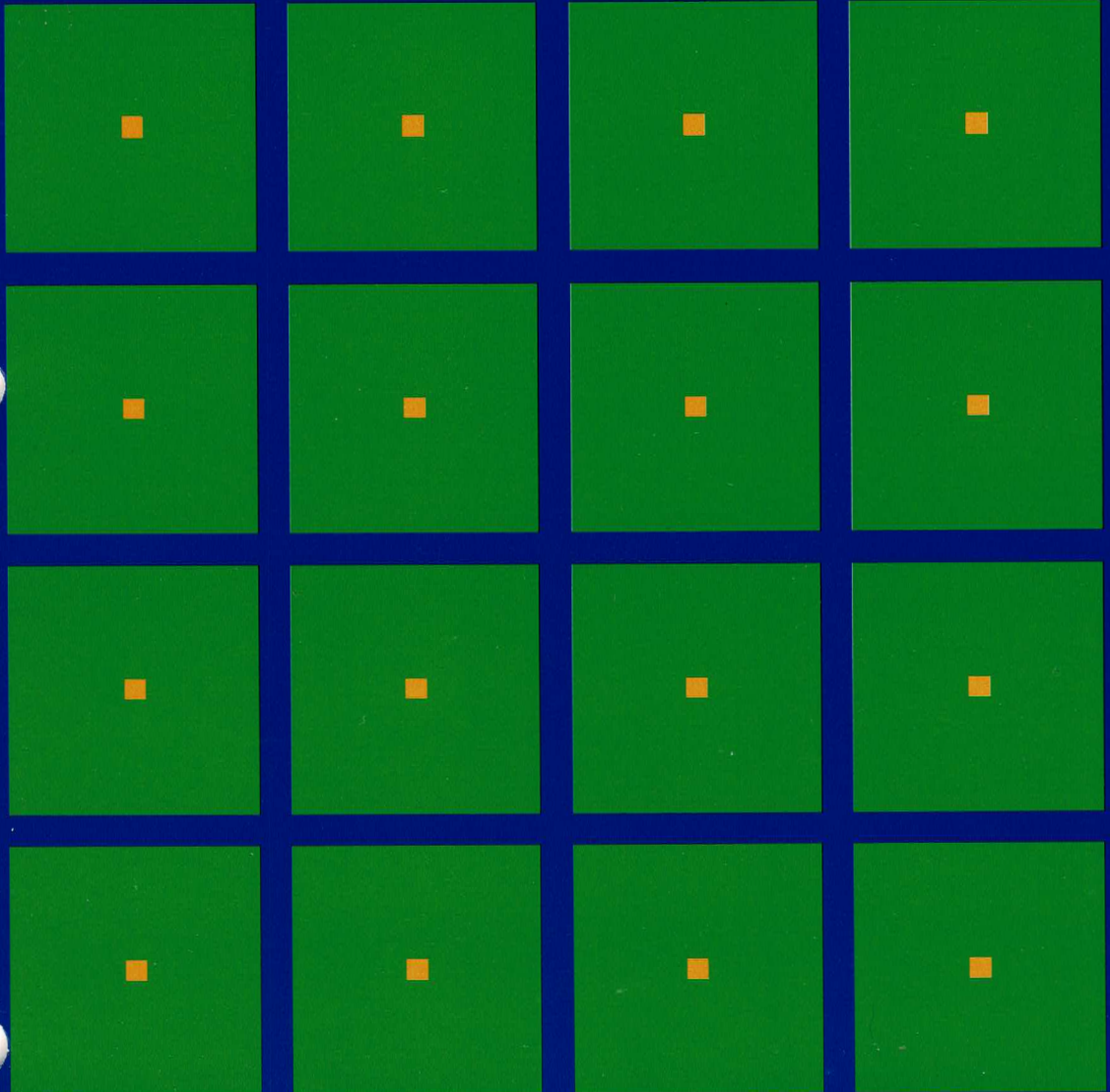
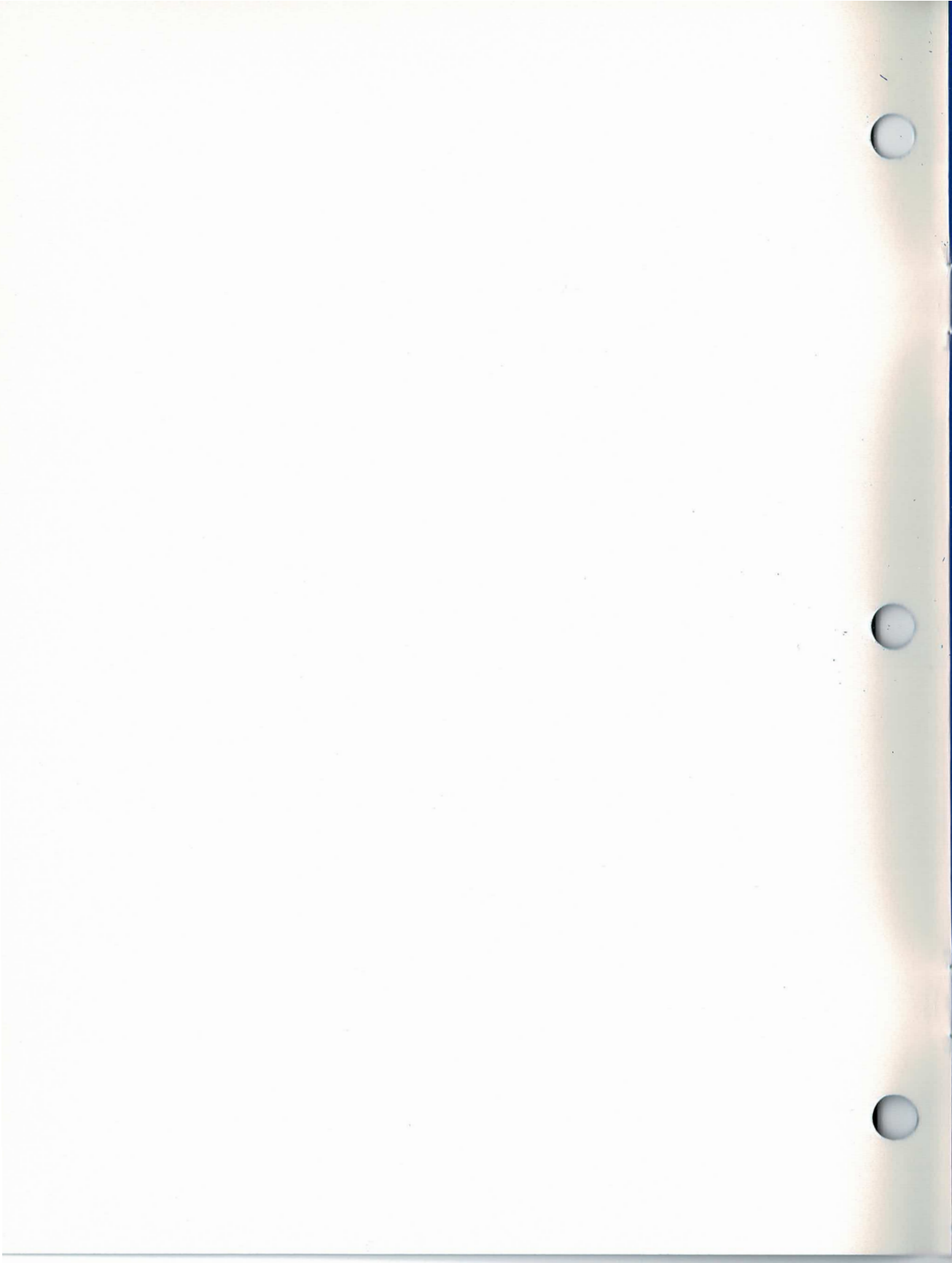


GRiDAccess User's Guide





GRiDAccess User's Guide

April 1986

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About This Book

This manual explains how to use and provides reference information on the GRiDAccess software product.

What Is GRiDAccess? GRiDAccess is a communications program that allows a user to receive and send files with a variety of remote computers over the telephone lines and other common carriers.

GRiDAccess also lets you make and receive telephone calls using a telephone plugged into your computer. You continue working with the GRiD applications as you make or receive calls, and converse with your party. You can turn your computer into a highly efficient phone dialer by using GRiDFile or GRiDMaster to store phone numbers.

The purpose of this guide is to provide reference information on GRiDAccess and explain how to use it.

Before Using This Guide If you already use the GRiD Management tools—GRiDFile, GRiDPlan, GRiDPlot, or GRiDWrite—this guide provides you with all the information you need to use GRiDAccess.

However, if you are a new GRiD User, you should first familiarize yourself with the GRiD software keyboard, menus, forms, file creation procedures, and file handling commands as described in the *Getting Started* tutorial and the *GRiD Software* manual.

How Do I Begin? Read Chapter 1 to acquaint yourself with GRiDAccess, your system requirements and those of the remote computer you wish to communicate with, and some procedures to guide you in performing the more prominent functions of the program.

Where necessary, Chapter 1 refers you to the remaining chapters of the book; these chapters contain detailed descriptions of GRiDAccess menus and forms. Read these chapters to familiarize yourself with the full capabilities of GRiDAccess.

Typographical Considerations This guide follows certain typographical conventions concerning keycaps and use of the keyboard. You should be aware of these conventions as you read.

Keycaps

Keycap labels are in upper case, just as they appear on your keyboard. Thus, when you see the symbol CODE, you should press the key labeled CODE rather than typing the word "CODE" letter by letter.

Multi-Key Operations

Throughout this manual, you are instructed to perform operations like "press CODE-RETURN." When you see a hyphen between two keycap names, press the keys in the order in which they appear and hold them down together. Thus, when you see "press CODE-RETURN," press down the CODE key and, while holding it down, press the key labeled RETURN. If you see three keycap names linked with hyphens, hold down the first two while pressing the the third.

