

DataLinkTM 1200/2400

User's Manual

 **APPLIED ENGINEERING[®]**

A DIVISION OF AE RESEARCH CORPORATION

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DataLinkTM **1200/2400**

User's Manual

Federal Communications Commission Radio Frequency Interference Statement

The equipment described in this manual generates and uses radio frequency energy. If it is not installed and used properly (i.e. in strict accordance with these instructions), it may cause interference to radio or television reception.

DataLink 1200 FCC I.D. Number: **EYW5QGDATALINK**

DataLink 2400 FCC I.D. Number: **EYW5QGDATALINK24**

This equipment has been type tested and found to comply with the limits for a class B computing device in accordance with the specifications in Subpart J of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against radio and television interference in residential installation.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reposition the receiver's antenna. Also make sure the antenna wires are making good electrical contact.
- Use a roof-mounted antenna rather than a "rabbit-ear" antenna or an antenna mounted in the attic.
- Make sure that all electrical connections on the computer are secure and any shielded I/O cables are properly fastened.
- Move the computer farther away from the receiver.
- Plug the computer and receiver into separate electrical circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Solve Radio-TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

Warning: This equipment has been certified to comply with the limits for Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

Applied Engineering is not responsible for any radio or television interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

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Introduction

MANY of you are first-time modem users who purchased the DataLink 1200 or DataLink 2400 because of its attractive price and/or because of Applied Engineering's good reputation. Whatever the reason, you're in for a treat. By purchasing Applied Engineering's DataLink, you've given yourself the benefits of both a high-quality modem and a serial card without the inconvenience of two separate cards or a serial card plus an external modem. And like most Applied Engineering cards, it comes with a five year warranty and the Technical Support telephone number giving you easy access to our knowledgeable support staff.

ONCE you've installed DataLink, you've got everything you need to take immediate advantage of it. The DataLink Communications disk contains two communications programs. The DataTerm program is a full function program which allows you to use the DataLink with your //e (with at least 128K) and IIGS. OnLine 64 is an easy to use, menu driven program for II Plus and 64K //e owners. The numbers of various bulletin boards and free memberships are also included in the DataLink package to get you started "linking up" with other computers nation-wide.

DATALINK also includes a reference card with an abbreviated list of commands for both the DataLink firmware and the DataLink software. You can place it in the crack above the top row of keys on your keyboard for a quick reminder of which keys do what.

INSTRUCTIONS in this manual will quickly guide you through the installation of the DataLink card and tell you how to directly address the card's chip. It also has a list of the card's registers, their functions and default settings as well as instructions on how to use the Communications Menu built into the firmware.

MANUAL updates are included on the READ.ME file on the DataLink disk. Any comments or suggestions regarding this manual or any other **Æ** manual, will be greatly appreciated both by **Æ** and by others who use our products.

Please address any comments or suggestions to:

Applied Engineering

P.O. Box 5100

Carrollton, Texas 75011

Attention: Manager, Technical Publications

Warning! 

Disconnect the phone line from your modem during
electrical storms.

Both your DataLink and your motherboard could
sustain serious damage from a surge.

CHAPTER ONE

Getting Started

Before you install the DataLink, call your phone company's business office and tell them that you'll be using a modem. They'll need the following information:

- ❑ FCC Registration Number: **EYW5QGDATALINK** for the 1200 or **EYW5QGDATALINK24** for the 2400. This assures them that the modem is FCC approved.
- ❑ The Ringer Equivalence Number: **0.6B**. You cannot have equipment equaling more than 5.0 total ringer equivalence hooked up to a single phone line.
- ❑ The Manufacturer: **Applied Engineering**
- ❑ And the Model: **DataLink** or **DataLink 2400**

If you plan to spend a lot of time on-line, you may want to consider getting a phone line devoted solely to modem use.

- ❖ **Important:** Call Waiting is not a viable option since the interrupt caused by an incoming call is likely to break the modem's transmission. If you currently have Call Waiting you can:
 - Cancel Call Waiting.
 - Ask your phone company if they provide a way for you to switch Call Waiting on and off.
 - Add Call Forwarding and have your calls transferred to another line while using the modem. Possibly a friend or neighbor will be willing to take your calls.
 - Use the modem late at night. Chances are, you won't be interrupted. Besides, the long-distance rates are usually cheaper.
- ❖ *[[Plus Note:]]* Plus owner's may want to install the lowercase ROM chip (available from Applied Engineering Sales) before installing the DataLink. This chip will allow your *[[Plus* to display lowercase while in 40 column mode.

Making The Connections

1) Find a location

Quite likely, your computer is on the other side of the room from the telephone jack. To remedy this, you may want to move your computer, have another jack installed near your computer, or run a longer phone cord from the phone jack to the computer. You can purchase a longer phone cord from a phone equipment dealer.

The long cord provided with the DataLink can be used to connect the DataLink card to the wall jack or to connect the phone.

❖ *Note:* Connecting a phone to DataLink is optional.

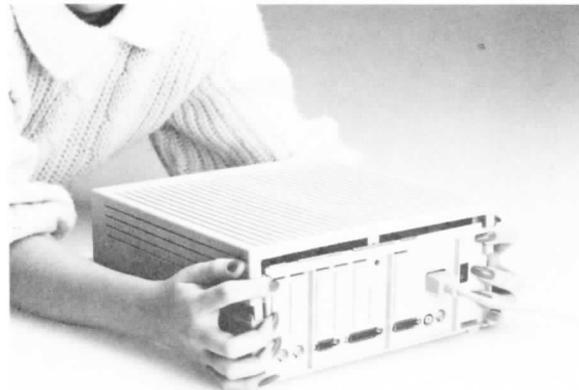
DataLink requires a modular jack. If your phone is hard-wired or if you have a four-pronged phone jack, see your phone equipment dealer about adapting them to a modular jack.

2) Remove the lid of your computer:

- First, turn off power to your computer.
- Pop the hood of the][,][Plus, and //e by pulling up on the cover at the rear edge (the edge farthest from the keyboard) until the two corner fasteners pop apart.
- The IIGS's lid has two fasteners on the sides of the back panel. Push in on the tops of the fasteners with your forefingers while pushing up with your thumbs and heel of your hands on the side of the lid.



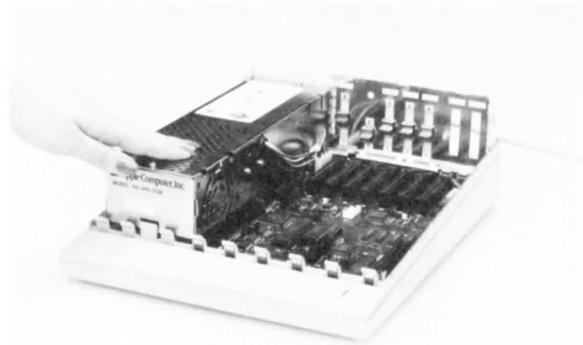
Remove the][,][+ or //e cover



Remove the IIGS cover

3) Touch the power supply

Static electricity may damage your computer and card. **Touch the power supply** to discharge any static electricity that may be on your body. This is a quick and easy safety precaution--don't blow it.

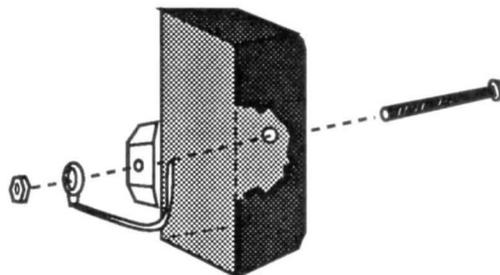


Touch the Power Supply

4) Install the phone connector plate (2400 only)

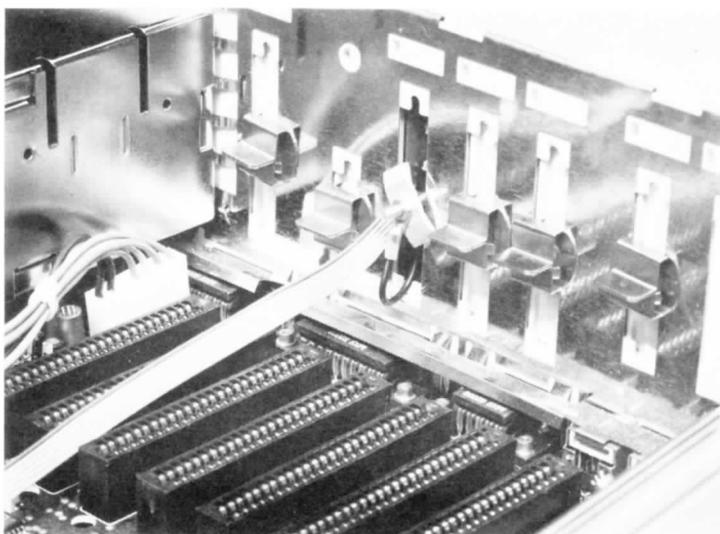
You'll want to begin assembling the connector before you insert the cables into the back panel of the computer. This will make it easier to work with.

