attached data terminal. This lead is held in the MARK state when Received Line Signal Detect is OFF except for user testing and during Local Mode.

In Data Mode, data transmitted to the attached data terminal will consist of one start bit, eight information bits, and one stop bit. The parity of data received from the network will be transported to the attached data terminal without alteration.

In Local Mode, data transmitted to the attached data terminal will consist of one start bit, eight ASCII formatted information bits, and one stop bit. The parity is set as indicated by the parity option. The break signal consists of binary zero bit transmission for more than 135 msec followed by binary one bit transmission for more than 100 msec.

Pin 4 - Request-to-Send (CA)

The Request-to-Send lead can be used by the attached data terminal to control data transmission depending on how the flow control options are set. The ON state of this lead indicates that the attached data terminal is prepared to transmit data. If the Rec.flow option (Receive Flow Control option) has been set to **eia,** this lead will be utilized as follows: ON indicates the attached data terminal is ready to receive data; OFF indicates the attached data terminal is not ready to receive data.

Pin 5 - Clear-to-Send (CB)

The Clear-to-Send lead is controlled by the 7500 to indicate when data can be received from the attached data terminal. If the Trans.flow option (Transmit Flow Control option) has been set to **eia,** Clear-to-Send will be used for flow control as follows: ON indicates the 7500 is ready to receive data; OFF indicates the 7500 is not ready to receive data.

If this option has been set to **off** or **xon/xoff,** the Clear-to-Send signal will be ignored.

Pin 6 - Data Set Ready (CC)

The Data Set Ready will be ON while power is available.

Pin 7 - Signal Ground (AB)

This lead provides the common reference level for all signals at this interface. Signal ground is direct current (DC) isolated from the power source.

Pin 8 - Received Line Signal Detect (CF) or Data Carrier Detect

This lead indicates the presence of a data call connection. If the DCD option is set to **ignore,** the Received Line Signal Detect lead is ON while power is available, turning OFF for 1 second after a call has been cleared. If the DCD option is set to **follow,** the signal on this lead will go ON after a call has been connected and will go OFF once the call has been cleared.

Pin 9 - Positive Polarity Test Voltage

Pin 10 - Negative Polarity Test Voltage

Pin 18 - Local Loopback (LL)

When this lead is turned ON, the 7500 enters the local loopback test mode. When this lead is turned OFF, the local loopback is ended.

Pin 20 - Data Terminal Ready (CD)

This lead allows the attached data terminal to control the 7500's connection to the network. When the DTR option is set to **follow,** the 7500 requires an ON condition of Pin 20 to interact with the attached terminal or to initiate or maintain a data connection or test sequence (except the local self-test). If the attached data terminal turns off the DTR lead for more than 50 milliseconds during data call setup, while in the data transfer mode or during a test sequence, the 7500 clears the call or terminates the test.

When the DTR option is set to **ignore,** the 7500 will act as if the DTR lead is always ON. Additionally, if the DTR option is set to **ignore** and the answer option is set to AUTO, the 7500 will automatically answer an incoming data call even if there is no data terminal equipment attached. This is useful for remote loopback testing of new installations.

Pin 21 - Remote Loopback (RL)

When the attached data terminal turns this lead ON, the 7500 enters remote loopback test mode. When the attached data terminal turns this lead OFF, the 7500 ends the remote loopback test.

Pin 22 - Ring Indicator (CE)

The 7500 transmits a pulsed signal on this lead when it receives an incoming call. Generally, the 7500 maintains this pulsed signal until either the call is answered or disconnected. The lead remains ON for a minimum of one second even if the call is answered before that second. The cadence of the pulse simulates ringing: two seconds ON, four seconds OFF. The 7500 maintains an OFF condition on this lead at all other times.

Pin 25 - Test Mode (TM)

The 7500 turns this lead ON when

- the attached data terminal turns on the Remote Loopback or Local Loopback leads
- a Local or Remote Loopback test is enabled through the commands typed on the keyboard of an attached data terminal
- a Local or a Remote Loopback test is enabled from the front panel of the 7500
- a Remote Loopback is initiated by the far-end.

The 7500 turns this lead OFF when the test condition is ended.

7500 — Asynchronous DTE

Attached Data Communications Equipment

Attached data communications equipment communicating via asynchronous 10-bit transmission including parity bit, 1 start bit, and at least 1 stop bit. For local mode operation and data call control the character code set must be ASCII. Single speed modems must provide no connection to the speed indication control leads on pins 12 and 13 of the interface. Dual speed modems must provide connection to the CI lead and no connection to the CI2 lead. Triple speed modems must provide speed indication control leads CI and CI2.

Data Rates

The 7500 operates at asynchronous full-duplex rates of 300, 1200, 2400, 4800, 9600, and 19200 bps.