Confirm

You are instructed both in this manual and in prompts that appear on your computer screen to "confirm" that a form is filled out correctly or that you are ready to go on to the next step of the task at hand. The proper response to a "confirm" request is to press CODE-RETURN.

Chapter 1: Introduction

This chapter introduces GRiDAccess to the new user and covers the following topics:

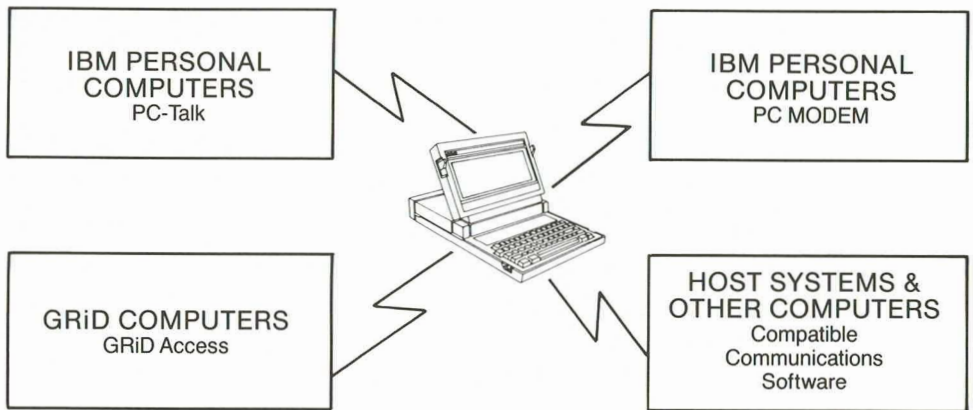
- Communications capabilities: whom you can communicate with and how.
- System requirements for both the computer using GRiDAccess and other computers using other communications software.
- Activating GRiDAccess so that you can dial and answer telephone calls.
- How to make connections for voice and data communications, and how to send and receive data.

The chapter gives an overview of the topics mentioned above; it doesn't cover all GRiDAccess functions or give you the technical details you may require in every instance. When necessary, you are referred to other parts of the guide for this information.

Communications Capabilities GRiDAccess lets you make and receive telephone calls on a telephone connected to your computer, and exchange data with remote computers using either GRiDAccess or other communication software (Figure 1-1).

NOTE: If you are using a GRiD Compass computer, you can use a special handset (available from GRiD) that allows voice communication with no need for a separate telephone. Refer to the *GRiD Compass Owner's Guide* for details.

Figure 1-1. Accessing Remote Systems with GRiDAccess



GRiDAccess lets you dial or receive calls as you work with any GRiD application; for example, you can place or receive a call as you work with a worksheet file under GRiDPlan. You simply press CODE-A, either to dial a number or answer an incoming call. Then, GRiDAccess presents you with one or more menus and forms, depending on what you want to do, and places or receives your call.

In addition to voice communication, GRiDAccess lets you exchange files with remote computers as summarized below:

- You can automatically dial from a list of telephone numbers in a GRiDFile database or GRiDMaster and then optionally send or receive data.
- You can dial a remote computer and then automatically send a file to it or receive a file from it.
- Using the telephone or handset, you can converse with a person at the remote computer before or after a file transmission.
- You can have GRiDAccess automatically answer incoming calls and then immediately send a file to the calling computer or receive a file from it.

System Requirements GRiDAccess not only gives you data and voice communications with other computers using GRiDAccess, but also makes it possible to exchange data with a variety of other computers using other communication software. The hardware and software requirements differ for your computer using GRiDAccess and the remote computer using other software, as discussed in the following sections.

Computers Using GRiDAccess

Computers using GRiDAccess must have a modem (either built-in or external). For the makes and models of external modems that you can use with GRiDAccess, contact your GRiD dealer or representative. In addition, you must have the following files in the “Programs” subject on an active device:

Title	Kind
GRiDAccess	Run
GRiDCaseHayesInternal	Modem (when using a GRiDCase with an internal modem)
GRiDCase	Serial (when using a GRiDCase)
HayesExternal	Modem (when using a GRiDCase with an external modem)
Modem	Device (when using a Compass with an internal modem)
Serial	Device (when using a Compass with an external modem)

In addition, you must have the standard GRiD-OS files (CCOS, Common, and Executive), version 3.1.0 or higher.

For voice communications, you must have a telephone (or handset) that plugs into the back of your computer. Before using your computer for telephone communications, read the telephone equipment checklist in Appendix A.

Computers Using Non-GRiD Software

The communication software on computers not using GRiDAccess must use the same communication *protocol* as GRiDAccess.

A protocol is a convention by which two computers communicate with each other over a telephone line or other carrier. The protocol coordinates and controls the exchange of data and other operations between the two computers.

GRiDAccess uses the XMODEM protocol, enabling you to exchange data with any other computer whose communication software uses this protocol. Many popular communication software products use the XMODEM protocol.

You should be able to exchange data with any computer that uses the XMODEM protocol. Appendix B, which describes the protocol, is included for GRiDAccess users interested in communicating with remote computers that cannot run GRiDAccess. If necessary, a programmer can use the information in the appendix to write a routine capable of communicating with GRiDAccess.

Activating GRiDAccess Before dialing or receiving a phone call, you must first *activate* (make available) GRiDAccess. When you activate GRiDAccess, the operating system brings it into main memory (RAM) where it remains until you deactivate it or turn off your computer.

To activate GRiDAccess, specify it in a File form (Figure 1-2) and confirm.

NOTE: The GRiDMaster application includes the convenient option of automatically activating GRiDAccess whenever you start-up your computer. Refer to the Administrator chapter in the *GRiDMaster User's Guide* for details.

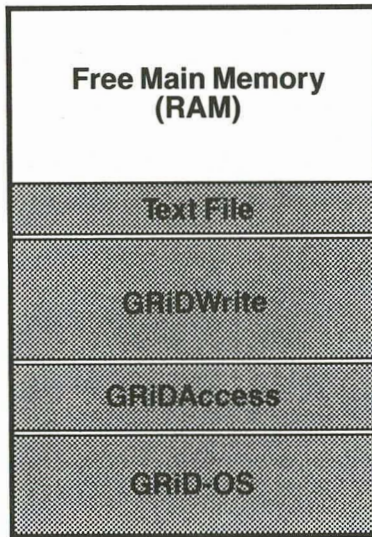
Figure 1-2. File Form for Activating GRiDAccess

Device	Hard Disk
Subject	Programs
Title	GRiDAccess
Kind	Run
Password	

Select a file and confirm or
Press CODE-? for help

Once GRiDAccess is active, you can carry on your ordinary work, pressing CODE-A when you want to dial or answer the phone. As you work, your current application and GRiDAccess coexist in main memory (RAM) at the same time. For example, Figure 1-3 shows main memory usage when, after activating GRiDAccess, you start work on a text file.

Figure 1-3. *Main Memory (RAM) Usage After Activating GRiDAccess and Retrieving a Text File*



Deactivating GRiDAccess When you deactivate GRiDAccess, GRiD-OS removes it from main memory, freeing space for other uses. To deactivate GRiDAccess, press CODE-A, then CODE-ESC, and then confirm.

Note that GRiDAccess uses main memory—approximately 29K of space—that would ordinarily be available to your current application. If the text file shown in Figure 1-3 had been extremely large, you would have had to consider deactivating GRiDAccess to make additional main memory available before retrieving the file.

How To Use GRiDAccess This section describes how you can:

- Dial a number from the Card File in GRiDMaster.
- Dial a number from a telephone list in a GRiDFile database.
- Dial a number, hold a conversation, and optionally send a file.
- Answer an incoming call, hold a conversation, and optionally receive a file.

In the procedures that follow, you are referred, when necessary, to other parts of the guide which contain more detailed information.

Dial From the GRiDMaster Card File

Use the following procedure to dial from the Card File in GRiDMaster. (Refer to the *GRiDMaster User's Guide* for information about the GRiDMaster desk organizer application.)

To Dial from the GRiDMaster Card File

1. Retrieve your organizer file using the File form.
2. From the Administrator Tool (CODE-9), press CODE-O for the Options menu, and set the GRiDAccess Always Active item to Yes. Confirm the Options form to activate GRiDAccess.
3. Select the card of the person you wish to call from the Card File (CODE-3). A sample card is shown below.

The screenshot shows a window titled "Data Works: Howard, John" with a timestamp of "03/27/86" and "2:48 PM". The main area contains a card with the following fields:

Work number (1)	765-4321
Work number (2)	x522
Home number	
Title	Director, Sales
Address	
Address	
City	
State	
ZIP Code	
Country	
Manager	Brown, Jean
Comments	
Comments	

Below the card is a status bar with the text "Confirm to select another card" and a row of icons numbered 1 through 10. The icons include a keyboard (1), a pencil (2), a card (3), a folder (4), a document (5), a calculator (6), a clock (7), a telephone (8), a grid (9), and a user icon (10). The text "GRID USER TASKS" is visible on the right side of the status bar.

Move the outline to the number you wish to dial, and press CODE-A.

4. The Idle menu, shown below, appears with the outline around the Dial the Phone item. Confirm.

```

Dial the phone
Dial the phone and send a file
Dial the phone and receive a file
Answer the phone and send a file
Answer the phone and receive a file
Change telephone configuration

Select item and confirm
Version 3.1.5 of GRiDAccess

```

See Chapter 2 for an explanation of all the items in the Idle menu.

5. The Dial Access form, shown below, appears; it is filled in with the number you selected. If the other information in the form is correct, pick up your telephone handset and confirm; otherwise, correct the form and then pick up your handset and confirm. The selected number is dialed.

```

Phone number      (415) 961-5800
Outside access prefix 415
Local area code   9
Modem type        Internal
Dial type         Touch-tone
Wait for answer   30
Speaker volume    Medium

Dial access: Fill in form and confirm

```

See Chapter 3 for an explanation of all the items in the Dial Access form.