- 1) Insert the long screw into the hole in the middle of the connector.
- 2) Begin screwing the metal bracket to the long screw.
- 3) Next slide the eyelet from the ground wire over the screw
- 4) Begin screwing on the nut. Screw on the bracket and the nut just enough so that they won't fall off.



Assemble the Connector

- 5) Now feed the cable from the phone connector plate, the ground wire, and the bracket from the outside of the computer through an unused expansion hole in the rear panel close to the slot in which you'll install the DataLink.
- ❖ *Note:* You'll need to position the ground wire and the bracket vertically to fit them through the hole.
- 6) Turn the bracket so that it is at a diagonal to the slot. The ribbon cable should feed just under the bracket.
- 7) Tighten the screw and nut with a small flathead screwdriver and the included hex wrench.

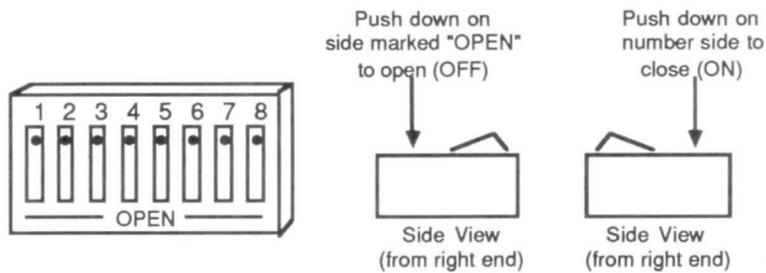


Install the Connector Plate

5) Setting the switches

Remove the DataLink from its anti-static bag. Now locate the switch block. It is a red rectangular box with 8 white switches toward the upper right corner of the card.

For most users, the switches can be left as shipped (all closed). You can control the firmware settings of the baud rate, the parity, the data format, etc., through the keyboard. For those who want to know what the switches do, a chart has been included in the appendices.



DataLink Dip Switches (set as shipped)

6) Insert the card

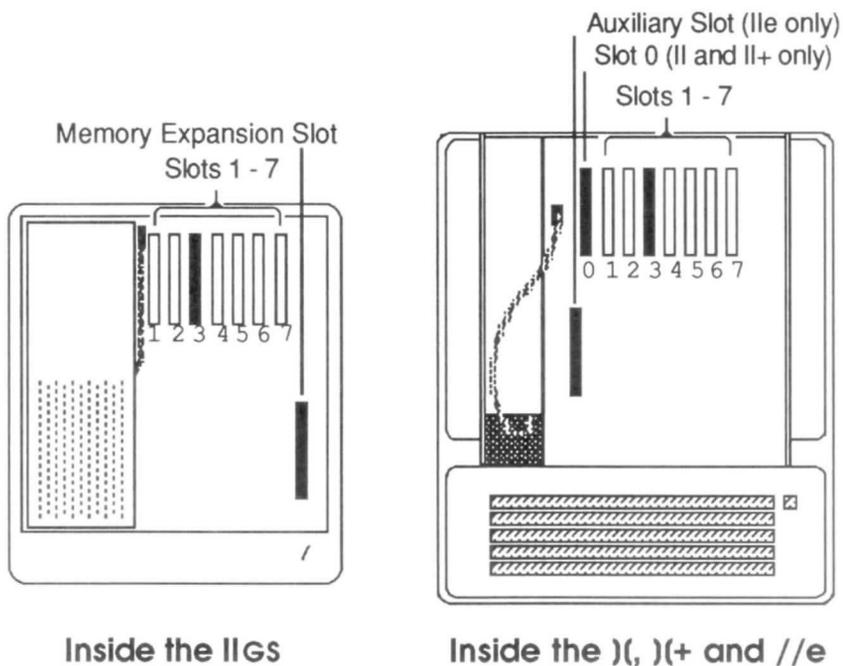
The computer's power should still be off to prevent damaging your computer or the card.

Insert the gold "fingers" of the card's edge connector into any slot--

EXCEPT:

- slots 0 and 3 of the)(and)(Plus.
- slot 3 and the Auxiliary slot of the //e.
- slot 3 and the Memory Expansion Slot of the IIGS.

Refer to the drawing below. The slots you should **NOT** put the card in are blacked-out.



The fingers will enter the slot with some friction and then seat firmly.

7) Plug in the lines

1200

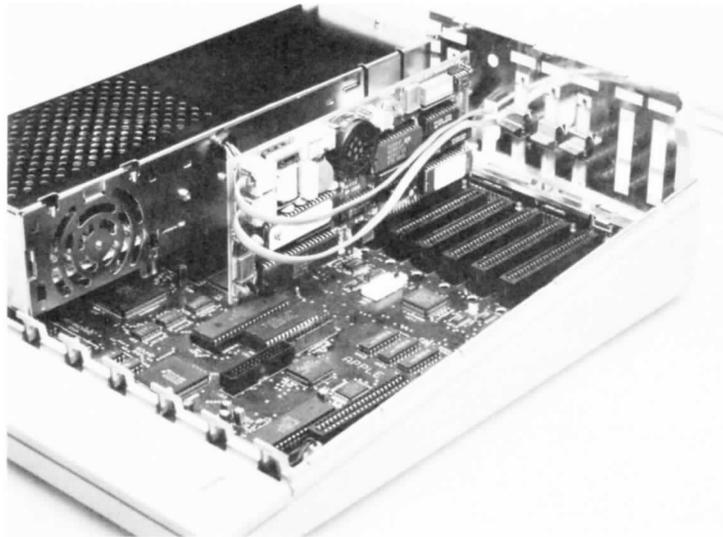
1200 owners should feed the phone cord(s) through an unused expansion hole in the rear panel of the computer closest to the slot that holds your DataLink.

Insert the line going to the wall jack into one of the card's sockets.

- ❖ *Note:* It doesn't matter which socket you use; either will work.

If you want a phone connected (optional), insert the line from the phone into the other socket on the card.

A properly installed card will look like the one shown below.

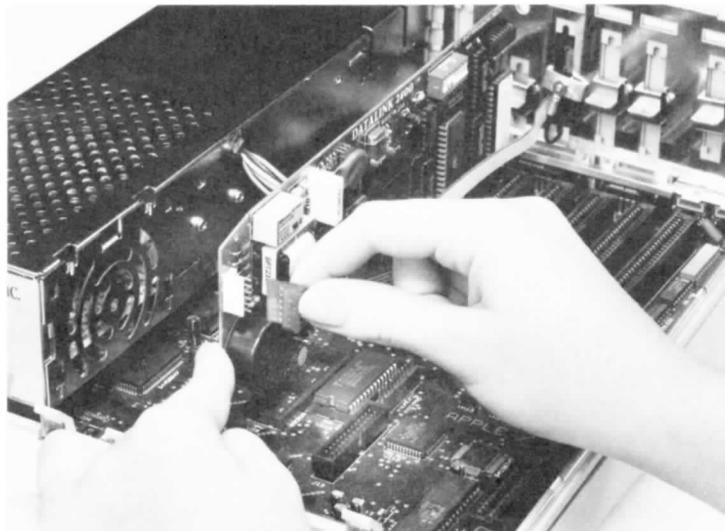


DataLink 1200 Installed

2400

Connect the cable from the connector plate to the connector pins on the end of the DataLink card.

- ❖ *Important!:* Make sure you line up the connector's socket top to bottom with the pins.

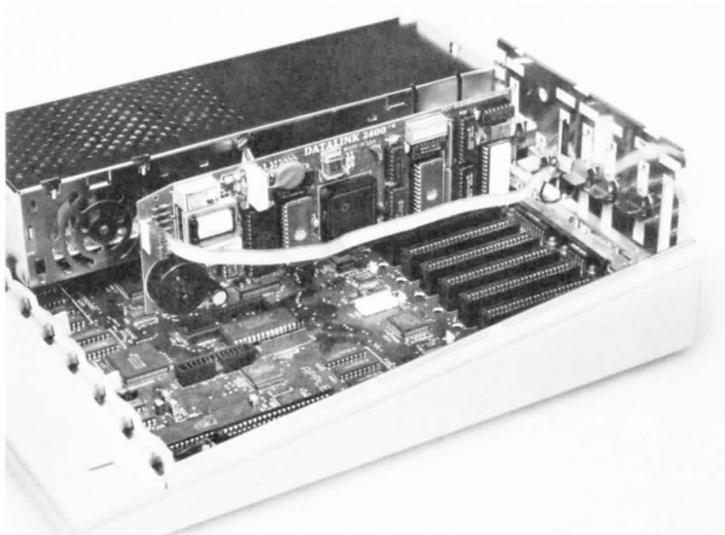


DataLink 2400 Line Connection

Insert the line coming from the wall jack into the connector's "Line" socket.