DTE EIA Interface Information

The 7500 provides a female EIA-232D receptacle. Where this product employs the EIA-232D standard interface, older equipment which adheres to the RS-232C standard can also be connected. The EIA customer interface pin assignments are listed in table below.

Table O: Asynchronous DTE Pin Assignments

PIN NO.	CIRCUIT MNEMONIC	DESCRIPTION
2	BA	Transmitted Data
3	BB	Received Data
4	CA	Request to Send
5	CB	Clear to Send
6	CC	Data Set Ready
7	AB	Signal Ground
8	CF	Received Line Signal Detect
12	CI	Speed Mode Indicator
13	CI2	Speed Mode Indicator
18	CN	Analog Loopback
20	CD	Data Terminal Ready
21	RL	Remote Loopback
22	CE	Ring Indicator
25	TM	Test Mode

Pin 2 - Transmitted Data (BA)

Signals on this lead are transmitted by the 7500 to the attached modem. This lead is held in the MARK state (logic level 1) when data is not being transmitted.

In the Data Mode, data transmitted to the modem will consist of one start bit, eight information bits and one stop bit. The parity of data received from the network will be sent to the modem without alteration. A break signal is transmitted to the modem in response to an Indication of Break X.29 message received from the network. The break signal consists of binary zero bit transmission for more than 135 msec followed by binary one bit transmission for more than 100 msec.

In the Local Mode, data consists of one start bit, eight ASCII formatted information bits, and one stop bit. The parity is set as indicated by the parity option.

Pin 3 - Received Data (BB)

Signals on this circuit are transmitted by the attached modem to the 7500. This circuit is held in the MARK state by the modem when data is not being transmitted.

The data from the modem must have one start bit, eight information bits, and at least one stop bit. Parity is generally ignored in local mode and transported transparently in data mode. (The exceptions are: 1) the 7500 is always sensitive to the parity of the xon/xoff characters; and 2) the 7500 always ignores the parity of the Attention sequence characters and the Forwarding characters.) Only ASCII-formatted data is supported in the local mode. The 7500 recognizes a break signal as previously described.

Pin 4 - Request-to-Send (CA)

The Request-to-Send lead is used by the 7500 interface to control data transmission. The ON state of this lead indicates that the 7500 interface is prepared to transmit data. If the Rec.flow option has been set to **eia,** an ON indicates that the 7500 is ready to receive data from the attached modem. An OFF indicates that it is not ready to receive data.

Pin 5 - Clear-to-Send (CB)

The Clear-to-Send lead indicates that the attached modem is ready to receive data (including dialing information) from the 7500. If the Trans.flow option has been set to **eia,** an ON indicates that the attached modem is ready to accept data from the 7500. An OFF indicates that the attached modem is not ready to accept data from the 7500.

Pin 6 - Data Set Ready (CC)

The Data Set Ready lead will be ON when the associated modem is off-hook. It may also be ON when the modem is idle, waiting for receipt of an ASCII dialing sequence. Any data call in progress is ended by the 7500 at the ON to OFF transition of this lead.

Pin 7 - Signal Ground (AB)

This lead provides the common reference level for all signals at this interface. Signal ground is DC isolated from the power source.

Pin 8 - Received Line Signal Detect (CF)

This pin is also referred to as Data Carrier Detect (DCD).

This circuit will be ON when the attached modem is in Data Mode; that is, it is ready to receive data from the distant modem. It may also be ON when the modem is idle, waiting for receipt of an ASCII dialing sequence.

The 7500 ends any data call in progress at the ON to OFF transition of this lead provided the DCD option is set to **follow.** The 7500 ignores transitions of this lead when the DCD option is set to **ignore.**

Pins 12 and 13 - Speed Mode Indicators (CI and CI2)

These leads are read by the 7500 interface to indicate that a multiple speed modem has stepped down from its nominal (highest) speed programmed via the front panel.

These leads are examined by the 7500 after Received Line Signal Detect comes on and 7500 responds according to the following table, provided the Setup option is set appropriately. The leads are ignored if the Setup option indicates a single speed modem. Only pin 12 is interpreted if the Setup options indicate a dual speed modem; both pins 12 and 13 are interpreted if the Setup option indicates a triple speed modem is connected.

Table P: Speed Mode Indicator

PIN 12	PIN 13	ACTION
ON	ON	Remain at Nominal (Highest) Speed
ON	OFF	Drop Back One Speed From Nominal
OFF	ON	Drop Back One Speed From Nominal
OFF	OFF	Drop Back Two Speeds From Nominal

These leads may change state any time after Received Line Signal Detect comes ON including during the data call.

Pin 18 - Analog Loopback (CN)

This lead will remain OFF.

Pin 20 - Data Terminal Ready (CD)

This lead allows the 7500 interface to control the attached modem. In an idle condition, the 7500 interface holds this lead OFF.