While the telephone conversation is in progress, the message "Phone is in use" appears at the bottom of your screen.

6. When you are finished with your conversation, press CODE-A to return to the Active menu, shown below.

```

Hang up the phone
Execute telephone commands
Change telephone configuration
Send a file
Receive a file
Cancel file transfer

Select item and confirm
Phone is in use

```

You can now terminate the connection or select another option from the form such as Send a File or Receive a File. Move the outline to the desired item in the Active menu (Hang up the Phone in the example above) and confirm.

NOTE: This last step is important. You cannot simply hang up your telephone when you are finished conversing. You must tell the computer you are finished by selecting the Hang up the Phone item in the Active menu. If you neglect this last step, the message "Phone is in use" will continue to appear at the bottom of your screen.

7. If you don't intend to use GRiDAccess again shortly, deactivate it by pressing CODE-A and then CODE-ESC and confirming. This action gives you additional working space in main memory by removing GRiDAccess.

Dial From a Database Telephone List

Use the following procedure to dial from a telephone list in a GRiDFile database file. (Refer to the *Management Tools Reference* manual for information about the GRiDFile database application.)

To Dial from a Database Telephone List

1. Activate GRiDAccess as described earlier in this chapter.
2. Using the File form, retrieve the database file containing the telephone list. Press CODE-F and confirm (with no query conditions) to display the entire list of numbers. An example of such a list is shown below.

A	B	C	
Name	Area	Number	
Beck, B	408	295-2046	
Belton, J	408	444-3948	
Blynn, G	409	492-2378	
Delchamps, Annie	205	344-9468	
Elder, Sarah	415	339-5033	
Forsythe, Alex	205	478-4509	
Jones, Agnes	408	336-9076	
Myers, C	205	475-6922	
Nelson, Q	408	489-3301	
Pace, Linda	314	293-4972	
Parks, Holden	415	338-2046	
Plummer, R	415	305-3387	
Raia, M	314	492-3895	
Russell, J	415	496-3699	
Sage, K	205	219-2217	
Johnson, Marshall	309	457-2386	
Santos, C	309	576-8790	
Tish, John	408	789-3221	

NOTE: In this example, the area codes are placed in a separate column. They can, however, appear in the same column as the telephone numbers, or any other format convenient to you.

3. Press CODE-A. The following message appears:

Access: Confirm for last number or select

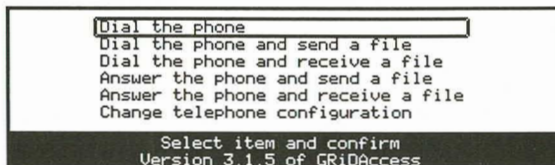
You can either pick up the telephone handset and confirm to use the last number dialed or select a number from the database list.

If you want to select a phone number, move the outline to the desired number, press CODE-B and, using the Arrow key, select the number you wish to call. In the example below, both the telephone number and the area code were selected. Pick up the telephone handset and confirm your selection to dial the number.

A	B	C	
Name	Area	Number	
Beck, B	408	295-2046	
Belton, J	408	444-3948	
Blynn, G	409	492-2378	
Delchamps, Annie	205	344-9468	
Elder, Sarah	415	389-5038	
Forsythe, Alex	205	478-4509	
Jones, Agnes	408	336-9076	
Myers, C	205	475-6922	
Nelson, Q	408	489-3301	
Pace, Linda	314	293-4972	
Parks, Holden	415	338-2046	
Plummer, R	415	305-3387	
Raia, M	314	492-3895	
Russell, J	415	496-3699	
Sage, K	205	219-2217	
Johnson, Marshall	309	457-2386	
Santos, C	309	576-8790	
Tish, John	408	789-3221	

Access: Make a selection and confirm

- The Idle menu, shown below, appears with the outline around Dial the Phone item. Confirm.

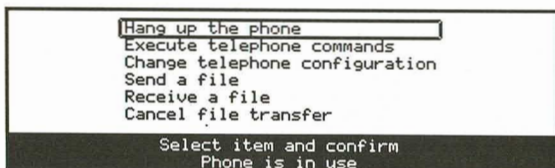


See Chapter 2 for an explanation of all the items on the Idle menu.

- The Dial Access form (described in Chapter 3) appears; it is either blank or as you filled it in for an earlier call. If the information in the form is correct, confirm; otherwise, correct the form and then confirm. The number is then dialed.

NOTE: If you confirmed in Step 3 without selecting a number from the database list, the Dial Access form appears with the information filled in from the previous call. If there was no previous call, the form is blank.

- When you are finished with your conversation, press CODE-A to return to the Active menu, shown below.



You can now terminate the connection or select another option from the form such as Send a File or Receive a File. Move the outline to the desired item in the Active menu (Hang up the Phone in the example above) and confirm.

NOTE: This last step is important. You cannot simply hang up your telephone when you are finished conversing. You must tell the computer you are finished by selecting the Hang up the Phone item in the Active menu. If you neglect this last step, the message "Phone is in use" will continue to appear at the bottom of your screen.

- If you don't intend to use GRiDAccess again shortly, deactivate it by pressing CODE-A and then CODE-ESC and confirming. This action gives you additional working space in main memory by removing GRiDAccess.

Dial, Converse, and Send a File

This section describes the steps to follow when using your telephone (or handset) to connect to another telephone, hold a conversation, and then send a file to a computer on the other end.

To Dial, Converse, and then Send a File

1. Activate GRiDAccess as described earlier in this chapter.
2. Press CODE-A. The Idle menu, shown below, appears with the outline around Dial the Phone. Confirm.

Dial the phone Dial the phone and send a file Dial the phone and receive a file Answer the phone and send a file Answer the phone and receive a file Change telephone configuration
Select item and confirm Version 3.1.5 of GRiDAccess

See Chapter 2 for an explanation of all the items on the Idle menu.

3. The Dial Access form, shown below, appears.

Phone number	<input type="text"/>
Outside access prefix	415
Local area code	9
Modem type	Internal
Dial type	Touch-tone
Wait for answer	30
Speaker volume	Low
Dial access: Fill in form and confirm	

Fill in the form. (The way you fill in the form depends on your telephone configuration; see Chapter 3 for details.) In the example shown above, the Phone Number, Outside Access Prefix, and Local Area Code items were filled in. Pick up the telephone handset and confirm to place the call.

4. When your party answers, hold the telephone conversation and then, when you're ready to send the file, press CODE-A.

- The Active menu appears. Move the outline to Send a File, shown below, and confirm.

```

Hang up the phone
Execute telephone commands
Change telephone configuration
Send a file
Receive a file
Cancel file transfer
-----
Select item and confirm
Phone is in use

```

See Chapter 4 for an explanation of all the items on the Active menu.

- After you confirm the Send a File item, the Options form, shown below, appears.

```

300 1200 2400 4800 9600
-----
Baud rate          1200
File transfer protocol  modem?
Type of data       ASCII
Host is GRiD compatible Yes
-----
Options: Fill in form and confirm
Phone is in use

```

The Options form above shows the initial settings for each item. You can change them as required; for example, you would set Host is GRiD Compatible to No if you're exchanging data files that are not in GRiD format. (See Chapter 5 for details on the Options form.)

Confirm when the settings in the form are correct; in this example, the initial settings as shown in the above form were used.

- The File form appears. Specify in the form the name of the file you want to send and confirm.
- GRiDAccess may display the message `Waiting for carrier`. When the remote computer is ready to receive your file, the file transfer will begin.
- After sending the file, GRiDAccess notifies you that the file transfer has been completed by displaying the following message:

```
Send file completed
```

Press CODE-A to return to the Active menu. You can now continue your conversation or select another option from the form; for example, at this point you could send another file or receive a file.

To terminate the connection, move the outline to the Hang Up the Phone item in the Active menu and confirm.

- If you don't intend to use GRiDAccess again shortly, deactivate it by pressing CODE-A and then CODE-ESC and confirming. This action gives you additional working space in main memory by removing GRiDAccess.

Answer, Converse, and Receive a File

This section describes the steps to follow when using your telephone (or handset) to answer an incoming call, hold a conversation, and then receive a file from the computer on the other end.

To Answer, Converse, and then Receive a File

1. Activate GRiDAccess as described earlier in this chapter.
2. When the telephone rings, Press CODE-A and then hold your conversation. When you're ready to receive the file, press CODE-A again.
3. The Active menu, shown below, appears.

```

Hang up the phone
Execute telephone commands
Change telephone configuration
Send a file
Receive a file
Cancel file transfer

Select item and confirm
Phone is in use
  
```

Move the outline to Receive a File as shown and confirm. (See Chapter 4 for an explanation of all the items in the Active menu.)

4. The Options form, shown below, appears.

```

300 1200 2400 4800 9600
Baud rate          1200
File transfer protocol  modem?
Type of data       ASCII
Host is GRiD compatible Yes

Options: Fill in form and confirm
Phone is in use
  
```

The form above shows the initial settings for each item. You can change them as required; for example, you would set Host is GRiD Compatible to No if you're exchanging data files that are not in GRiD format. (See Chapter 5 for details on the Options form.)

Confirm when the settings in the form are correct; in this example, the initial settings as shown in the above form were used.

5. The File form appears. Specify in the form the file to receive the incoming data and confirm.
GRiDAccess may display the message `Waiting for carrier` while waiting for the remote computer to begin sending the file.
6. GRiDAccess notifies you when the file transfer has been completed by displaying the following message:

```
Send file completed
```

Press `CODE-A` to return to the Active menu. You can now continue your conversation or select another option from the form; for example, at this point you could send a file, or receive another file.