If you want a phone connected (optional), insert the line from the phone into the "Phone" socket on the connector.

A properly installed card will look like the one shown below.



DataLink 2400 Installed

9) Check for dial tone

If you have connected a phone, lift the receiver. You should get a dial tone. If you don't, check the connections and listen again. If you still don't get a dial tone, turn to the Trouble Shooting section in the appendices of this manual.

10) Test call

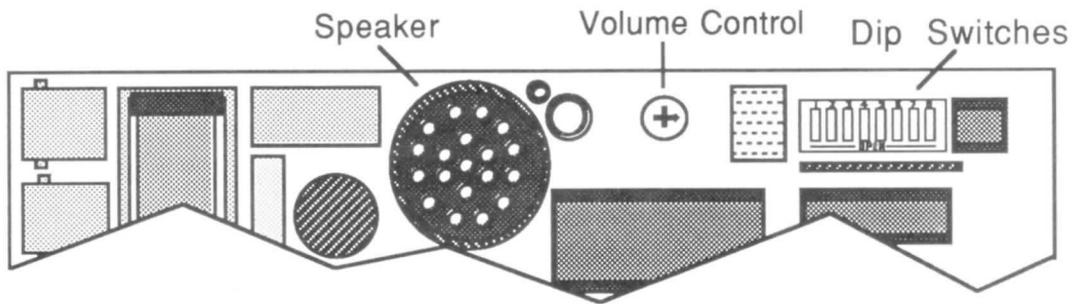
Do not put the lid on yet. You may want to make sure the computer recognizes the card before replacing the top.

- 1) Boot your computer and get into AppleSoft BASIC mode. (Refer to your Owner's Guide if you don't know how.)
 - ❖ *IIGS Note:* IIGS owners must access the "Slots" option of the Control Panel menu and set the slot containing the DataLink to "Your Card." If the card is in the recommended slot two, the setting should be "Your Card." See your IIGS owner's manual for more information on setting the slot.
- 2) At the BASIC prompt (">), enter **IN#n**  where *n* is equal to the slot number in which your DataLink is installed.
- 3) Now hold down the Control button while pressing "A".

The prompt, **AE DATALINK**, should appear on your screen.
- 4) Type **T**, press , and then type **ATDT** (all caps) followed by your own telephone number (to get a busy signal). Press .

You should hear a dial tone (if your modem line is connected); then the numbers being dialed; then a busy signal.

 - ❖ *1200 only:* Adjust the speaker volume by turning the dial to the right of the speaker (as shown in the drawing below). Right increases the volume; left decreases. Keep in mind that with the cover on the computer, the speaker will be slightly muffled. You may want to point the arrow on the dial up to begin with. This will give you medium volume.



Adjust the Volume on the 1200

- ❖ *2400 only:* The 2400's volume is controlled by the "ATL" command described later in the manual.

The modem will eventually time out or you can abort the connection yourself by pressing any key. DataLink will send the message, "NO CARRIER."

If you don't get the "NO CARRIER" message, run the test again being careful to follow the directions very closely.

If, after a second try, you still can't get the test to work, refer to Appendix A - *Trouble Shooting*.

11) Close the Lid

Replace the lid by sliding the front of the lid in first and then pushing gently and firmly on the back of the lid until it pops into place.

12) Installation is complete!

What To Do Now

You may either use this manual to help you to directly address the card's firmware, telling it at what baud rate to transmit and receive, commanding it to dial, redial, answer, send, download, etc.

OR

You may put away this manual and open the DataLink Communications manual (or any other compatible software package) to begin linking up with other computers world-wide, downloading and uploading programs, and grabbing useful information that you might have had a tough time getting before you got the DataLink.



CHAPTER TWO

Sample Session *using DataLink Firmware*

This chapter gives you an example of how to use the DataLink firmware to call a bulletin board and save the exchange. This is provided to let you get your feet wet. Complete descriptions of DataLink commands follow this chapter.

If you have the number of a local BBS you may want to use that or you can call one of the bulletin boards on the sheet provided with the DataLink. (Long-distance charges will apply in most cases.)

Once connected, you'll login as a guest, get a list of the basic commands for that bulletin board, save them to disk, then logoff.

You'll need a ProDOS formatted disk on which to save the buffer. When instructed to enter, "MY.DISK," enter the name of your ProDOS formatted disk.

- ❖ *Note:* Don't use the /DL disk (provided with the DataLink) for saving the buffer. This disk is almost full.

In the following directions, "Enter" means to type in the command followed by a carriage return (). "Type" instructions don't need a carriage return.

Do This	Result:
Boot computer	You should boot into ProDOS.
Run BASIC	Gives you BASIC prompt "]".
	If you're not sure how to run BASIC, refer to your computer's owner's guide.
Enter IN# <i>n</i>	(<i>n</i> = the slot # in which DataLink is installed.) Tells computer where to find DataLink.

Type ^A	(Hold down the Control key while pressing "A".) Gives "AE DATALINK:" prompt.
Type ?	Displays Communications Menu.
Highlight SMART	(Use the   keys or  &  to move the highlight bar.) Selects Smart Mode.
Press ESC	Puts you in Smart Mode.
Type ^A	SMART menu displayed.
Type R	Lists the RECV menu. If the RECV is ON, press  . If the RECV is OFF select O)N.
Enter ATDT #	(# is the number of the BBS you wish to dial.)

You should hear the board answer, followed by a high pitched tone or whistle. The DataLink will send you the message, "Connect 2400" or "Connect 1200" (depending on your modem and the baud rate setting). Most boards will then give you an intro screen.

If you get a busy signal, type A/ (no carriage return) to dial again.

If you get only garbage on the screen, try setting the baud rate to 1200 or 300 using the Communications Menu and dial again.

Follow login directions	Different boards have different login procedures. Most boards will let you login as a guest.
Enter ? at the prompt	On many boards, this will give you a list of possible commands. (Almost all boards will tell you what to press for help.)
Type ^A	Returns you to Smart Mode while leaving you on-line (connected to the BBS).
Type R	Selects RECV option.
Type S	Selects Save option.

- ❖ *Note:* Also notice the Xmodem option. This is what you'll use to download files other than text files.

At PATHNAME prompt, enter /MY.DISK/DLSTUFF Saves the buffer to your disk with the name, "DLSTUFF".

- ❖ *Note:* (If you don't know what pathnames are, refer to "A Brief ProDOS Tutorial" in the appendices of this manual.

If your disk (MY.DISK) is not in an accessible drive, you'll get an error message. Should this happen, put the disk in an accessible drive and save it again (Type ^A, Type R, etc.).

At this point, you can continue to explore the bulletin board or...

Logoff	Usually done by typing T (Terminate) or B (Bye) or O (Off). Refer to the BBS's help menu for proper logoff.
Type ^A	Returns you to Smart Mode.
Type M	Returns you to the Main Menu.
Highlight Quit	Selects the Quit option.
Press ESC	Quits the DataLink firmware and returns you to BASIC.

You now have a file (DLSTUFF) which contains all the information that was sent from your computer to the host and visa-versa. You can now load this file into AppleWorks or another word processing program and print the list of BBS commands (if your word processing program supports printing) for future reference.



CHAPTER THREE

Addressing DataLink

This chapter gives you a detailed description of the Communication Menu, TTY, and Smart Mode, which you used in the last chapter.

Directly addressing the DataLink

Follow these steps to directly address the DataLink:

- 1) Turn on your computer and get into the BASIC mode.

❖ *Note:* If you're not sure how to get into BASIC, refer to your computer user's guide.

- 2) If you want the display in 80 columns, you should, at the BASIC prompt () enter:

PR#3 

- 3) Let the computer know the location of the card by typing in:

IN#n 

where "n" is equal to the slot number of your DataLink.

- 4) You may now either access the Communications Menu which is part of DataLink's firmware, or directly address the modem chip on the DataLink by holding down the Control key while typing "A":

^A

("^" = "CONTROL") followed by:

T

This will put you in the terminal mode indicated by a flashing underline cursor. (More about Direct Addressing and the AT commands in the next chapter.)