The 7500 interface turns this circuit ON in response to the turning ON of the Ring Indicator lead for more than 100 msec causing the attached modem to automatically answer a call coming from the analog network. The 7500 checks for the presence of Data Set Ready, Clear-to-Send, or Receive Line Signal Detect, for a timeout period of 15 seconds. If the 7500 detects one of these leads as ON within a 15-second time period, the analog call is connected. If the ZCA option is ON, the 7500 generates a Call Request Packet to the network. This Call Request Packet contains a called address of 10 zeros. If the ZCA option is OFF, the 7500 will provide the user with access to Local Mode. If the timeout period is exceeded, the 7500 returns to its idle state (Data Terminal Ready OFF).

This lead also turns ON in response to receipt of an incoming call. This prepares the modem to accept dialed digits through the EIA interface. The 7500 checks for the presence of Clear-to-Send for a timeout period of 15 seconds. If the 7500 sees Clear-to-Send ON within this time period, it answers the call. If the timeout period is exceeded, the 7500 rejects the call and returns to its idle state (Data Terminal Ready OFF). Autodial modem control commands and responses are data from the 7500's perspective and are not processed differently from any other customer data.

This lead turns OFF for a minimum of 1 second at the termination of a data call. Incoming calls are not accepted until after circuit DTR has been OFF for 1 second.

Pin 21 - Remote Loopback (RL)

This lead will remain OFF.

Pin 22 - Ring Indicator (CE)

An ON signal appears on this lead when the modem detects a call coming from the analog network. This signal may or may not toggle in step with analog 20 Hz ring bursts. The 7500 correctly interprets the meaning of this signal in either case. The 7500 ignores ON signals less than 100 milliseconds.

Pin 25 - Test Mode

This lead indicates the attached modem is in a test mode. The 7500 does not accept incoming calls when this lead is ON. The OFF to ON transition, however, does not cause a call in progress to be disconnected because this is normal in a test mode.

7500 — Synchronous DCE

Data Terminal Equipment Requirements

The data terminal must accept timing (transmit signal element timing and receive signal element timing) from the 7500.

Data Rates

The 7500 operates at synchronous half-duplex emulation at 1200 to 19200, and 56000 bps; and synchronous full-duplex operation at 1200, 2400, 4800, 9600, 19200, 48000 or 64000 bps.

Synchronous Interface Information

When the Multipurpose Enhancement Board is installed, the 7500 provides a female 25-pin EIA-232D DCE interface connector on port 1 for synchronous data communication and a female 25-pin RS-366 ACU interface connector on port 2 for automatic calling. When the High Speed Synchronous Enhancement Board is installed with its adapter cable connected to port 2, the 7500 provides a female 34-pin V.35 DCE interface for synchronous data communication. In this configuration, the 25-pin female interface at port 1 is not functional. The synchronous interface pin assignments are listed in table below.

Table Q: Synchronous DCE Pin Assignments

V.35 PIN	EIA-232D PIN	MNEMONIC	DESCRIPTION
B	7	SG	Signal Ground
C	4	RTS	Request to Send
D	5	RFS	Ready for Sending
E	6	DSR	Data Set Ready
F	8	RLSD	Received Line Signal Detect
H	20	DTR	Data Terminal Ready
J	22	RI	Ring Indicator
L	18	LL	Local Loopback
N	21	RL	Remote Loopback
P	2	BA	Transmitted Data-A Wire
S		BA	Transmitted Data-B Wire
R	3	BB	Received Data-A Wire
T		BB	Received Data-B Wire
V	17	BD	Receiver Signal Element Timing-A Wire
X		BD	Receiver Signal Element Timing-B Wire
Y	15	BC	Transmitter Signal Element Timing-A Wire
AA		BC	Transmitter Signal Element Timing-B Wire
NN	25	TM	Test Mode

The following table is for reference only and provides the wiring configuration of the adapter cable used with the High Speed Synchronous Enhancement Board. The connector on the High Speed Synchronous Enhancement Board is a 25-pin male which mates with the 25-pin female connector on the adapter cable.

Table R: V.35 Adapter Cable

V.35 PIN	HIGH SPEED SYNC PIN
B	14
C	1
D	8
E	5
F	7
H	3
J	6
L	2
N	4
P	13
R	17
S	24
T	16
V	21
X	20
Y	19
AA	18
NN	15

Pin 7/B - Signal Ground

This circuit provides the common reference level for unbalanced interchange circuits (RTS, RFS, DSR, RLSD).

Pin 4/C - Request-to-Send

The Request-to-Send is generated by the DTE to control half-duplex emulation data transmission. The ON state of this circuit indicates that the DTE is prepared to transmit data.