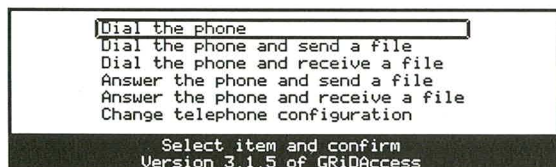
To terminate the connection, move the outline to the Hang Up the Phone item in the Active menu and confirm.

7. If you don't intend to use GRiDAccess again shortly, deactivate it by pressing `CODE-A` and then `CODE-ESC` and confirming. This action gives you additional working space in main memory by removing GRiDAccess.

Chapter 2: The Idle Menu

After activating GRiDAccess, the Idle menu (Figure 2-1) appears when you press CODE-A and a call or data transmission isn't in progress.

Figure 2-1. *The Idle Menu*



The following sections describe the items in the Idle menu in alphabetical order.

Answer the Phone and Receive a File The Answer the Phone and Receive a File item tells GRiDAccess to expect an incoming call and file from a remote computer. After you select this item and confirm, the Options form (described in Chapter 5) appears, where you specify the protocol to be used during the file transfer.

After you fill in the Options form and confirm, the File form appears. Specify in the form the file that is to receive the incoming data and confirm. GRiDAccess displays the message `Waiting for call`. After the remote computer calls and a connection is made, GRiDAccess tells the remote computer to start sending a file. Upon completion of the file transfer, GRiDAccess hangs up the phone.

NOTE: The computer sending you the file must begin the transfer within 90 seconds after the connection is made or GRiDAccess cancels the file transfer and hangs up the phone.

To cancel Answer the Phone and Receive a File, press CODE-A, select either the Hang Up the Phone item or the Cancel File Transfer item from the Active menu, and confirm.

Answer the Phone and Send a File The Answer the Phone and Send a File item tells GRiDAccess to expect an incoming call and, after answering the call, to send a file to the calling computer. After you select this item and confirm, the Options form (described in Chapter 5) appears, where you specify the protocol to be used during the file transfer.

After you fill in the Options form and confirm, the File form appears. Specify in the form the name of the file to be sent and confirm. GRiDAccess displays the message *Waiting for call*. After receiving the incoming call, GRiDAccess sends the file when the remote computer is ready. Upon completion of the file transfer, GRiDAccess hangs up the phone.

NOTE: The computer to which you're sending the file must be ready to accept data within 90 seconds after the connection is made or GRiDAccess cancels the file transfer and hangs up the phone.

To cancel Answer the Phone and Send a File, press CODE-A, select either the Hang Up the Phone item or the Cancel File Transfer item from the Active menu, and confirm.

Change Telephone Configuration The Change Telephone Configuration item lets you change certain settings in the Dial Access form. After you select this item and confirm, a portion of the Dial Access form appears (Figure 2-2).

Figure 2-2. *The Dial Access Form—Change Telephone Configuration*

Internal External	
Modem type	Internal
Dial type	Touch-tone
Wait for answer	30
Speaker volume	Low
Access: Fill in form and confirm	

You can change any of the items shown in the form; after confirming, the new settings are in effect and the Idle menu reappears. (The items in the Dial Access form are described in detail in Chapter 3.)

Dial the Phone The Dial the Phone item dials a number and then lets you converse over your telephone (or handset) with another party. You can subsequently send or receive a file using the Send a File item or the Receive a File item on the Active menu (see chapter 4).

After you select Dial the Phone and confirm, the Dial Access form (described in Chapter 3) appears. Fill in the form with any information necessary to complete the call and confirm. GRiDAccess then dials the phone number you entered.

Dial the Phone and Receive a File The Dial the Phone and Receive a File item lets you call a remote computer and then receive a file from it. After you select the item and confirm, the Dial Access form (described in Chapter 3) appears. Fill in any information necessary to complete the call and confirm. The Options form (described in Chapter 5) appears.

Fill in the Options form with information on the communication protocol to be used. After you complete the form and confirm, the File form appears. Specify in the File form the file to receive the incoming data. GRiDAccess then dials the phone number and signals the remote computer to start sending a file.

NOTE: The computer sending you the file must begin the transfer within 90 seconds after the connection is made or GRiDAccess cancels the file transfer and hangs up the phone.

To stop a file transfer, press CODE-A, select either the Hang Up the Phone item or the Cancel File Transfer item from the Active menu, and confirm.

Dial the Phone and Send a File The Dial the Phone and Send a File item lets you call a remote computer and then send a file to it. After you select the item and confirm, the Dial Access form (described in Chapter 3) appears. Fill in any information necessary to complete the call and confirm. The Options form (described in Chapter 5) appears.

Fill in the Options form with information on the communication protocol to be used. After you complete the form and confirm, the File form appears.

Specify in the File form the file you want to send, and then confirm.

GRiDAccess then dials the phone number and starts sending the file when the receiving computer is ready.

NOTE: The computer to which you're sending the file must be ready to accept data within 90 seconds after the connection is made or GRiDAccess cancels the file transfer and hangs up the phone.

To stop a file transfer, press CODE-A, select either the Hang Up the Phone item or the Cancel File Transfer item from the Active menu, and confirm.

Chapter 3: The Dial Access Form

The Dial Access form (Figure 3-1) appears when you select a Dial the Phone item from the Idle menu (Chapter 2). Fill in the telephone number and other information necessary for GRiDAccess to make a call to a telephone or another computer.

Figure 3-1. *The Dial Access Form*

Phone number	<input type="text"/>
Outside access prefix	
Local area code	
Modem type	Internal
Dial type	Touch-tone
Wait for answer	30
Speaker volume	Medium

Dial access: Fill in form and confirm

The following sections describe the items in the Dial Access form in alphabetical order.

Dial Type Initial setting is either Touch-Tone™ or the last value specified and saved in the GRiDManager Sign-On form. Choices are Pulse, Touch-Tone.

Specify Touch-Tone for most modern, digital telephone installations. For older, nondigital equipment, set the Dial Type to Pulse.

Local Area Code Specify the Local Area Code item under the following conditions:

- You make telephone calls from GRiDMaster or a GRiDFile database where the telephone numbers include area codes.
- You travel, making the calls from different locations with different area codes.

Changing the Local Area Code setting ensures that GRiDAccess can reach the number you specify. When dialing, GRiDAccess compares the Local Area Code setting and the area code in the Phone Number item. If they are the same, GRiDAccess knows you're making a local call and doesn't dial the area code. If the Local Area Code setting differs from the area code given with your number, GRiDAccess uses the area code in the Phone Number item to make the connection.

NOTE: When you deactivate GRiDAccess, the current Local Area Code is saved. When you next activate GRiDAccess, the Local Area Code is set to the same value.

Modem Type Initial setting is either Internal or the last value specified and saved in the GRiDManager Sign-On form. Choices are External, Internal.

A modem is the device by which a computer transmits data over phone lines. Select Internal if you intend to use the modem built into your computer; select External if you have a separate modem or an internal modem without the auto-dialing feature. For the makes and models of external modems that you can use with GRiDAccess, contact your GRiD dealer or representative.

Outside Access Prefix Where applicable, this is the prefix you must dial to get an outside telephone line. For example, dialing 9 is a common escape prefix on many telephones.

NOTE: When you deactivate GRiDAccess, the current Outside Access Prefix is saved. When you next activate GRiDAccess, the Outside Access Prefix is set to the same value.

Phone Number No initial setting.

The Phone Number item is the telephone number of the party you want to dial. You may also use control characters to perform special functions, as explained below.

Character	Meaning
0-9, *, #	GRiDAccess dials these characters. They perform the same functions as those on your telephone dial.
x	GRiDAccess assumes the call is to an internal extension and dials only the digits in the Phone Number item, ignoring any specifications for the Local Area Code and Outside Access Prefix items.
.	GRiDAccess waits one second before entering the next number.
^	GRiDAccess waits either for a dial tone or for a maximum of 15 seconds, whichever comes first, and then dials the number.
space, comma, parentheses, hyphen.	GRiDAccess ignores these characters. Use any of these characters for readability. They don't affect dialing.

The following are examples using the characters just described.

`^242`

This tells the system to wait for a dial tone (or for 15 seconds), and then dial extension 242.

`..9^555-1212`

The system waits two seconds, dials 9 to reach an outside line, waits for a dial tone (or for 15 seconds), then dials 555-1212.

`..9 ^ (408)-555-1212`

The system waits two seconds, dials 9 to reach an outside line, waits for a dial tone (or for 15 seconds), and dials the long-distance number. The parentheses, spaces, and hyphens are for appearance only; they have no effect on dialing speed.

`^9^555-1212.....00000 (213)-555-1212`

This instruction is for a long-distance common carrier line (such as MCI). The system waits for an internal dial tone (or for 15 seconds), then dials 9 to reach an outside line. It waits for an outside dial tone and dials the local number of the common carrier. After waiting 10 seconds while the local number rings, it dials a five-digit access number followed by the 10-digit long-distance number that you are trying to call. (You must substitute your own access number for the five zeros.)

Speaker Volume

Initial setting is off. Choices are Off, Low, Medium, High.

NOTE: For the GRiD Compass, the initial setting is either Medium or the last value specified and saved in the GRiDManager Sign-On form.

The Speaker Volume setting controls the loudness of the speaker within your computer. The speaker stays on as the telephone number is dialed; it is turned off after you are connected.

With the speaker on, you can hear whether the telephone line is busy, ringing, or disconnected.

NOTE: GRiDAccess automatically turns the speaker volume off when answering an incoming call.

Wait For Answer Initial setting is either 30 seconds or the last value specified and saved in the GRiDManager Sign-On form.

This item applies when you are dialing, and then sending or receiving a file. After changing from voice mode to data mode, the system waits for a carrier signal from the remote computer. The Wait for Answer setting determines how long the system waits for this carrier signal. If there's no carrier signal from the remote computer by the end of the period you specify, the system disconnects the line.