The Communications Menu

The Communications Menu is an easy way to execute CONTROL-A (^A) commands. They are arranged in menu fashion so that you may see the pertinent settings at once and change them easily if the need arises.

You may access the Communications Menu by holding down the CONTROL key while typing an "A":

^A

The DataLink should respond by printing

```
AE DATALINK:
```

to the screen.

Now, type a question mark:

?

You'll then see a screen like the one below.

```
APPLIED ENGINEERING DATALINK IN SLOT 2

      BAUD RATE:      1200 or 2400
      DATA BITS:    8
      STOP BITS:     1
      PARITY:        NONE
      ECHO:          OFF
      LF AFTER CR:   NO
      XON/XOFF:      YES
      REDIAL:        NO
      DIAL USING:    TONE
      ATTENTION CODE: ^A

COMMUNICATIONS MENU

OTHER COMMANDS:
      DIAL:
      TERMINAL:      SMART
      HANG UP:
      QUIT:

USE ARROWS OR RETURN TO SELECT/MODIFY
<ESCAPE> TO SELECT COMMUNICATION ITEM
```

This screen shows settings commonly used to communicate with other modems. To change the settings, simply use the   keys or the   keys to move up and down the menu, and the   keys or the   to change the settings. The options for each item are listed below:

Item: Default Settings	Options
BAUD RATE: 1200/2400*	50, 75, 110, 134.5, 150, 300, 1200, 2400*
DATA BITS: 8	8,7
STOP BITS: 1	1,2
PARITY: NONE	NONE, ODD, EVEN, MARK, SPACE
ECHO: OFF	ON, OFF, LOCAL
LF AFTER CR: NO	NO, YES
XON/XOFF: YES	YES, NO
REDIAL: NO	NO, IMMED, 30 SEC, 1 MIN, 2 MIN, 3 MIN, 5 MIN, 10 MIN
DIAL USING: TONE	TONE, PULSE
ATTENTION CODE: ^A	^: A, B, C, D, E, F, G, I, K, L, N, O, P, T, U, V, W, X, Y, Z, DISABLED

* DataLink 2400 only

Item	Function
OTHER COMMANDS	Press  then type in any ^A command. Don't confuse the ^A commands with the AT commands. A list of the ^A commands is included in the "Firmware Commands" appendix of this manual. You do not need to prefix the command with ^A when using this option.
DIAL	Press  , type in the number you want to dial, and press  .
TERMINAL	Use left and right arrows to select SMART mode or TTY mode
HANG UP	Press  to hang up the phone.
QUIT	Pressing  takes you out of DataLink. You will probably want to disable the card by entering ^A then R. This will turn off the DataLink card.

You can terminate the ATTENTION CODE, OTHER COMMANDS, and DIAL items by pressing .

TTY mode

You can enter TTY mode from BASIC by selecting TTY from the Communications Menu or with the ^AT command.

A flashing underline cursor indicates that terminal mode is active.

In TTY (terminal) mode, the DataLink emulates a simple computer terminal in full-duplex (echo off) mode. The Escape code sequences described below and the full communications command set (^AT) can be used while in terminal mode.

Escape Codes

This feature is only available in terminal mode. These codes enable the older Apple][and Apple][Plus computers to support lowercase letters and generate characters not available on the older keyboards.

Pressing the Escape key once will invoke lowercase mode; all subsequent letters input from the keyboard will be output from the DataLink as lowercase letters.

Two consecutive Escape characters while in lowercase mode will revert to uppercase (or normal) letter output.

While in lowercase mode, pressing the Escape key once will capitalize only the next letter and will remain in lowercase mode.

The default setting for special characters is S E (Special Characters Enabled). To disable the special characters, enter ^AS D.

- ❖ *Reminder:* A lowercase ROM chip is available from Applied Engineering Sales (214) 241-6060. This chip allows your][Plus to display lowercase letters. (Letters entered from the keyboard will still be uppercase.)

ESC*n*

While in TTY mode, the Escape key can be used in combination with the number keys to generate the following characters:

- n*
- 1 ASCII file-separator (FS) code
- 2 ASCII unit-separator (US) code
- 3 [character
- 4 \ character
- 5 _ character
- 6 { character
- 7 | character
- 8 } character
- 9 ~ character
- 0 ASCII escape (ESC) code
- : ASCII delete (DEL) code

SMART mode

In order to use the SMART mode, you must have loaded ProDOS and be in BASIC. The SMART terminal mode adds several extra features to the regular terminal mode (TTY).

To enter the smart mode:

- ◇ Move the shaded block over the `TERMINAL :` option with the up and down arrow keys
- ◇ Select SMART by using the   keys or the   keys.
- ◇ Press ESC.

You're in the SMART mode. When you press `^A`, a status line appears below the cursor. It looks like this:

```
B)RK   C)AT   E)CHO   M)ENU   R)ECV   S)END
```

When you type the first letter of one of the options, that particular function is performed. For example, typing:

C

will give you a CAT prompt.

The options perform the following functions:

- B BRK** sends a 233 msec break
- C CAT** gives a CAT prompt. Press  for a catalog of the current on-line disk or enter the volume name or pathname of the directory you wish to catalog.
- E ECHO** toggles between the off, on and local settings.

The **ON** setting will send the information to both the computer on-line and your screen.

When echo is **OFF**, the data you type will be sent to the computer with which you are on-line but won't be sent to your screen.

The **LOCAL** setting will send your data to your screen but not to the other computer.

- M MENU** returns to the Communications Menu

The **RECV** Command

- R RECV** controls the capture buffer

The buffer lets you capture data transmitted between your computer and the one to which you're connected (remote). The commands you send directly to the DataLink and the DataLink menus displayed on the screen are not captured by the buffer.

The buffer is very useful for saving BBS commands and mail. For example, instead of pressing the BBS's help key every time you want to find out what commands it will accept, you can capture the command menu with the buffer, save the buffer to disk then print the buffer file. This procedure is described in the previous chapter.

You can also capture messages that are on the bulletin board and instead of using on-line time to read them, save them to your buffer then to disk and read them after you logoff.

When **RECV** is selected, DataLink prints one of the following sub menus:

```
RECV ON:  C) LEAR  O) FF  S) AVE  X) MODEM
```

or

```
RECV OFF: C) LEAR  O) N  S) AVE  X) MODEM
```

If the **CLEAR** or **ON/OFF** items are selected, the action is taken and the DataLink returns to the terminal mode.

If the **SAVE** option is selected, then `PATHNAME :` appears.

- ❖ *Note:* If you don't understand what a pathname is, refer to "A Brief ProDOS Tutorial" in the appendices of this manual.

At this point, type in a valid ProDOS pathname to which you want to save the contents of the buffer when it becomes full (ex: `/MY.DISK/DLSTUFF`). If you're on-line when you select **SAVE**, the buffer will be saved to the given pathname immediately, clear itself, and then resume capturing.

- ❖ *Note:* If you don't have a formatted ProDOS disk with the pathname you give in an accessible drive, you'll get an error message. The information in the buffer will remain intact. Simply save again, giving the correct pathname of an accessible disk.

Don't try to save to the `/DL` disk (provided with the DataLink). This disk is almost full.

Receiving Files with Xmodem

XMODEM under the **RCV** option is what you would use to receive files other than text files. Text files are files that contain only standard (ASCII) characters; no control characters or other special codes are recognized. Xmodem not only transfers the special characters, but also checks for errors while sending. Xmodem is widely used for transferring shareware and public domain programs. Bulletin boards will often tell you when you should use Xmodem to download.

When the remote modem is ready to send you the file, you'll select the **XMODEM** option from the **SMART** mode menu. At the **FILETYPE :** prompt, enter the type of file you'll be downloading. The filetype options are:

TXT	BIN	S16	ADB	AWP	ASP	PAS	CMD
S-C	INT	IVR	BAS	VAR	REL	SYS	

To get an on-screen list of the filetypes, enter `"?"` at the **FILETYPE** prompt. Also, entering anything besides the listed filetypes will display the list.

If the filetype you wish to download is not listed, you can use its hexadecimal code (a \$ and two hex. digits).

Pressing <Return> defaults to `TEXT` (text).

At the `PATHNAME` prompt, enter the name by which you wish to save this file.

- ❖ *Note:* If you don't enter a volume name, the current on-line volume will be used. To check which volume is currently on-line, select the `CAT` command from the `SMART` mode menu and press <Return>.