Pin 5/D - Ready for Sending

The Ready for Sending circuit is controlled by the 7500 to indicate when data can be received from the DTE. The Ready for Sending circuit operates as follows:

The OFF to ON transition of the Ready for Sending circuit follows the OFF to ON transition of the Request to Send circuit by a fixed time delay in the range of 17 to 80 msec. This delay guarantees that the OFF to ON transition of the Ready for Sending circuit occurs after the remotely connected terminal adapter's Received Line Signal Detect lead turns ON. The ON to OFF transition of the Ready for Sending circuit follows the ON to OFF transition of the Request to Send circuit by not more than 5 msec.

Pin 6/E - Data Set Ready

For nailed-up connections Data Set Ready will be ON while power is available, including during loopback testing.

For circuit switched connections, it turns ON in response to an incoming call or when making an outgoing call. This lead also turns ON upon initiation of local loopback testing. This lead turns OFF when a data call is terminated, and upon termination of local loopback testing.

Pin 8/F - Received Line Signal Detect

For circuit switched full-duplex operation, this circuit indicates the presence of a data connection. The OFF to ON transition of this signal occurs within 15 to 150 msec after a data call has been connected. The ON to OFF transition occurs within 15 msec after the data call is terminated. This circuit is always ON in the nailed-up 64 kbps mode.

For half-duplex emulation operation, this circuit turns ON as it would with full-duplex operation provided that Request to Send is at the remote end. This circuit is turned OFF when Request to Send turns OFF at the remote end, or when a circuit switched call is terminated.

Pins 3/R and 3/T - Received Data

Signals on this circuit are generated by the 7500 in response to data received from the remote data equipment. The 7500 presents each signal element on the OFF to ON transition of the Receiver Signal Element Timing circuit.

NOTE When the 7500 has been placed in a loopback mode by the remote terminal adapter, received data is clamped to one.

Pins 17/V and 17/X - Receiver Signal Element Timing

This circuit is used to provide the DTE with timing information for data reception. Each signal element on the Receive Data circuits occurs at the OFF to ON transition of these timing circuits. The ON to OFF transition of this circuit indicates when the DTE should read the data on the Receive Data circuits.

Pins 15/Y and 15/AA - Transmitter Signal Element Timing

This circuit is used to provide the DTE with timing information for data generation. The OFF to ON transition of this circuit indicates when the DTE should present the data on the Transmit Data circuits. The 7500 will sample the Transmit Data circuits on the ON to OFF transitions of these timing circuits.

Pins 2/P and 2/S - Transmitted Data

The 7500 recognizes data generated by the DTE when Request to Send lead is ON. The 7500 will sample this circuit on the ON to OFF transition of the Transmitter Signal Element Timing circuit.

Pin 20/H - Data Terminal Ready

An ON signal from the attached DTE indicates to the 7500 that the DTE is ready to be connected to the network. An OFF condition for more than 50 msec during data call setup, while in the data transfer mode, or during a test sequence, causes the 7500 to clear any circuit switched call or terminate the test.

Pin 22/J - Ring Indicator

A pulsed signal appears on this circuit when the 7500 receives an incoming data call. This signal is maintained until the 7500 answers or clears the call, or until the network clears the call attempt. The cadence is designed to simulate ringing: 2 seconds on, and 4 seconds off. The initial pulse remains on for minimum of 1 second. An OFF condition is maintained at all other times.

Pin 18/L - Local Loopback

Transmitted data is looped back to received data while this circuit is ON. While in local loopback mode, the 7500 responds to an incoming circuit switched data call by alerting as if the Automatic Answer option was OFF. This operation continues until the originator disconnects or until the user exits local loopback. If the 7500 is optioned for automatic answer and DTR indication is ON or comes ON after termination of the local loopback, the 7500 answers the incoming call.

Pin 21/N - Remote Loopback

If this lead is turned on before the data call is initiated, the remote terminal adapter will loop back its data to the 7500.

Pin 25/NN - Test Mode

This circuit is ON during local loopback and when looping back B channel data in response to a remote loopback initiated by the remote terminal adapter. An OFF condition is maintained at all other times

7500 — Automatic Calling Unit Interface

The multipurpose enhancement option board provides an RS-366 Automatic Calling Unit (ACU) interface.

The RS-366 ACU interface collects digits until the End of Number (EON) digit is received or until the expiry of a 3-second inter-digit idle timer.

The leads are listed and defined in the table below.

Table S: Interface Connector Pin Identification

Pin No.	Circuit	Description
1	---	Shield (No Connection)
2	DPR	Digit Present
3	ACR	Abandon Call Retry
4	CRQ	Call Request
5	PND	Present Next Digit
6	PWI	Power Indication
7	SG	Signal Ground
8	---	Unassigned
9	---	+ Voltage Output for testing
10	---	- Voltage Output for testing
11	---	Unassigned
12	---	Unassigned
13	DSC	Distant Station Connected
14	NB1	Digit Signal Circuit
15	NB2	Digit Signal Circuit
16	NB4	Digit Signal Circuit
17	NB8	Digit Signal Circuit
18	---	Unassigned
19	---	Unassigned
20	---	Unassigned
21	---	Unassigned
22	DLO	Data Line Occupied
23	---	Unassigned
24	---	Unassigned
25	---	Unassigned

Functional Description of Interchange Circuits

A list of circuits showing category as well as equivalent CCITT identification in accordance with CCITT Recommendation V.24 as amended at the VI Plenary Assembly (Geneva, Switzerland, October 1976) is shown in the next table.