To change the Wait for Answer setting, type an integer representing the maximum number of seconds that the system is to wait for a carrier signal before disconnecting.

Chapter 4: The Active Menu

The Active menu (Figure 4-1) appears when you are currently carrying on voice or data communications, and you press CODE-A.

Figure 4-1. *The Active Menu*

```
Hang up the phone
Execute telephone commands
Change telephone configuration
Send a file
Receive a file
Cancel file transfer

Select item and confirm
Phone is in use
```

The following sections describe the items on the Active menu in alphabetical order.

Cancel File Transfer The Cancel File Transfer item stops the transfer of data, either incoming or outgoing, between your computer and the remote computer. After you select the item and confirm, the data transfer halts. You can now talk over the telephone (or handset) if you were in voice communication before the transfer began; otherwise, GRiDAccess hangs up.

Change Telephone Configuration The Change Telephone Configuration item lets you change certain settings in the Dial Access form. After you select this item and confirm, a portion of the Dial Access form appears (Figure 4-2).

Figure 4-2. *The Dial Access Form—Change Telephone Configuration*

```
Internal External
Modem type Internal
Dial type Touch-tone
Wait for answer 30
Speaker volume Low

Access: Fill in form and confirm
```

You can change any of the items shown in the form; after confirming, the new settings are in effect and the Idle menu reappears. (The items in the Dial Access form are described in detail in Chapter 3.)

Execute Telephone Commands The Execute Telephone Commands item lets you perform the same functions on a handset attached to your Compass computer as you can on a regular telephone—for example, putting a call on hold and then transferring it to another extension. You can execute a telephone command only when you are in voice communications over the telephone handset.

NOTE: You will generally not need to use this item if you have a standard telephone connected to your computer. However, the Enter Dial Characters and Select Dial Characters commands (described below) can still be used in this situation.

When you select this item and confirm, the Commands form is displayed, as shown in Figure 4-3. The commands are executed immediately after you confirm the form.

Figure 4-3. *The Commands Form*

Enter dial characters	Depress switch hook	Select
Command	Depress switch hook	
Handset	On	
Commands: Fill in form and confirm Phone is in use		

Pressing ESC or CODE-A cancels this item and causes the Active menu to reappear.

The following sections describe the items in the Commands form.

Command

Initial setting is Depress Switch Hook. The items in the form are described below.

- | | |
|------------------------|---|
| Depress Switch Hook | GRiDAccess simulates the depression of the switch hook on a real telephone for a period of $\frac{1}{3}$ of a second. This would allow you to put your call on hold, if your telephone system supports such a function. NOTE: Do not use this item on a GRiDCase computer; it may cause your system to “hang.” |
| Enter Dial Characters | You can enter any combination of the numbers and characters that appear on a telephone dial or touch buttons: the numbers 0 through 9, the pound sign (#), or an asterisk (*). This lets you enter such information as bank account transactions, telephone extension numbers, and credit card numbers, as desired. After you enter the numbers and confirm, GRiDAccess dials them. |
| Select Dial Characters | The telephone list in the GRiDFile database file or other file you are currently working with appears. Select the desired dial characters from the list and confirm. The Commands Form reappears; confirm if the numbers are correct; then, GRiDAccess dials them. |

Handset

Initial setting is On. Choices are Off, On.

The Handset item controls the use of the GRiD Compass handset. “On” turns the handset on and “Off” turns it off (the equivalent to placing your hand over the mouth piece of the receiver). This option has no effect on the speaker built into the GRiD Compass internal modem.

Hang Up the Phone The Hang Up the Phone item causes GRiDAccess to terminate a telephone connection after answering or placing a call.

Receive a File The Receive a File item tells GRiDAccess to expect an incoming file from a remote computer connected to your computer. After you select this item and confirm, the Options form (described in Chapter 5) appears, where you specify the protocol to be used during the file transfer.

After you fill in the Options form and confirm, the File form appears. Specify in the form the file that is to receive the incoming data, and confirm. GRiDAccess then signals the remote computer to start sending the file. Upon completion of the file transfer, GRiDAccess returns the phone to voice mode.

NOTE: The computer sending you the file must begin file transfer within 90 seconds after the connection is made or GRiDAccess cancels the file transfer and hangs up the phone.

To cancel Receive a File, press CODE-A, select either the Hang Up the Phone item or the Cancel File Transfer item from the Active menu, and confirm.

Send a File The Send a File item tells GRiDAccess to send a file to a remote computer already connected to your computer. After you select this item and confirm, the Options form (described in Chapter 5) appears, where you specify the protocol to be used during the file transfer.

After you fill in the Options form and confirm, the File form appears. Specify in the form the name of the file to be sent and confirm. GRiDAccess then sends the file when the remote computer is ready. Upon completion of the file transfer, GRiDAccess returns the phone to voice mode.

NOTE: The computer to which you're sending the file must be ready to accept data within 90 seconds after the connection is made or GRiDAccess cancels the file transfer and hangs up the phone.

To cancel Send a File, press CODE-A, select either the Hang Up the Phone item or the Cancel File Transfer item from the Active menu, and confirm.

Chapter 5: The Options Form

The Options form (Figure 5-1) appears when you specify that you intend to send or receive a file from either the Idle menu (Chapter 2) or the Active menu (Chapter 4).

Figure 5-1. *The Options Form*

300	1200	2400	4800	9600
Baud rate	1200			
File transfer protocol	modem7			
Type of data	ASCII			
Host is GRiD compatible	Yes			
Options: Fill in form and confirm				

The following sections describe the items on the Options form in alphabetical order.

Baud Rate Initial setting is 1200 bits per second. Choices are 300, 1200, 2400, 4800, 9600.

Baud Rate is the speed at which data is transmitted and received.

NOTE: Check with a person at the remote computer if you're not sure which baud rate to specify.

File Transfer Protocol The file transfer protocol is the set of conventions and rules that GRiDAccess and the remote computer use in making a file transfer. The protocol at your computer and the remote computer must be the same. If they aren't the same, the communication attempt fails and GRiDAccess issues an error message.

GRiDAccess uses the Modem7 protocol. The Modem7 protocol uses an error detection technique in which the checksum character indicates errors.

NOTE: If you need detailed technical information on the Modem7 protocol, see Appendix B.

Host Is GRiD Compatible The formats of files created by GRiD-OS applications and those created by other applications can differ. When such files are to be transmitted, GRiDAccess must know the format of an incoming file, and how to put outgoing files into a format expected by the remote computer. You provide this information to GRiDAccess through the Host Is GRiD Compatible item.

The information you require depends on whether you intend to send or receive files, as described in the following sections.

Initial setting is Yes. Choices are Yes, No. If you specify No, either the Receive File Options form (when you're to receive data) or the Send File Options form (when you're to send data) appears.

NOTE: If you select Binary as the Type of Data item, GRiDAccess ignores the settings in the Receive File Options form, and all settings in the Send File Options form except the Intercharacter Delay item.

Receive File Options Form

The Receive File Options form (Figure 5-2) appears when you select No as the Host Is GRiD Compatible item, and you intend to receive data.

Figure 5-2. *Receive File Options Form*

Enter character(s) CR CR-LF

Line ends with CR-LF

Receive file options: Fill in form and confirm

The single item on this form is described below.

Line Ends With Initial setting is CR-LF (for carriage-return, line-feed characters). Choices are CR-LF, CR (for carriage return character), or up to three ASCII character(s) that the remote computer recognizes as line-end characters. GRiDAccess uses the characters you specify to break the incoming stream of characters into separate lines.

If you don't know the proper setting, check with a person at the sending computer.

Send File Options Form

The Send File Options form (Figure 5-3) appears when you select No as the Host Is GRiD Compatible item, and you intend to send data.

Figure 5-3. *Send File Options Form*

1-256	No change
Line length	No change
End line at	Character
End line with	CR-LF
Intercharacter delay	None
Send file options: Fill in form and confirm Phone is in use	

End Line At The End Line At item applies only when you specify a number from 1 through 256 in the Line Length item.

The End Line At item lets you ensure that only full words—a group of non-blank characters preceded and followed by at least one blank character—are transmitted to the remote computer.

NOTE: If you select Binary as the Type of Data item, GRiDAccess ignores this setting.

Initial setting is Character. Choices are Character, Word. The settings, as described below, determine GRiDAccess action when the characters of a word exceed the end boundary of an outgoing line, as determined by the Line Length item.

Character	GRiDAccess includes the partial word in the current outgoing line and sends the remaining characters of the word at the beginning of the next outgoing line.
Word	GRiDAccess removes the beginning characters of the word from the outgoing line and sends the entire word at the beginning of the next outgoing line.

End Line With Initial setting is CR-LF (for carriage-return, line-feed characters). Choices are: CR-LF, CR (for carriage-return character), or up to three ASCII character(s) that the remote computer recognizes as line-end characters.

When transmitting, GRiDAccess normally terminates a completed line with the carriage return and line-feed (CR-LF) characters. Some computers don't recognize CR-LF as the line-end characters. In such cases, you must set this item to the character(s) that the remote computer expects to see at the end of each line. (Refer to the ASCII table in the *GRiD Software* manual for details on the key sequences needed to generate any special line-end characters which may be required by the remote computer.)

NOTE: GRiDAccess ignores this setting when you set the Line Length item to No Change or set the Type of Data item to Binary.

When GRiDAccess sends a file to a remote computer, it inserts the line-end character(s) you specify at the point you specify in the Line Length item.

Intercharacter Delay Initial setting is None. Choices are None, or a number indicating the number of 1/100th of a second increments GRiDAccess is to pause.

The Intercharacter Delay item determines how long GRiDAccess pauses after transmitting each character.

Use a setting other than None when the receiving computer cannot process the data as fast as your computer sends it. Increase the delay period until the data can be received and processed successfully by the remote computer.