After you've entered a pathname, your DataLink will send a 'NAK' (control code) to the remote system indicating that you are ready to receive the first 128-byte block of the file. When the remote system sees the NAK, it will send the first block, and you will see "--GOOD" after the `BLOCK $01` line, and the block number will change to \$02. This process will continue until either the last block is transferred or the transfer aborts. The transfer will abort if:

- 1) Ten consecutive errors are transferred
 - 2) User presses ^A (or the current attention character).
 - 3) Some boards allow user's to abort by pressing some other key combination. Check the board you are connected to for details.
- ❖ *Note:* Don't be alarmed if you get errors at the beginning of the transfer; it takes a few tries for the sender and receiver to get in sync.

Upon successful completion of a transfer, you'll see "--END OF FILE."

The `SEND` Command

S `SEND` gives you a choice of the file type you wish to transmit (send). Selecting `SEND` will display the options:

```
SEND:  T)TEXT  X)MODEM
```

By selecting `TEXT`, you can send pre-prepared `text` files. Text files are files which use standard (ASCII) characters only; no special characters (eg: control characters) are recognized.

You could, for example, create a message in FreeWriter (included on back of the /DL disk) or in AppleWorks and print it to disk as a text file, call up a board, then use the S)END command to upload the message.

- ❖ **HELP:** We have included instructions on how to prepare a text file using AppleWorks, AppleWriter and, Sensible Writer in the **DataLink Communications** manual. (See the section *Creating macros with AppleWorks*, in the "Macro Files" chapter.)

Creating the message with your word processor then sending it while on-line instead of creating the message while connected can help you reduce your on-line time. It also allows you to check your messages for spelling, etc.

Sending Files with Xmodem

Choosing **XMODEM** from the SMART mode allows you to send any files with the Xmodem protocol. As described above, Xmodem lets you send special codes and also checks for errors. You could send an AppleWorks wordprocessing file, or spreadsheet, or a game or program you have written yourself (whether in BASIC or assembly language) and Xmodem will keep it intact.

When the system you are connected to is ready to receive the file, it will send a 'NAK' (control code) to your DataLink. When the NAK is received, DataLink will begin sending blocks of 128 bytes to the remote system. As each block is sent, the message "--BLOCK \$xx" will appear on the screen.

If the remote system decides that it has correctly received the block, it will send back an 'ACK' code and you will see "--GOOD" on your screen. If not, it will send back a NAK and you will see "--ERROR" on your screen. If there was an error, the same block will be sent again.

After the last block has been sent, you will see "--END OF FILE" on your screen.

There are various timeouts in the firmware, which are necessary for synchronizing the two systems. For example, while waiting for the initial NAK which signals the remote system is ready to receive, the DataLink goes through up to ten 10-second timeouts. After each ten seconds, you will see a "+" appear on your screen. After ten +'s, the Xmodem transfer will be aborted, and you will see the "--TIMEOUT" message.

Sometimes your DataLink may receive extraneous characters while it's waiting for the initial NAK. These will be displayed as "--RECEIVED \$xx" and your DataLink will keep looking for the NAK.

If at any time you wish to manually abort the Xmodem transfer, typing the attention key (usually control-A) will do it. Then you will see the message "--ABORT."

CHAPTER FOUR

DataLink 1200 ***AT Commands***

This chapter describes the AT (attention) commands for the DataLink 1200. A Quick Reference Card is included with the DataLink package with a summary of the commands and their functions.

❖ *Important:* To directly address the DataLink you must first enter the SMART mode (via the Communications Menu) or TTY (^AT) terminal mode.

List of AT Commands

- | | |
|-----|---|
| AT | Attention—required prefix for all commands except "+++" and "A/" (must be in uppercase) |
| A / | Repeat last command (no carriage return required) |
| A | Manual answer |
| D | Dial number following (can include T,P,R and ;)
ex: ATDT (999) 999-9999 |
| P | Pulse dial |
| R | Reverse to answer mode after dialing |
| T | Touch tone dial |
| , | Pause during dial |
| ; | Return to command mode after dial |
| E0 | No Echo in command state |
| E1 | Echo in command state (default) |
| H0 | Hang up (default) |
| H1 | Pick up line |
| I | 3 character modem chip product code and revision number |

(continued)

M0	Monitor speaker always OFF
M1	Monitor speaker ON until carrier detected (default)
M2	Monitor speaker always ON
O	On-line state from command state
Q0	Result codes sent (default)
Q1	No result codes sent (Quiet)
Sr?	Read S register r (r=0-16)
Sr=n	Set S register r to values n (r=0 to 16, n=0 to 255)
V0	Non-verbal (numeric) result codes
V1	Verbal result codes (default)
Z	Reset and use ALL DEFAULT values
+++	Escape code (default value). Pause 1 second before and after

Definitions of Commands

Command and On-Line State

When the DataLink is accepting commands from you, it's in the Command state. In the On-Line state, it is talking to another computer. You may shift from the Command to the On-line state without breaking the connection by using the Escape (+++) and On-Line (O) commands described later in this section.

AT

Addressing the Chip

"AT," short for Attention, should prefix every direct command except Escape (+++) and Repeat Last Command (A/). The modem will recognize the AT prefix only if both letters are in Uppercase.

Follow the AT prefix with the command or commands you want. You may have more than one command per line. For example: **ATDT241-6060** translated means, "Attention DataLink, I want you to Tone Dial this number: 241-6060."

- ❖ *Note:* A string of commands cannot exceed 32 characters. This will rarely, if ever, present a problem to you.

Backspace

Deleting Commands

The AT prefix cannot be deleted with the backspace. However, you can use backspace to delete the other commands on the line before you press return. If you decide that you don't want to address the DataLink, simply hit Return at the AT prompt. The card will respond with "OK".

A/

Repeating the last command

A/ will repeat the last command entered. This is particularly useful for redialing numbers. The A/ command does not need the AT prefix nor does it need a carriage return. A/ is a solo command; you cannot use any other command on the same line.

A

Manual Answer

The Command "A" allows you to manually tell the computer to answer the phone. Using this command overrides the Number of Rings Before Answering setting and the Answer Off setting.

This command could be used to switch between talking to a person and talking to their computer. Whoever called initially will type the ATD command and press Return. The other person types the ATA command and presses Return. If a connection is made, DataLink should respond with, "CONNECT." If no connection is made the DataLink will hang up, send a NO CONNECT result and return to the Command Mode.

D

Dial

The "D" command tells the DataLink to dial a number. The D command should be followed by the number you want to dial. Ex:

```
AT D 241-6060
```

The spaces and hyphen are included for legibility. They do not affect the numbers dialed. The characters which can be used for dialing are, 0-9, A, B, C, D, #, and *.

Other commands which directly affect the dial command are **P**, **R**, **T**, **(comma)**, and **(semi-colon)**. *See Page 24.*

E

Echo

"E" controls whether or not the data you type in while in the command mode will appear on the screen.

E0--turns Echo off; the data you enter won't appear on the screen.

E or **E1**--turn Echo on; data does appear on the screen.

H

Hang up

"H" is the command that controls picking up the line and disconnecting.

H or **H0**--same as hanging up the phone.

H1--same as picking up the phone.

I

Interrogate

"I" accesses the modem chip and reads its product code. This code may be required by some communications software when looking for a Hayes-compatible command from your DataLink.

The number will appear as a three digit product code either to the screen or to the program that requires it. The first two digits are the product code. The last digit is the revision number. *2118*

M

Audio Monitor

The "M" command turns the speaker on or off.

M0--turns the speaker off.

M or **M1**--turns the speaker on until a carrier is detected. When a carrier is detected, the modem sends the message `CONNECT` to the screen and shuts off the speaker.

M2--turns the speaker on. This will allow you to monitor the call after the `CONNECT` message is sent.

O

On-Line

The "O" command tell the DataLink to go back on-line from the command state. This is useful for switching from verbal communication to data communication.

P

Pulse Dial

"P" informs the DataLink to pulse dial. If you enter ATP followed by a carriage return, the modem will continue to pulse dial until further notice. You may switch between pulse and tone dialing in the middle of a dial command by entering the P and T commands within the numbers you are dialing. Ex:

```
AT DT 1 (214) P 844-6611
```

Q

Quiet

The "Q" command determines whether or not the DataLink will send the result codes. (See list of result codes later in this chapter.)

Q or **Q0**--tells DataLink to send the result codes.

Q1--"quiets" the result codes.

R

Reverse Mode

"R" instructs the modem to go back to the answer mode after the telephone number is dialed. You may want to use this when calling an originate only modem. Put the "R" at the end of the telephone number.

Sr?

Read S Register

"Sr?" tells the modem to read the content of S register 0-16 where "r" is equal to the register number. The content of the S register called upon is sent to the computer of terminal as a decimal number ranging from 0-255. Register reading is described in detail in the "Register Settings" chapter.