Table T: Interchange Circuits By Category

Inter-change Circuit	CCITT Equiv-alent	Description	Signal Gnd./ Common Return	Digit.	Control	
				To 7500	To 7500	From 7500
SG	210	Signal Ground	X			
CRQ	202	Call Request			X	
PWI	213	Power Indicator				X
DLO	203	Data Line Occupied				X
DSC	204	Distant Station Connected				X
ACR	205	Abandon Call and Retry				X
PND	210	Present Next Digit				X
DPR	211	Digit Present			X	
NB1	206	Low Order Binary Digit		X		
NB2	207	Second Order Binary Digit		X		
NB4	208	Third Order Binary Digit		X		
NB8	209	High Order Binary Digit		X		

Circuit SG - Signal Ground (CCITT 201)

Direction: Not Applicable

This conductor directly connects the DTE circuit ground to the 7500 circuit ground to provide a conductive path between the DTE and 7500 signal common.

Circuit CRQ - Call Request (CCITT 202)

Direction: TO 7500

The ON condition of this circuit indicates a request to originate a call. The call is aborted if the 7500 detects the OFF condition on Circuit CRQ prior to turning circuit DSC ON.

The OFF condition indicates that the DTE is not using or has completed use of the 7500's ACU interface.

After the 7500 has turned ON Circuit DSC, the DTE may turn Circuit CRQ OFF without causing a disconnect.

Circuit PWI - Power Indication (CCITT 213)

Direction: FROM 7500

The ON condition indicates that power is on at the 7500.

Circuit DLO - Data Line Occupied (CCITT 203)

Direction: FROM 7500

The ON condition of this circuit indicates that the communication channel is in use.

The OFF condition indicates that the DTE may originate a call provided that its PWI is ON.

Circuit DSC - Distant Station Connected (CCITT 204)

Direction: FROM 7500

Signals on this circuit indicate whether a connection has been established to a remote data station.

This circuit turns ON in response to receipt of a Call Connected packet for X.25 virtual call set-up and in response to a Connect message for B channel circuit switched data call set-up. Control of the communication channel is transferred to the associated EIA-232D interface. When Circuit DSC is turned ON, the DTE may turn Circuit CRQ OFF without causing a communication channel disconnect. Disconnection of the channel by the DTE is then possible only through the associated EIA-232D interface.

Once Circuit DSC is turned ON, it remains On until Circuit CRQ is turned OFF by the DTE. After Circuit CRQ is turned OFF by the DTE, Circuit DSC is turned OFF.

Circuit ACR - Abandon Call and Retry (CCITT 205)

Direction: FROM 7500

the ON condition indicates that the call should be abandoned, and remains ON until the DTE turns off circuit CRQ. Circuit ACR turns ON upon receipt of any packet or message from the network other than a Call Connected packet or Connect message. Circuit ACR also turns On if Circuit CRQ is ON when the 7500 enters any test mode.

The OFF condition indicates the call origination can proceed.

Circuit ACR remains in the OFF condition after Circuit DSC is turned ON.

Digit Signal Circuits

Direction: TO 7500

Circuit NB1 - Low Order Binary (2) (CCITT206)

Circuit NB2 - Second Order Binary (2) (CCITT207)

Circuit NB4 - Third Order Binary (2) (CCITT208)

Circuit NB8 - High Order Binary (2) (CCITT209)

Parallel binary signals on these circuits are generated by the DTE.

The information presented on these interchange circuits may either be transmitted (e.g., digits of the called number) or used locally as a control signal. One use of these interchange circuits for control purposes is the passing of the EON code combination to the 7500 after the last digit of the number to be called has been passed.

The next table defines the character set provided by the sixteen code combinations available.

Table U: Digit Signal Character Set

	Digit Signal Circuit State			
Digit	**NB8**	**NB4**	**NB2**	**NB1**
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
*	1	0	1	0
#	1	0	1	1
EON	1	1	0	0
SEP	1	1	0	1
Unassigned	1	1	1	0
Unassigned	1	1	1	1

NOTE: In the case of circuit switched call set-up, the 7500 interprets the SEParator to mean wait for a REDIRect message from the network before transmitting subsequent digits.

In the case of X.25 call set-up, the # character is treated identically to that of EON, and the SEParator and * characters are ignored.

Unassigned characters are also ignored.