Line Length The Line Length item indicates the number of characters in each line of data that GRiDAccess transmits. At the end of each line, GRiDAccess inserts a line-end character, depending on your choice in the End Line With item.

NOTE: If you select Binary as the Type of Data item, GRiDAccess ignores this setting.

Choices are No Change, or a number from 1 through 256, indicating the number of characters.

If you select No Change, GRiDAccess doesn't insert line-end characters. If you specify a number, GRiDAccess inserts the line-end characters after the specified number of characters of each transmitted line.

Type of Data Initial setting is ASCII. Choices are ASCII, Binary.

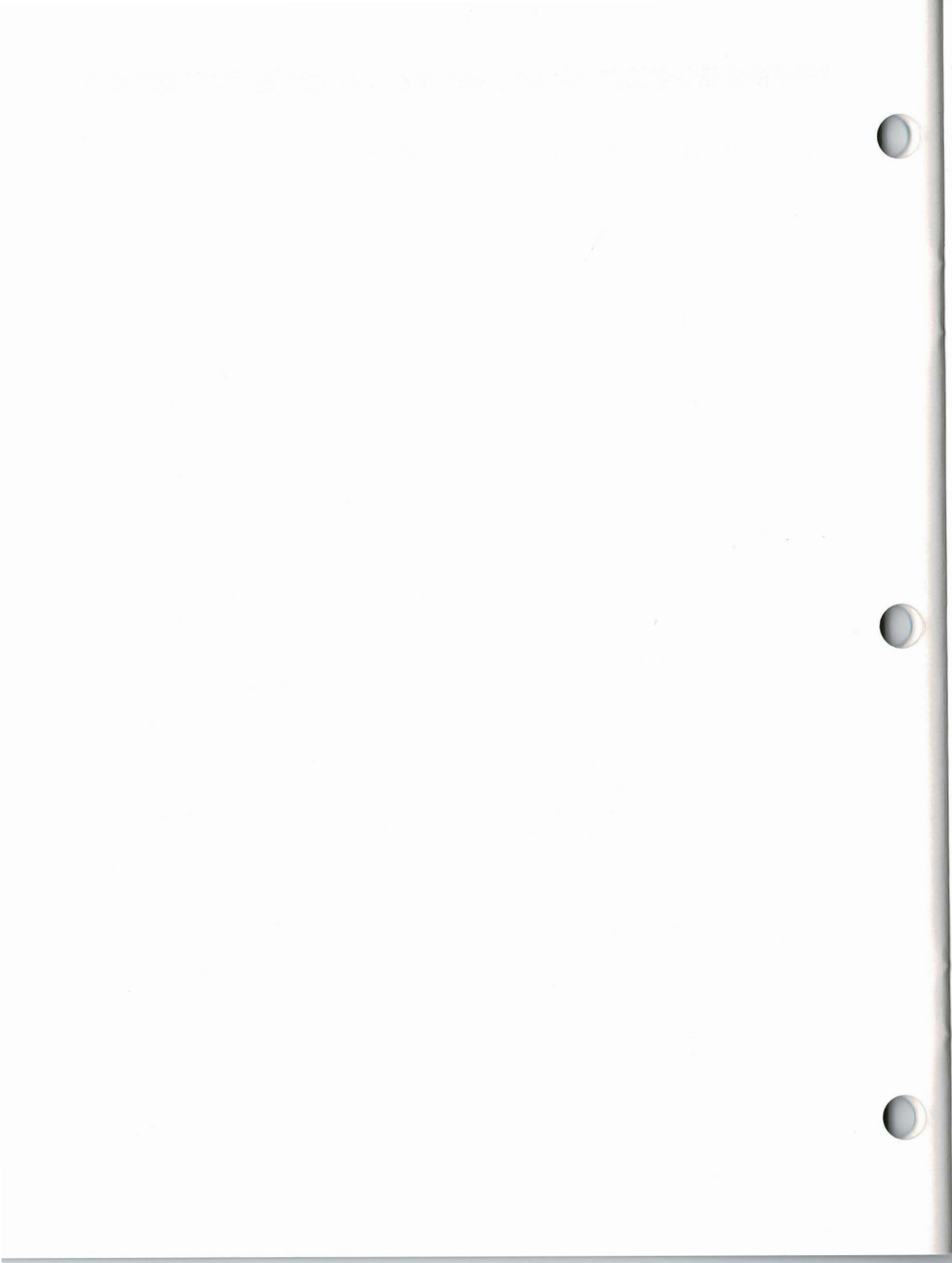
Use this setting to determine the type of data to be transmitted or received. The ASCII setting is normally used for transmitting text and data files. The binary setting is generally used for transmitting executable files (programs).

NOTE: If you set the Host Is GRiD Compatible item to No and select Binary as the Type of Data item, GRiDAccess ignores the settings in the Receive File Options form, and all settings in the Send File Options forms except the Intercharacter Delay item.

Appendix A: Telephone Equipment

This Appendix provides a checklist to determine the suitability of your telephone and related equipment for GRiDAccess communications. Use the following checklist the first time you send and receive data using your telephone equipment.

- The Federal Communications Commission (FCC) may require that you notify your local telephone company before using telephone lines to transmit data. For details, see the *Owner's Guide* for your computer.
- The telephone cord must have an RJ-11 modular plug, a small plug with four delicate wires. If your telephone cord has a four-pronged round plug instead, obtain an RJ-11 adapter for it (available at any electronics store).
- Your company's Private Branch Exchange (PBX) facilities may not be compatible with your computer, even though the physical connectors (RJ-11) are identical. Your computer is not compatible with digital PBX systems that use digital telephone sets. Check with your dealer or sales representative for compatibility information.
- If you have a GRiD Compass, you can plug a telephone handset (available from GRiD Systems) into the connector marked AUDIO on the rear panel of the Compass. You need a handset when you want to engage in both voice and data communications through your GRiD Compass, and you don't have or don't want to carry a separate telephone.
- Remember that you can't receive and make telephone calls on the line when you are using it to receive or transmit data.
- If your telephone has a Call Waiting feature, you may want to disable it (by forwarding all your calls to another extension) or use your computer with a different extension. The Call Waiting signal can disrupt the telephone connection.
- Refer to the *Owner's Guide* for your computer for further information on connecting your particular computer to a telephone line.



Appendix B: GRiDAccess Protocol

This appendix gives the communications protocol used by GRiDAccess in exchanging data with other computers. It is included for programmers who want to write routines for non-GRiD computers, enabling them to communicate with GRiD computers using GRiDAccess.

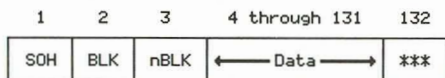
GRiDAccess uses the Modem7 protocol. This protocol is sometimes referred to as XMODEM after the program that originally used it. Modem7 uses a checksum character to check for line errors.

The protocol works as follows.

After the connection, the receiving computer transmits an ASCII Negative Acknowledgment control character (NAK, 15h) to the sending computer every 10 seconds until the sender responds with a data packet, or until 9 NAK characters are sent. If the receiving computer sends 9 NAK characters without a response from the sending computer, the file transfer is canceled.

The data is transmitted in packets of 132 characters each. Figure B-1 shows the format of the packet.

Figure B-1. XMODEM Packet Format



SOH: This byte always contains the ASCII control character 01h (Start of Header).

BLK: This byte contains the binary representation of the block number. The blocks are numbered 1 through 255; after 255, the block numbers start at 0 and again increase in increments of 1 up to 255.

nBLK: This byte contains the ones complement of the block number.

Data: This is the actual data. Since the packet length must always be 132 characters, the final packet may contain less than 128 bytes of actual data. If the file is being transmitted to a non-GRiD computer, the portion of the packet not containing real data is filled with the ASCII control character SUB (MS-DOS EOF marker, CTRL-Z, 1Ah). If the computer is GRiD compatible, the remainder of the packet is filled with ASCII NUL control characters (00h).

* * *: This is a checksum computed on the data portion of the packet only. A checksum character is computed by simply adding all of the characters in the data portion of the packet (the 128 bytes) using byte arithmetic.

The packets are checked at the receiving side and may be rejected by the receiver for any of the following reasons:

- First character of packet is not a SOH.

- Incorrect block number.

- nBLK is not the ones complement of BLK.

- The checksum character computed is not the same as the one passed.

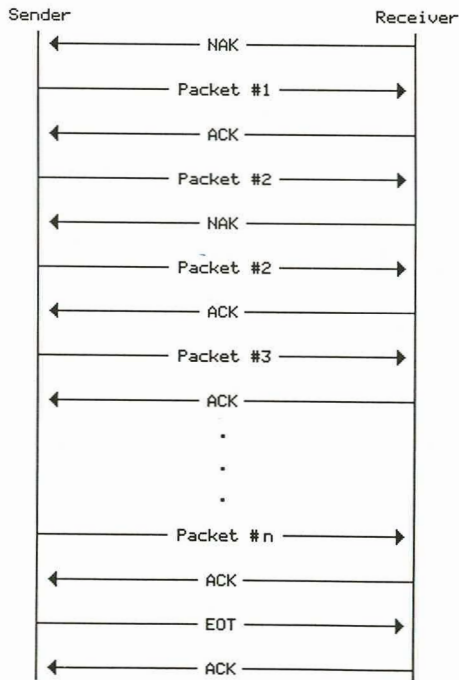
If the packet is rejected, the receiver sends an ASCII NAK control character (15h) to the sender. The sender will then send the packet again, up to eight times. If the packet is not received correctly within nine attempts, the transfer is canceled.

If the packet was received correctly, the receiver sends an ASCII ACK control character (06h) to the sender. The sender will then send the next packet.