Sr=n

Set Register

"Sr=n" tells DataLink to set the register (r) to a particular value (n). The value of the register (n) can range from 0-255. Refer to the "Register Settings" chapter.

T

Touch Tone

"T" instructs DataLink to use touch tones to dial phone numbers. Touch tones are required to use many long distance services. If you enter "ATT" followed by a carriage return, all phone numbers following (preceded by the ATD command) will be touch tone until further notice.

- ❖ *Reminder:* You can use touch tones and pulse tones within the same dial command.

V

Verbal/Non-Verbal

The "V" command informs the computer whether you want the result codes to be sent as words or as single numbers. (The result codes are listed later in this chapter.)

V or V0—result codes sent as numbers (non-verbal).

V1—result codes sent as words (verbal).

Z

Reset

"Z" resets the DataLink back to its default settings. The default settings are listed in the abbreviated AT commands list at the beginning of this chapter.

, (comma)

Pause

The "," makes the DataLink pause during dialing. Use this to wait for a second dial tone when placing a call through a PBX. Use more commas to increase the pause time. Register S8 controls the length of the pause.

; (semicolon)

Return to Command State After Dialing

The ";" forces the DataLink to go back into the command state from the on-line state after dialing a number. The ";" command should be entered after the number to be dialed. It will not disconnect the link.

+++

Return to Command State

"+++" makes the DataLink return to the command state from the on-line state. The command does not use the AT prefix nor does it require a carriage return. However, the command must be preceded and followed by a one second pause. The pauses prevent the "+++" from being excluded as transmittable data.

Result Codes

When you send a command to the modem, it will answer with a result code unless told not to (ATQ). The result Code can be enabled or disabled, and may appear as a word or a single digit.

When enabled, the possible responses are:

Digit Code	Word Code	Description
0	OK	The command line was executed without error.
1	CONNECT	Carrier detected at 300 baud.
2	RING	Ringling signal detected on phone line.
3	NO CARRIER	Carrier has been lost or was never found.
4	ERROR	The command line was not executed due to incorrect input. This could be the result of commands that the DataLink does not recognize or of too many characters (>32).
5	CONNECT 1200	A carrier has been detected at 1200 baud.



CHAPTER FIVE

DataLink 2400 **AT Commands**

This chapter describes the AT (Attention) commands for the DataLink 2400. A Quick Reference Card is included with the DataLink package with a summary of the commands and their functions.

❖ *Important:* To directly address the DataLink you must first enter the SMART mode (via the Communications Menu) or TTY (^AT) terminal mode.

List of AT Commands

- AT** Attention—required prefix for all commands except "+++" and "A/" (must be uppercase)
- A /** Repeat last command (no carriage return required)
- A** Manual answer
- B** Bell/CCITT @ 1200 bps
- D** Additional 2400 dial commands listed below
- D** Dial number following (can include T,P,R and ;)
ex: ATDT (999) 999-9999
- P** Pulse dial
- R** Reverse to answer mode after dialing
- S=x** Dial stored number 0 (factory) -3 (see &Zx=s)
- T** Touch tone dial
- W** Wait for dial tone before dialing
- @** Wait for quiet before dialing
- ,** Pause during dial
- !** Flash
- ;** Return to command mode after dial
- E0** No Echo in command state
- E1** Echo in command state (factory)

(continued)

H0	Hang up (factory)
H1	Pick up line
In	(n=0-3) Interrogate chip for product code, ROM checksum, or manufacturer's ID.
L0/L1	Volume Lo
L2	Volume Medium (factory)
L3	Volume High
M0	Monitor speaker always OFF
M1	Monitor speaker ON until carrier detected (factory)
M2	Monitor speaker always ON
O	On-line state from command state
Q0	Result codes sent (factory)
Q1	No result codes sent (Quiet)
Sr?	Read S register r (r=0-27)
Sr=n	Set S register r to values n (r=0-27, n=0-255)
V0	Non-verbal (numeric) result codes
V1	Verbal result codes (factory)
Xn	Enable extended result code (n=0-4 factory).
Y0	Long space disconnect enabled (factory)
Y1	Long space disconnect disabled
Z0	Resets the modem with configuration 0
Z1	Resets the modem with configuration 1
&C	Data Carrier Detect always on
&C1	Data Carrier Detect on after detect (factory)
&Dn	Data Terminal Ready (n=0 [factory] -3)
&F	Restore factory settings
&G0	Guard tone off (factory)
&G1	550 Hz guard tone
&G1	1800 Hz guard tone
&P0	Pulse Dial mode US
&P1	Pulse Dial mode UK
&R0	Disable RTS-CTS
&R1	Enable RTS-CTS
&S0	DSR Override On
&S1	DSR Override Normal

(continued)

- &Tn Test Mode (first set test time with S18=n)
 - 0 Terminate Test
 - 1 Local Analog Loopback Test L3
 - 3 Local Digital Loopback Test
 - 4 Grant Remote Digital Loopback Test
 - 5 Deny Remote Digital Loopback Test
 - 6 Remote Digital Loopback Test L2
 - 7 Remote Digital Loopback Test w/Self Test
 - 8 Local Analog Loopback Test w/Self Test
- &V View Profile (shows configurations)
- &Wn Write Current Config to Non-Volatile Memory (n=0 or 1)
- &Yn Default Configuration Profile (n=0 [factory] or 1)
- &Zx=s Store telephone number "x" string "s"
- +++ Escape code (default value). Pause 1 second before and after

Definitions of Commands

Command and On-Line State

When the DataLink is accepting commands from you, it's in the Command state. In the On-Line state, it is talking to another computer. You may shift from the Command to the On-line state without breaking the connection by using the Escape (+++) and On-Line (O) commands described later in this section.

AT

Addressing the Chip

"AT," short for Attention, should prefix every direct command except Escape (+++) and Repeat Last Command (A/). The DataLink 2400 will recognize the AT prefix if both letters are in uppercase or if both letter are in lowercase. Do not, however, mix upper with lowercase.

Follow the AT prefix with the command or commands you want. You may have more than one command per line. For example: **ATDT241-6060** translated means, "Attention DataLink, I want you to Tone Dial this number: 241-6060."

- ❖ *Note:* A string of commands cannot exceed 32 characters. This will rarely, if ever, present a problem.

Backspace Deleting Commands

The AT prefix cannot be deleted with the backspace. However, you can use backspace to delete the other commands on the line before you press return. If you decide that you don't want to address the DataLink, simply hit Return at the AT prompt. The card will respond with "OK".

A/ Repeating the last command

A/ will repeat the last command entered. It is particularly useful for redialing numbers. The A/ command does not need the AT prefix nor does it need a carriage return. A/ is a solo command; you cannot use any other command on the same line.

A Manual Answer

The Command "A" allows you to manually tell the computer to answer the phone. Using this command overrides the Number of Rings Before Answering setting and the Answer Off setting.

This command could be used to switch between talking to a person and talking to their computer. Whoever called initially will type the ATD command and press Return . The other person types the ATA command and presses Return . If a connection is made, DataLink should respond with "CONNECT." If no connection is made, the DataLink will hang up, send a NO CONNECT result, and return to the Command Mode.

B Bell/CCITT Answer

DataLink 2400 supports both Bell and CCITT standards. At 2400 bps, CCITT is selected. At 300 or 1200 bps, either standard can be chosen.

B0--CCITT v.22 standard at 300 or 1200 bps

B1--Bell 212A standard at 300 or 1200 bps (factory).

D

Dial

The "D" command tells the DataLink to dial a number. The D command should be followed by the number you want to dial. Ex: **AT D 241-6060**. (The spaces and hyphen are included for legibility. They do not affect the numbers dialed.) The characters which can be used for dialing are 0-9, A, B, C, D, #, and *.

Other commands which directly affect the dial command:

- P** Pulse dial
- R** Reverse to answer mode after dialing
- S=x** Dial stored number 0 (factory) -3 (see &Zx=s)
- T** Touch tone dial
- W** Wait for dial tone before dialing
- @** Wait for quiet before dialing
- ,** Pause during dial
- !** Flash
- ;** Return to command mode after dial

E

Echo

"E" controls whether or not the data you type in while in the command mode will appear on the screen.

E0--turns Echo off; the data you enter won't appear on the screen.

E or E1--turn Echo on; data does appear on the screen (factory).

H

Hang up

"H" is the command that controls picking up the line and disconnecting.

H or H0--same as hanging up the phone (factory).

H1--same as picking up the phone.