Circuit PND - Present Next Digit (CCITT 210)

Direction: FROM 7500

Signals on this circuit are generated by the 7500 to control the presentation of digits on Circuits NB1, NB2, NB4, and NB8. The ON condition indicates that the 7500 is ready to accept the next digit indicated on Circuits NB1, NB2, NB4, and NB8.

The OFF condition indicates that the DTE should turn OFF Circuit DPR and set the states of the Digit Signal Circuits for the next digit. Circuit PND shall not be changed to the ON condition while Circuit DPR is ON.

Circuit PND may come ON after the DTE turns Circuit DPR OFF following the presentation of the last code combination on NB1, NB2, NB4, and NB8.

Circuit DPR - Digit Present (CCITT 211)

Direction: TO 7500

Signals on this circuit are generated by the DTE to indicate that the 7500 may read the code combination presented on Circuits NB1, NB2, NB4, and NB8.

The OFF to ON transition indicates that the DTE has set the states of Circuits NB1, NB2, NB4, and NB8 for the next digit.

Packet Assembler Disassembler (PAD) Capabilities

The 7500 options provide capabilities comparable, but not identical, to those outlined in the CCITT X.3, X.28, and X.29 specifications. The Local Mode commands provide the functions analogous to those specified in X.28. The 7500 supports all X.29 messages received from a remote X.25 endpoint except the *Reselection PAD* message.

7500 Options Relative to CCITT Recommendation X.3 Parameters: CCITT Recommendation X.3 defines certain parameters for an X.25 PAD. The CCITT assigns reference numbers by which these parameters are identified and assigns different values to each parameter. The parameter values are also represented by a number. The X.29 messages that the SET supports use these parameter reference numbers and values. The Table below gives the parameter reference numbers and parameter values that the 7500 supports. Parameter 101 is settable via X.29 but is not an X.3 parameter. Selected X.3 parameters and operations are supported as indicated by Table V. Other 7500 options that are not in this table are not X.3 parameters and are not settable or readable via X.29.

Table V: X.3 Parameters

Parameter Reference Number	Parameter Description	Selectable Possible Values	Parameter Meaning	R*	W**
1	Exit Data Character	0 1 2-15,17-127	Exit Data Disabled Character DLE As coded to ASCII	X	X
2	Echo	0 1	No echo Echo	X	X
3	Selection of data forwarding character	0 2 126	None Carriage Return All Control Characters + DEL	X	X
4	Selection of idle timer delay	0 1-255	No Idle Timer Value in twentieths of a second	X X	X X
5	Transmit Flow Control	0 1 2	None Use of XON/XOFF Use of EIA leads	X	X
6	Control of PAD Service Signals	0 8 9	Off Verbose Mode Numeric Mode	X	X
7	Selection of operation of the PAD on receipt of Break signal	0 1 2 5 8 21	Break ignored Interrupt Reset Interrupt and indicate break Exit Data Discard output, interrupt and indicate break	X	X
8	Discard output	0 1	Normal Data delivery Discard output	X	X

* R means the option value can be read via X.29.
** W means that the option can be written (set) via X.29.

Table V: X.3 Parameters (Contd)

Parameter Reference Number	Parameter Description	Selectable Possible Values	Parameter Meaning	R*	W**
9	Padding after carriage return (CR)	0	No padding after CR	X	
10	Line folding	0	No line folding	X	
11	Binary speed of start-stop DTE	2 3 12 13 14 15	300 bit/s 1200 bit/s 2400 bit/s 4800 bit/s 9600 bit/s 19,200 bit/s	X	
12	Receive Flow Control	0 1 2	None (EIA for 1st gen.) Use of XON/XOFF EIA leads (2nd gen.)	X	X
15	Editing	0 1	No editing Editing in Data Mode	X	X
16	Character Erase	8 127	Backspace (CtrlH) DELETE	X	X
17	Line Erase	24 21	CAN (CtrlX) NAK (CtrlU)	X	X
19	Editing PAD service signals	2	Editing PAD service signals for display terminals	X	
101	Remote Loopback	0 1	Remote Loopback disabled Remote Loopback enable	X	X

* R means the option value can be read via X.29.
** W means that the option can be written (set) via X.29.

REFERENCE

The information in this section will be of interest to the telecommunications manager and the computer department's staff.

General Features

The basic 7500 consists of a main circuit board assembly with one EIA-232D interface and a replaceable firmware board. The 7500 can be configured in a stand-alone arrangement by the addition of an external power supply or in a multiple-mount arrangement by its insertion into a multiple mounting that provides a common power supply and supports up to eight 7500s.

A single version of firmware implements all of the functions described in this manual.

The three types of optional interface circuit board assemblies are:

- A Multipurpose Enhancement Board that provides an RS-366 Automatic Calling Unit (ACU) interface and optionally converts the asynchronous EIA-232D interface into a synchronous interface.
- A second EIA-232D Asynchronous DCE interface enhancement board.
- A High Speed Synchronous DCE interface enhancement board that, in conjunction with a passive adapter cable, provides a V.35 interface at speeds of 48, 56, and 64 kbps.