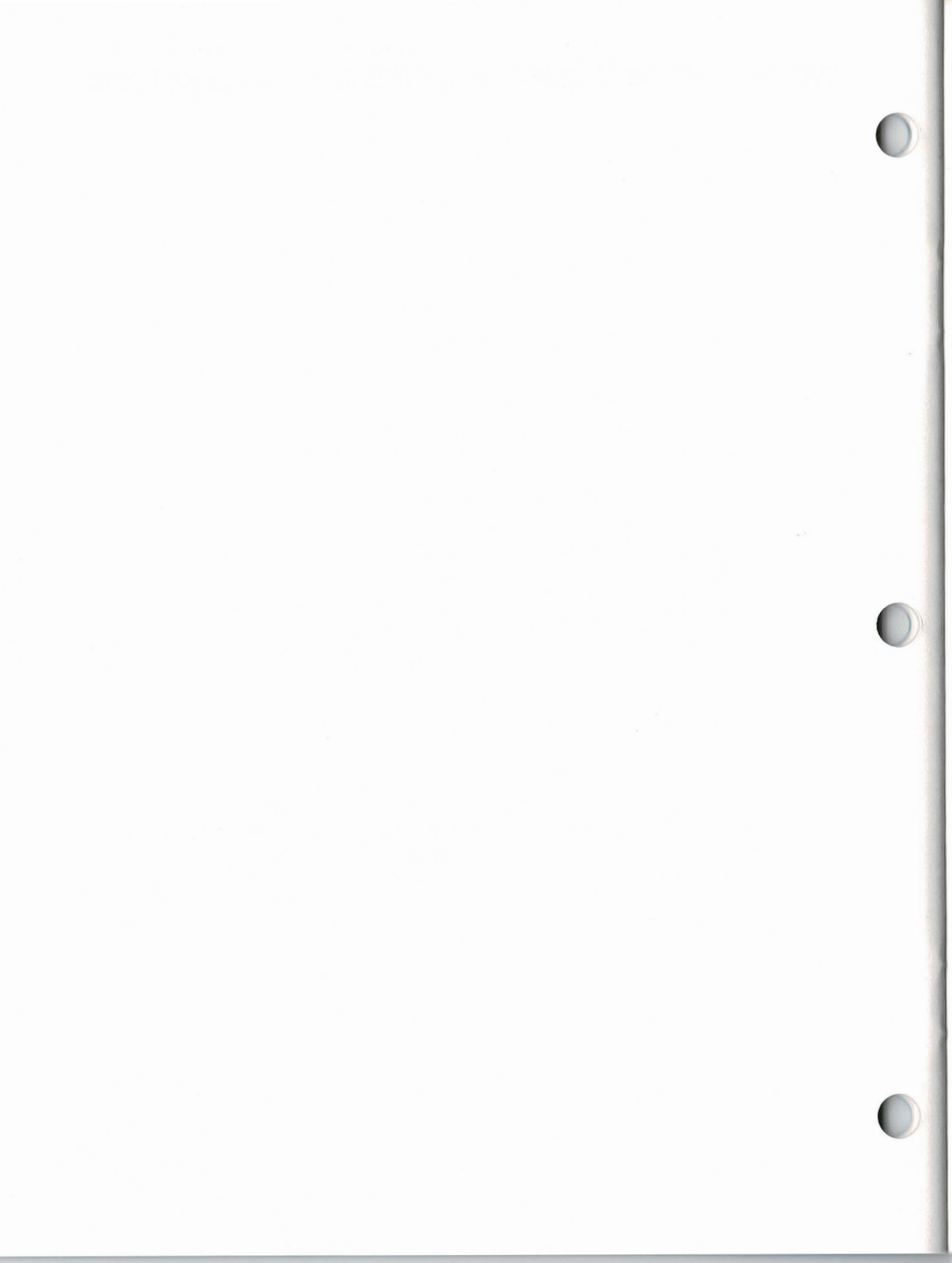
After the last packet has been sent and received error-free, the sender transmits an ASCII end-of-transmission control character (EOT, 04h). The receiver sends an ACK character back and the file transfer is concluded.

Figure B-2 illustrates a successful file transfer session.

Figure B-2. *XMODEM Protocol File Transfer Session*



A minor change has been made to the protocol by GRiDAccess. If the user specifies that the host (receiving) computer is GRiD compatible, the first packet transmitted is a special GRiD-defined data packet with a block number of 0. The packet contains information about the file to be transmitted. If the receiving computer is not a GRiD compatible system, this special packet will be rejected by the receiving computer.



Appendix C: Error Messages

When an error occurs, GRiDAccess displays a message preceded by a number. Use the number to locate information in this chapter that explains the message and ways to correct the error. The messages are listed in numerically ascending order.

11000: Modem is not connected to a phone line

What happened: GRiDAccess tried to dial the telephone number but the modem could not be found.

What to do: Attach the modem to the computer and redial the number.

11001: Modem does not support voice communications

What happened: The user selected Dial the Phone from the Idle menu; GRiDAccess tried to place the modem into voice mode after dialing. The modem indicated through an error code that it did not support voice communications.

What to do: The modem does not support voice communications. If a file is to be sent, select Dial the Phone and Send a File instead. If voice communications is required, use the regular telephone.

11002: Data received 9 times without success

What happened: GRiDAccess received the same data packet 9 times from the sending computer and the packet contained at least one error each time.

What to do: Ensure that the sending computer is using the Modem7 file transfer protocol. Then, try receiving the file again.

11003: Receiving computer is not GRiD compatible

What happened: The receiving computer doesn't have communications software that is compatible with GRiDAccess.

What to do: Specify No for the Host is GRiD Compatible item of the Options form (described in Chapter 5) and try sending again. See Chapter 5 for the additional information you must provide when you specify No.

11004: No response from sending computer

What happened: GRiDAccess did not receive an expected response from the sending computer within a specified time period.

What to do: Ensure that the sending computer is using the Modem7 file transfer protocol. Then, try receiving the file again.

11005: No response from receiving computer

What happened: GRiDAccess did not receive an expected response from the receiving computer within a specified time period.

What to do: Ensure that the receiving computer is using the Modem7 file transfer protocol. Then, try sending the file again.

11006: Data sent 9 times without success

What happened: GRiDAccess sent the same data packet to the receiving computer 9 times without the receiving computer accepting it.

What to do: Ensure that the receiving computer is using the Modem7 file transfer protocol. Then, try sending the file again.

11007: Phone number must not be blank

What happened: The Telephone Dial Access form was confirmed and the phone number field did not contain any characters.

What to do: The phone number field must contain at least one character.

11009: Load overlay error: Press ESC to cancel.

What happened: GRiDAccess tried to load a portion of the GRiDAccess program from a permanent storage device and an error was encountered.

What to do: The message displayed beneath this message contains the error condition that caused the load to fail. Make sure that the device that the GRiDAccess program was selected from is still attached to the computer. If not, reattach it.

11010: Modem type may not be changed while modem active

What happened: The Modem Type item on the Dial Access form was changed while the modem was in voice communication, waiting for a call, or transferring a file.

What to do: The modem type may not be changed under the conditions outlined above. If the modem must be changed, select Hang Up the Phone on the Active menu and confirm to place the modem into an inactive state.

11011: Commands allowed only while in voice mode

What happened: The user selected the Execute Telephone Commands item on the Active menu while the modem was in a state other than voice mode. The current operation was not affected.

What to do: The commands form is applicable only while the modem is operating in voice (conversation) mode.

11012: Access change not allowed during transfer

What happened: The user selected the Change Telephone Configuration item on the Active menu while GRiDAccess was sending or receiving a file. The transfer was not affected.

What to do: The telephone configuration may not be altered during a file transfer. Wait until the transfer is completed or cancel the transfer using the Cancel File Transfer or Hang Up the Phone items on the Active menu.

11013: Internal modem cannot be activated

What happened: GRiDAccess attempted to activate the modem built into the computer and failed.

What to do: Ensure that both the CCOS file and the Modem file (see page 1-3) are in the "Programs" Subject on the device used for start-up. For a GRiDCase, the Programs Subject must also contain the file GRiDCase with a Kind of Serial. Select the correct Modem and Serial files in the GRiDManager Options form.

11014: External modem cannot be activated

What happened: GRiDAccess attempted to activate the serial port on the computer and failed.

What to do: Make sure that the Serial file (see page 1-3) is in the "Programs" Subject on the device used for start-up. Select the correct Serial file in the GRiDManager Options form.

11015: Line length is greater than maximum

What happened: The Line Length item on the Options form was set to a value greater than 256.

What to do: Specify a value less than or equal to 256.

11016: Modem is being used by another application

What happened: Another GRiD application or program in your computer is currently using the modem.

What to do: Either wait until the modem is free, or cancel the competing program, and try again.

11017: Application does not support dial selection

What happened: You selected the Select Dial Characters item in the Commands form, and the application you are currently working with does not support this function.

What to do: If you wish to process dial characters, enter them manually in the Enter Dial Characters item of the Commands form, or else concurrently work with a GRiDFile database file or other file that supports this function.

Glossary

ASCII American Standard Code for Information Interchange. A code consisting of control characters and graphic characters used for information interchange among data processing systems, data communication systems, and associated equipment.

baud rate The rate at which a modem transmits or receives digital data; the faster the modem, the higher the baud rate.

carrier A signal that the modem changes, or modulates, in order to transmit data. If the carrier is lost, then the modem can no longer transmit or receive data.

character stream A group of characters transmitted one at a time in a sequential stream.

control character A character that controls the transmission or display of data. Control characters are part of the standard ASCII character set, though not one of the standard alphabetic, numeric, or special characters used in data. A control character may or may not be visible on your screen.