I

Interrogate

"I" accesses the modem chip and tests the ROM or reads its product code or manufacturer's number. This code may be required by some communications software when looking for a Hayes-compatible command from your DataLink.

I or I0--displays product code. The product code will appear as a three digit product code either to the screen or to the program that requires it. The first two digits are the product code. The last digit is the revision number.

I1--adds up all the ROM's bytes (checksum) and displays the result. The correct checksum is 000. If your result is different, a bit may have been destroyed.

I2--another checksum test that adds up the ROM's bytes and compares that number with the correct number stored in its own memory.

I3--the modem chip manufacturer's ID. Sierra 2400 Ver 1.384A

L

Volume Control

The DataLink 2400 volume is controlled with the L command as follows:

L0 or L1--Low volume.

L2--Medium volume (factory).

L3--High volume.

M

Audio Monitor

The "M" command turns the speaker on or off.

M0--turns the speaker off.

M or M1--turns the speaker on until a carrier is detected. When a carrier is detected, the modem sends the message CONNECT to the screen and shuts off the speaker (factory).

M2--turns the speaker on. This will allow you to monitor the call after the CONNECT message is sent.

M3--turns the speaker on after dialing until carrier detected. With this setting, you can monitor the connect procedure of the DataLink.

O

On-Line

The "O" command tells the DataLink to go back on-line from the command state. This is useful for switching from verbal communication to data communication.

O or **O0--**(factory) returns modem to on-line state.

O1--returns modem to on-line state and sends a retrain sequence (at 2400 baud only).

P

Pulse Dial

"P" informs the DataLink to pulse dial. If you enter ATP followed by a carriage return, the modem will continue to pulse dial until further notice. You may switch between pulse and tone dialing in the middle of a dial command by entering the P and T commands within the numbers you are dialing. Ex:

```
AT DT 1 (214) P 844-6611
```

Q

Quiet

The "Q" command determines whether or not the DataLink will send the result codes.

Q or **Q0--**(factory) tells DataLink to send the result codes.

Q1--"quiets" the result codes.

R

Reverse Mode

"R" instructs the modem to go back to the answer mode after the telephone number is dialed. You may want to use this when calling an originate only modem. Put the "R" at the end of the telephone number.

S=x

Dial Stored Number

Used in conjunction with the dial command, "D," the S=x command will dial one of the numbers stored in position 0 (factory) -3. These are the numbers written to non-volatile memory with the **&Zx=s** command.

For example, to dial a number stored in position 2, you would enter **ATDS=2**.

- ❖ *Note:* The other dial commands (eg: P, T, W, etc.) must be placed within the saved string; you can't, for example, use the command **ATDTS=2**. This command would result in the number stored at S0, not S2, to be dialed using tone dialing.

Sr?

Read S Register

"Sr?" tells the modem to read the content of S register 0-27 where "r" is equal to the register number. The content of the S register called upon is sent to the computer or terminal as a decimal number ranging from 0-255. Register reading is described in detail in the following chapter.

Sr=n

Set Register

"Sr=n" tells DataLink to set the register (r) to a particular value (n). The value of the register (n) can range from 0-255. Refer to the "Register Settings" chapter.

T

Touch Tones

"T" instructs DataLink to use touch tones to dial phone numbers. Touch tones are required to use many long distance services. If you enter "ATT" followed by a carriage return, all phone numbers following (preceded by the ATD command) will be touch tone until further notice.

- ❖ *Reminder:* You can use touch tones and pulse tones within the same dial command.

V

Verbal/Non-Verbal

The "V" command informs the computer whether you want the result codes to be sent as words or as single numbers.

V or V0-- result codes sent as numbers (non-verbal).

V1--(factory) result codes sent as words (verbal).

X

Enable Extended Result Code

See entry after Result Code Table, *Page 47.*

Y

Long Space Disconnect

With Long Space Disconnect enabled, the DataLink 2400 will disconnect if it receives no signals from the host computer for 1.6 seconds or longer.

Y0--Enabled; will disconnect (factory)

Y1--Disabled; won't disconnect

Z

Reset DataLink with Stored Profile

This command will reset the modem then use the 0 or 1 configuration profile. The profiles are written to non-volatile memory with the &W command.

- ❖ *Note:* See the &W command for information about writing the configuration profile. See the &V command for viewing the profiles. See &Y for setting the default profile.

Z0--resets the modem and uses configuration profile 0.

Z1--resets the modem and uses configuration 1.

& C

Data Carrier Detect

&C0--DCD always on and the state of the data carrier from the remote modem is ignored (factory setting).

&C1--(factory) DCD tracks data carrier from the remote modem; DCD is on when data carrier is detected.

& D

Data Terminal Ready

&D0--(factory) DataLink ignores DTR.

&D1--DataLink enters the command state when DTR goes from on to off.

&D2--DataLink hangs up, enters command state and disables auto-answer when DTR makes an on-to-off transition.

&D3--Modem resets to the default profile (see &Y) and enters command state when DTR makes on-to-off transition.

& F

Restore Factory Setting

Entering this command resets the DataLink 2400 to its ROM settings. Any settings you have altered are returned to their factory settings.

& G

Guard Tone Value

Guard tones are not required in the United States. However, you can set them with the &G command.

&G0--(factory) Guard Tone Off

&G1--550 Hz guard tone.

&G2--1800 Hz guard tone

& P

Pulse Dial Ratio

This setting is used to determine the off-hook to on-hook interval used with pulse dialing.

&P0--(factory) The common setting in the US. Gives a ratio of 39/61.

&P1--Common setting for UK. Gives a ratio of 33/67.

& R

RTS/CTS

(Request To Send/Clear To Send) Clear To Send means that the DataLink is ready to receive data from your computer to send to the host.

&R0--Disable RTS-CTS (factory setting)

&R1--Enable RTS-CTS

& S

DSR Override

(Data Set Ready) DSR means that the DataLink is connected to the host or another computer and is ready to communicate.

&S0--DSR always on (factory setting)

&S1--on when the DataLink is connected to a communication channel and is ready.

& T

Test Mode

Several things may be responsible for a bad connection. It could be the modem you are connected to, the line in between your modem and the other modem, how the DataLink is installed, or the DataLink itself. The following tests will help you pin-point the problem.

- 1) Before running any of the following tests, you'll want to check the connections to your modem. Make sure the modem is properly installed and the lines are attached to the proper connectors.
 - 2) Get into the terminal mode (see *Chapter Three*).
 - 3) Use the AT&F command to return the DataLink to its original (factory) settings.
 - 4) Set the time length of the test with the S18 register. (The default is 0 seconds.) AT S18=20 will give you a test time of 20 seconds.
 - 5) Run the &T8 test first and then use the other tests, &T1, &T3, &T6, &T7, &T8, to test the modem even further. Refer to the descriptions below to check the results of each test.
- ❖ *Note:* To run the tests labeled "Remote," your DataLink must be connected to another modem.

&T0--Terminate test

This command lets you end the test before the set time to terminate (S18) is reached.

&T1--Local Analog Loopback Test

This test will check the operation of the DataLink's connection to your computer.

&T3--Local Digital Loopback Test

This test will check the operation of the phone circuit and the remote modem. Start the test by establishing a connection with a remote modem. Enter the &T3 command from the command state. The user of the remote modem will then need to type in a few lines. If the remote user reports that the lines typed were returned as entered, the phone lines and remote modem are working properly.

&T4--Grant Remote Digital Loopback Test (factory) This command tells the DataLink to accept the request from a remote modem for the remote digital loopback test.

&T5--Deny Remote Digital Loopback Test This command tells DataLink to refuse the request from a remote modem for a remote digital loopback test.

&T6--Remote Digital Loopback Test Checks the operation of the DataLink and the remote modem, the connection of the DataLink to your computer, and the telephone circuit. To run this test, establish a connection to another modem, enter the command state, and enter AT&T6. Type something into the keyboard. What you type will be sent to the remote modem (without displaying on the remote screen) and then echoed back to you.

If what you receive is what you sent, all is operating properly. If not, run the various other tests to help isolate the problem.

- ❖ *Note:* If the remote modem is not Hayes compatible or is set to &T5, you will not be able to run this test.

&T7--Remote Digital Loopback Test w/Self Test Same as &T6 with the addition of the self-test; ie: you don't have to type in characters to be echoed back. At the end of the this test, a three digit code will be displayed. 000 = no errors; all aspects of the connection are functioning as they should. 021 = 21 errors. If you receive errors, run the other tests to help isolate the problem.

- ❖ *Note:* If the remote modem is not Hayes compatible or is set to &T5, you will not be able to run this test.