Asynchronous DCE 7500

- D-channel X.25 Virtual Call or Permanent Virtual Circuit Connections at interface rates up to 19.2 kbps. (NOTE: the maximum throughput of the D-channel is less than 19.2 kbps.)
- B-channel Mode 3/2 adaptive (BA).

  Mode 3/2 adaptive on the B-channel. If you select this value, the 7500 will attempt to establish a circuit-switched Mode 3 call. If the system you are calling cannot accept this type of call, the 7500 will attempt to establish a circuit-switched Mode 2 data call Mode 3 causes slightly higher delays on transmitted and received data than Mode 2, but it provides automatic error correction. Mode 3 also uses the packet assembly/disassembly (PAD) options in the same manner as X.25.
- B-channel Mode 2 (B2).

  Mode 2 circuit-switched data on the B-channel. Mode 2 provides the least amount of delay on transmitted and received data, but it does not provide error correction. As such, it is the closest functional replacement for data previously sent using analog modems.
- At most one of the following optional enhancements:
  a. Data call initiation via the RS-366 ACU function of the Multipurpose enhancement board.
  b. Support of a second EIA-232D interface for concurrent dual X.25 or Mode 3 packet switched data services on the D or a single B channel at data rates up to 19.2 kbps via the Second Asynchronous DCE Interface enhancement board. This configuration allows Mode 3/2 adaptive circuit-switched data operation on a single B channel on either port, but not both ports simultaneously. (NOTE: the maximum throughput of the D-channel is less than 19.2 kbps.)

Asynchronous DTE 7500

- Provides the D-channel functionality to allow one associated asynchronous, EIA-232D data communications equipment (i.e., modem) to interface with the ISDN network using X.25 data transfer. This mode of operation is intended primarily for use with the X.25 Modem Pooling feature of the 5ESS.
- Provides B-channel circuit-switched Mode 2 (B2) or Mode 2/3 (BA) adaptive data communication for two-stage modem pooling.

Synchronous DCE 7500

This configurations requires the installation of either the Multipurpose enhancement board or the High Speed Synchronous enhancement board.

The Multipurpose enhancement board:

- Provides a single synchronous EIA-232D (on the main board) with RS-366 Automatic Calling Unit interface (on the enhancement board) supporting data rates up to 19.2 kbps. The RS-366 functionality need not be utilized, but the Multipurpose enhancement board is still required.
- Provides for the transport of 56 or 64 kbps internally timed synchronous data over one circuit-switched B channel or 56/64 kbps X.25 data on a nailed-up B channel.

  An external adapter is required to supply a V.35 or RS-449 interface 56 kbps or 64 kbps operation. Such devices are advertised for sale in general trade data communications catalogs.

- Provides for manual initiation of synchronous data calls and selection of previously stored data repertory from the LCD interface.

The High Speed Synchronous enhancement board:

- Provides a single synchronous 25-pin male interface on the enhancement board supporting data rates of 48, 56, and 64 kbps.

  An external passive adapter cord supplied with the enhancement board converts the 25-pin male connector to an industry standard 34-pin V.35 interface. No connection should be made to Port 1 when the High Speed Synchronous option is installed.

- Provides for manual initiation of synchronous data calls and selection of previously stored data repertory from the display interface.

Tables below indicate which modes of operation are supported by each of the 7500's user configurations.

Table W: Asynchronous Configuration

ASYNCHRONOUS CONFIGURATION	CS MODE 3/2 (B)	PROVI-SIONED X.25 (D)
Single DCE	X	X
Dual DCE	Single	X
DTE (Modem Pool)	X	X

Table X: Synchronous Configuration

SYNCHRONOUS CONFIGURATION	CS/ NAILED MODE 2 (B)	CS/ NAILED 48K (B)	CS/ NAILED 56K (B)	CS/ NAILED 64K (B)
Multipurpose DCE	X		X	X
High Speed Sync DCE		X	X	X

Optional Enhancement Boards

The 7500 can accommodate one of three types of optional enhancement boards. Each enhancement board provides a different industry standard data interface, which is designated *Port 2* and is so labeled on the back panel.

Multipurpose Enhancement Board

This board is used to provide an RS-366 Automatic Calling Unit (ACU) interface. It also converts the EIA-232D interface on the main circuit board from asynchronous to synchronous depending on user selection through the display interface.

This board comes with an adhesive *RS-366* label with instructions to affix the label to the back panel of the 7500 to help alleviate the problem of mistaking this for a second EIA-232D interface.

Second Asynchronous Interface Enhancement Board

This optional board is used to provide a second asynchronous EIA-232D interface. Dual concurrent provisioned X.25 D channel data mode is supported. In addition, this configuration allows Mode 3/2 adaptive or Mode 2 circuit-switched B channel data operation on either port, but not both ports simultaneously.