GRiDAccess A program that resides as a file in the "Programs" Subject. GRiDAccess places and receives telephone calls through a telephone connection, and permits the exchange of data with remote computers.

handshake A sequence of predetermined signals or control characters exchanged by the modems or data communication software of two data processing systems. The sequence establishes the initial connection between the two systems.

host system The central computer and associated software and devices that control communications with external computers. A computer communicates with host systems through GRiDAccess or through emulator programs such as GRiD3101, GRiDTerm, and GRiDVT100. The Dow Jones News/Retrieval® is an example of a service provided by a host system.

interface The software or hardware within a computer system that allow communications to take place. The "EpsonFX80" file in "Programs" is an example of an interface between GRiD-OS and the Epson Model FX80 printer.

line end character A character or string of characters that indicates the end of a line of text.

modem An acronym for MODulator-DEModulator. It translates the computer's digital data into analog signals for transmission and reception over telephone lines.

Modem7 A communications protocol used by GRiDAccess based on the XMODEM protocol. This protocol uses checksum characters in checking for line errors.

parity bit A check bit added to each character (for example, in a data transmission) that makes the sum of all the binary one digits, including the check bit, either odd or even. The sender adds a parity bit to ensure that the sum of each character is even (in an *even parity system*) or odd (in an *odd parity system*). The receiver checks whether the bit count is either odd or even (depending on the system). If the bit count is not the odd or even count expected, the receiver assumes that an error occurred during transmission.

protocol In telecommunications, an arbitrary convention for communicating between a host system and a remote terminal, or another host system. The protocol is implemented in the hardware and software at the two computer systems to coordinate and control data transfer and other operations between them.

record A unit of data to be stored or processed. Each record can be broken into smaller pieces of information. In the GRiD applications, a record consists of data followed by carriage-return and line-feed (CR-LF) control characters. Each record corresponds to one row in the cell-based applications such as GRiDPlan.

RJ-11 A modular connector for telephone lines specified by the telephone company. It is a plastic plug with four delicate wires. It replaces the older connector, a thick round plug with four prongs.

timeout A time interval during which a certain operation must take place, for example, connecting to a host system once having dialed it.

touch-tone dialing A dialing system that uses audible tones rather than pulses. It is faster than pulse dialing, and has been installed in most recent telephone exchanges.

XMODEM A communications protocol within the public domain which defines rules and conventions for the exchange of data between two computers. See Appendix B.

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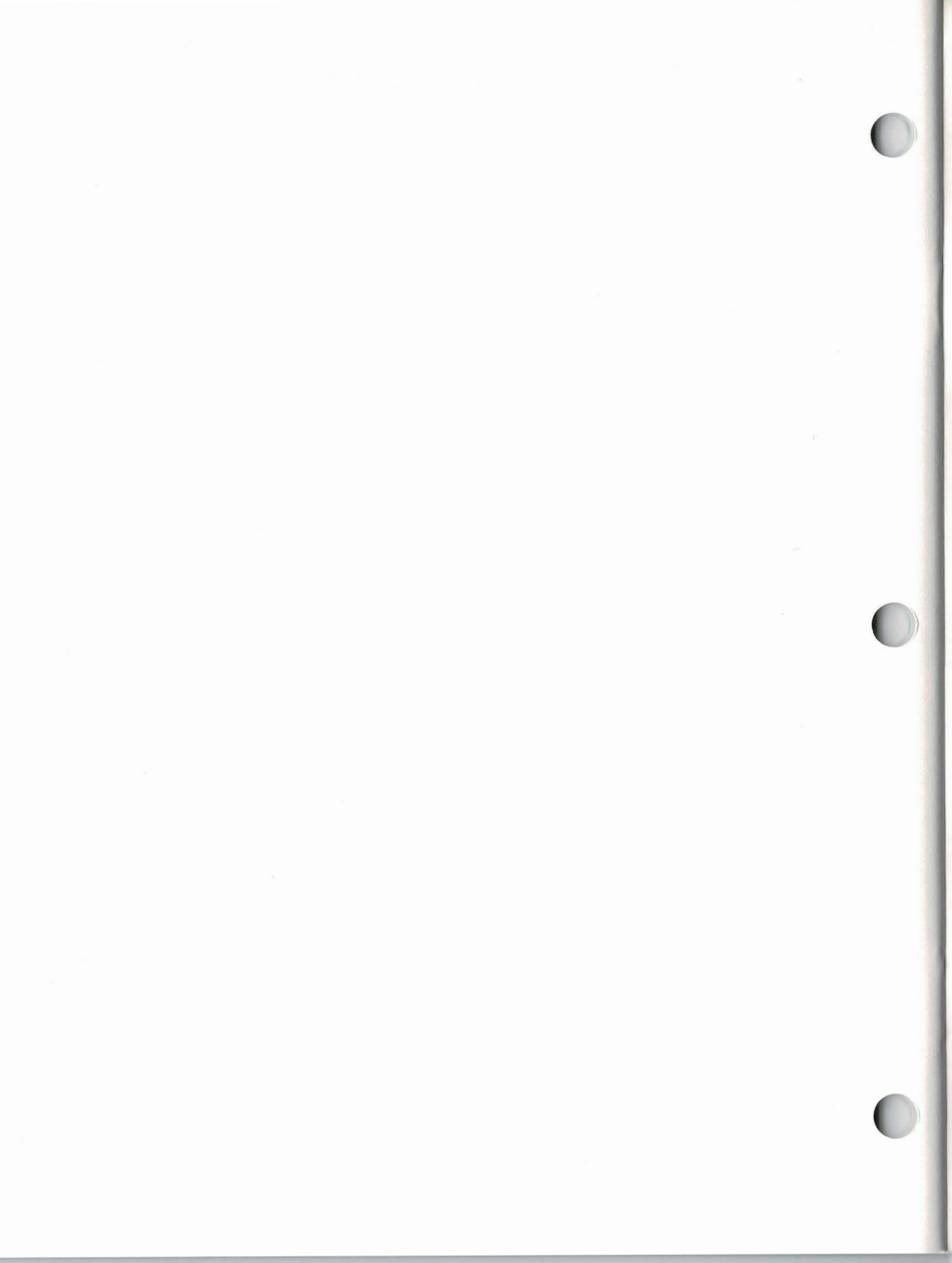
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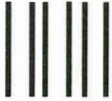


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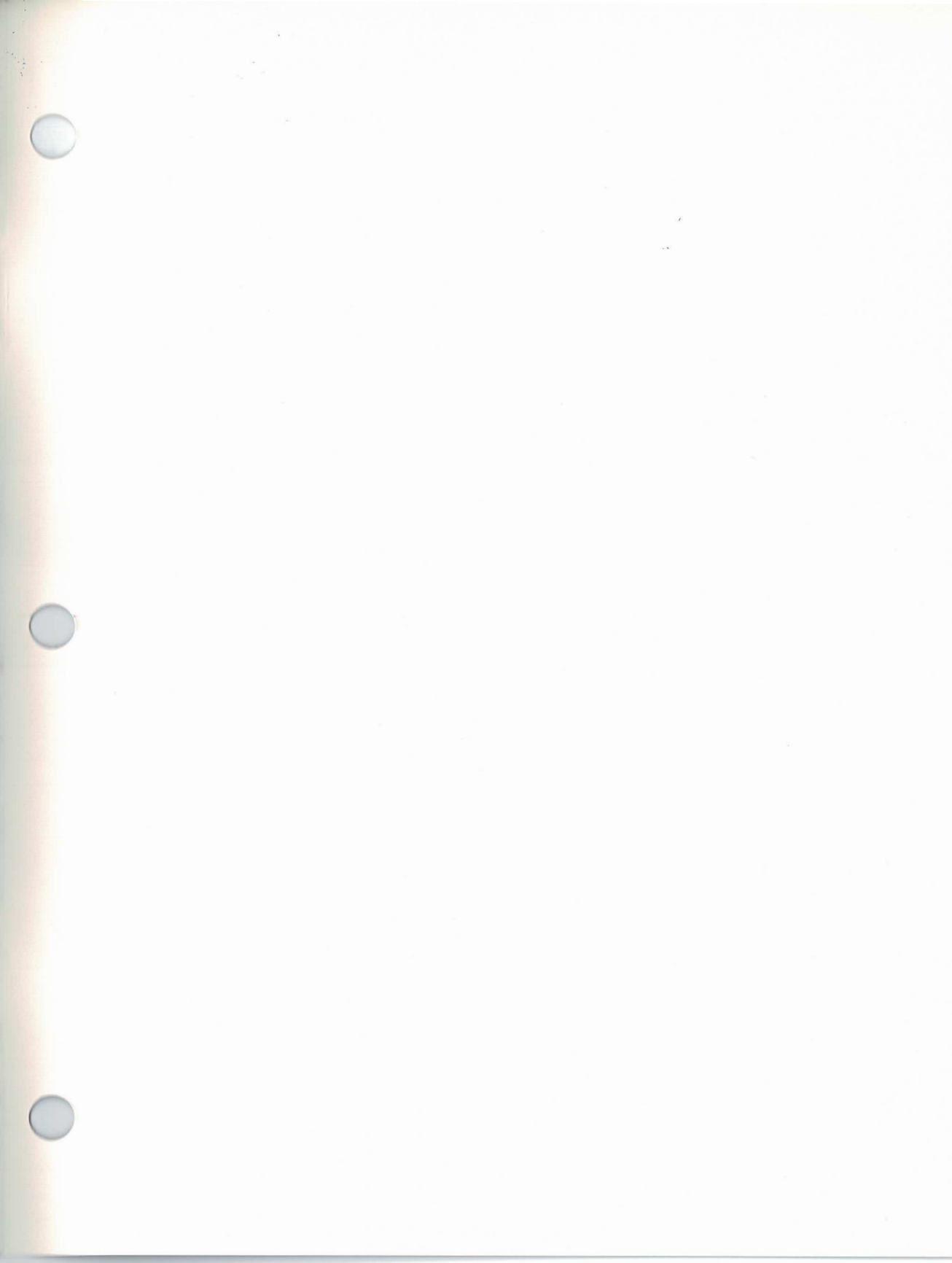
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