High Speed Synchronous Enhancement Board

This board is used to provide a V.35 interface at synchronous data rates of 48, 56, or 64 kbps via an external adapter cord that is packaged with the board.

The board comes with an adhesive *V.35* label with instructions to affix the label to the back panel of the 7500 to help alleviate the problem of mistaking this for a second EIA-232D interface.

No connection should be made to Port 1 when the High Speed Synchronous option is installed.

APPENDIX

Table Y: Hexadecimal Values for ASCII Characters

00	nul	01	soh	02	stx	03	etx	04	eot	05	enq	06	ack	07	bel
08	bs	09	ht	0a	nl	0b	vt	0c	np	0d	cr	0e	so	0f	si
10	dle	11	dc1	12	dc2	13	dc3	14	dc4	15	nak	16	syn	17	etb
18	can	19	em	1a	sub	1b	esc	1c	fs	1d	gs	1e	rs	1f	us
20	sp	21	!	22	"	23	#	24	$	25	%	26	&	27	'
28	(| 29 |)	2a	*	2b	+	2c	,	2d	-	2e	.	2f	/
30	0	31	1	32	2	33	3	34	4	35	5	36	6	37	7
38	8	39	9	3a	:	3b	;	3c	<	3d	=	3e	>	3f	?
40	@	41	A	42	B	43	C	44	D	45	E	46	F	47	G
48	H	49	I	4a	J	4b	K	4c	L	4d	M	4e	N	4f	O
50	P	51	Q	52	R	53	S	54	T	55	U	56	V	57	W
58	X	59	Y	5a	Z	5b	[	5c	\	5d	]	5e	^	5f	—
60	'	61	a	62	b	63	c	64	d	65	e	66	f	67	g
68	h	69	i	6a	j	6b	k	6c	l	6d	m	6e	n	6f	o
70	p	71	q	72	r	73	s	74	t	75	u	76	v	77	w
78	x	79	y	7a	z	7b	{	7c	¦	7d	}	7e	¯	7f	del

The following two tables show cause messages that may occur due to system problems. The cause name will appear on your screen — use this reference for explanation of the cause name and for restart recommendations.

Table Z: X.25 Cause Messages

Cause Name	Stimulus			Text
	Clear	Reset	Restart	
Remote DTE originated	0	0	0	FAR END REQUESTED
Remote Procedure error	17	3		REMOTE ERROR
Local Procedure error	19	5	1	LOCAL ERROR
Remote DTE Operational		0,161		FAR END OPERATIONAL
Invalid Calling Address	19,68			WRONG CALLING ADDRESS
Invalid Called Address	19,67			WRONG ADDRESS
Address not obtainable	13			WRONG ADDRESS
Network out of order	21	29 or 157		NETWORK FAILURE
Network operational		15 or 143	7	NETWORK OPERATIONAL
Facility call not allowed	03,65	03,65		CALL OPTION ERROR
Facility parameter not allowed	03,66			CALL OPTION ERROR
Reverse Charging rejected	25			CALL OPTION ERROR
LCN is incoming one-way	19,34			OUTGOING DENIED
Access barred	11			ACCESS DENIED
Call collision	01,72			NETWORK BUSY
Network congestion	5	1	3	NETWORK BUSY
Number busy	1			BUSY
Incompatible Destination	33	17		ACCESS DENIED
Destination out of order	0,162	0,162		FAR END FAILURE
Out of order	9			FAR END FAILURE

Table AA: Q.931 Cause Messages

Cause Name	Q.931 Code	Text
Normal	16	FAR END REQUESTED
Unassigned Number	1	WRONG ADDRESS
Incomplete Address	28	WRONG ADDRESS
Temporary failure	41	NETWORK FAILURE
Channel unacceptable	4	WRONG CHANNEL
Channel does not exist	82	WRONG CHANNEL
No B-channel available	34	DATA CALL BLOCKED
Facility not implemented	69	CALL OPTION ERROR
Facility not subscribed	50	CALL OPTION ERROR
Facility rejected	29	CALL OPTION ERROR
Transit network does not exist	91	CALL OPTION ERROR
Transit delay not met	39	CALL OPTION ERROR
Throughput not met	40	CALL OPTION ERROR
Bearer capability unavailable	58	WRONG CALL TYPE
Bearer capability not implemented	65	WRONG CALL TYPE
Incoming Calls Barred	54	ACCESS DENIED
Outgoing Calls Barred	52	OUTGOING DENIED
Network congestion	42	NETWORK BUSY
Number Busy	17	BUSY
No user responding	18	NO ANSWER
Call rejected	21	ACCESS DENIED
Incompatible Destination	88	ACCESS DENIED
Destination out of order	27	FAR END FAILURE

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