&T8--Local Analog Loopback Test w/self test This command tests the DataLink's transmit and receive circuits. At the end of the test, a three digit code will be displayed representing the number of errors encountered. 000 = no errors. 015 = 15 errors.

& V

View Profile

Use this command on a line by itself.

The View Profile command will display the current DataLink settings as well as the two stored user profiles (see &W) and stored telephone numbers (see &Z).

& W

Write Current Configuration

When you have the DataLink configured as you want it, you can save the settings to non-volatile memory so the next time you turn on the DataLink, your preferred setting will already be loaded for you.

The DataLink 2400 allows you to store two different configurations.

&W0--writes the storable settings to non-volatile memory in the first of 2 positions. When you turn on the DataLink, it will use the "0" configuration until told to do otherwise using the AT&Y command.

&W1--Writes the storable settings to the second position.

& Y

Default Configuration Profile

This command lets you set the configuration profile (written with the &W command) that the DataLink will use at startup.

&Y or **&Y0**--DataLink will use configuration profile 0 at startup (default).

&Y1--DataLink will use configuration 1 at startup.

&Zx=s

Store Telephone Number

DataLink 2400 can hold up to four telephone numbers (locations 0 through 3) in non-volatile memory. This means that the numbers you enter using this command will still be in memory when you turn your computer on the next time. Each phone number can be up to 36 characters.

"x" is equal to the position (0, 1, 2, or 3) to which you want to store the number.

"s" is equal to the phone number itself.

For example, &Z2=5551234 would store the phone number, 555-1234, in the third position (2).

❖ *Note:* You'll want to add any dial commands, such as T, P, W, etc., into this saved string.

, (comma)

Pause

The "," makes the DataLink pause during dialing. Use this to wait for a second dial tone when placing a call through a PBX. Use more commas to increase the pause time. Register S8 controls the length of the pause.

! (exclamation point)

Flash

Causes the DataLink to hangup for 1/2 second and then reconnect. Useful for PBX transfer call.

; (semicolon)

Return to Command State After Dialing

The ";" forces the DataLink to go back into the command state from the on-line state after dialing a number. The ";" command should be entered after the number to be dialed. It will not disconnect the link.

+++

Return to Command State

"+++" makes the DataLink return to the command state from the on-line state. The command does not use the AT prefix nor does it require a carriage return. However, the command must be preceded and followed by a one second pause. The pauses prevent "+++" from being excluded as transmittable data.

Result Codes

When you send a command to the modem, it will answer with a result code unless told not to (ATQ). The result Code can be enabled or disabled, and may appear as a word (ATV1) or a single digit (ATV0).

When enabled, the possible responses are:

Digit Code	Word Code	Description
0	OK	The command line was executed without error.
1	CONNECT	Carrier detected at 300 baud.
2	RING	Ringing signal detected on phone line.
3	NO CARRIER	Carrier has been lost or was never found.
4	ERROR	The command line was not executed due to incorrect input. This could be the result of commands that the DataLink 2400 does not recognize or of too many characters (>32).
5	CONNECT 1200	A carrier has been detected at 1200 baud.
6	NO DIALTONE	No dial tone could be found.
7	BUSY	A busy signal was detected.
8	NO ANSWER	No silence detected with @ in dial.
10	CONNECT 2400	Carrier detected at 2400 baud.

X

Enable Extended Result Code

The ATX command allows the DataLink 2400 to display different combinations of the result codes as follows:

- X0 Enable features of result codes 0-4
- X1 Enable features of result codes 0-5, 10
- X2 Enable features of result codes 0-6, 10
- X3 Enable features of result codes 0-5, 7, 10
- X4 Enable features of result codes 0-7, 10 (recommended)



CHAPTER SIX

Register Settings

This chapter is designed for those programmers interested in changing the register settings of the DataLink modem. The modem takes its settings from registers, S0-S16 for the 1200 and S0 through S27 for the 2400, located on the modem chip.

To read the current setting of a register, enter:

ATSr?

while in TTY mode, where *r* is equal to the register number you want to read. For example, to read the current setting of register 8 (pause time), you would enter: **^A** then **T** then **ATS8?**

The DataLink will respond by putting the current unit on the screen (ex. 002) followed by OK.

To change a register setting, enter:

ATSr=n

while in TTY mode, where *r* is equal to the register number and *n* is equal to the new value you want to assign to it. For example, to set the pause time to 5 seconds, you would enter: **^A** then **T** then **ATS8=5**

Each register must have a value from 0 to 255. Each of the registers and their functions are listed below. A list with abbreviated explanations is included on the Quick Reference Card.

S-Register Summary

<u>Reg.</u>	<u>Range</u>	<u>Units</u>	<u>Function</u>
S0	0-255	Rings	Select number of rings before answer
S1	0-255	Rings	Ring counter
S2	0-127	ASCII	Escape sequence character
S3	0-127	ASCII	Carriage return character
S4	0-127	ASCII	Line feed character
S5	0-32, 127	ASCII	Back space character
S6	2-255	Seconds	Wait time before blind dialing
S7	1-55	Seconds	Wait time for dial tone and carrier
S8	0-255	Seconds	Pause time for comma
S9	1-255	1/10 sec	Carrier detect response time
S10	1-255	1/10 sec	Time for carrier loss to hang up
S11	50-255	msec	Tone duration and spacing
S12	20-255	1/50 sec	Escape sequence guard time
S13-15			Reserved
S16			DataLink 1200 Analog Loopback test
<u>2400 only</u>			
S17			Reserved
S18	0-255	Seconds	Testing time for &Tn commands
S19-27			Reserved

S0 Auto Answer

<u>Default</u>	<u>Range</u>	<u>Units</u>
1	0-255	rings

You can tell the DataLink to answer the phone after a set number of rings (from 1 to 255). Setting the register value to 0 tells the DataLink not to answer. Incoming calls must then be answered manually using the ATA command.

S1 Ring Count

<u>Default</u>	<u>Range</u>	<u>Units</u>
0	0-255	rings

The number of rings are counted by this register. It resets to 0 if no rings are detected 8 seconds after the last ring. S0 (Auto Answer) must be set to 1 or greater for S1 to function.

S2 Escape Characters

<u>Default</u>	<u>Range</u>	<u>Units</u>
43+	0-127	ASCII

You can change the escape character from this register. The default is the plus sign (+). The value must be between 0 and 127 to enable the escape code to work. Values greater than 127 will be accepted but this will disable the escape code. If the escape code is disabled, the carrier must disconnect or the DTR must be set high.

- ❖ *Note:* The new escape code character must still be entered three times with a 1 second pause before and after before the computer will take it as an escape command.

S3 Carriage Return value

<u>Default</u>	<u>Range</u>	<u>Units</u>
13<CR>	0-255	ASCII

S3 contains the ASCII value for the carriage return. 13 is standard. This affects both the character used to end a command line as well as the character you receive following a modem response. The setting should be 13 unless you are using non-standard equipment.

S4 Line Feed value

<u>Default</u>	<u>Range</u>	<u>Units</u>
10<LF>	0-127	ASCII

This register holds the ASCII character value of the line feed. You can set the value to 0 if you do not want or need a line feed but you cannot completely disable it.

S5 Backspace value

<u>Default</u>	<u>Range</u>	<u>Units</u>
8	0-32, 127	ASCII

S5 is the register containing the ASCII value for the backspace character. This character is the backspace key as well as the character echoed to move the cursor back one position. When the backspace key is pressed, the cursor moves back one space, types a blank space (which deletes the present character and puts a space in its place) then moves back one space. This is actually three moves which takes longer than other key strokes. Therefore, the backspace may not function properly with the repeat key. The range value can be set anywhere from 0-32 or at 127. Values 33-126 are printable ASCII character values and cannot be used for the backspace character value.

S6 Wait Before Dialing

<u>Default</u>	<u>Range</u>	<u>Units</u>
2	2-255	seconds

Register S6 controls how long the modem will wait before blind dialing. (Blind dialing is dialing without listening for a dial tone.) If you set the time for less than two seconds, the modem will default to the minimum, two seconds. You may need to set the value greater than two seconds if, for some reason, you have trouble getting a dial tone right away.

S7 Wait For Carrier

<u>Default</u>	<u>Range</u>	<u>Units</u>
30	1-255	seconds

S7 allots the amount of time to wait for a carrier after the number has been dialed. If contact is made with a carrier, the modem sends the message (result code), "CONNECT" and puts the computer on-line. If there is no answer from the number you have dialed, the modem will tell you, "NO CARRIER" and will leave you in the command state.

S8 Pause time

<u>Default</u>	<u>Range</u>	<u>Units</u>
2	0-255	seconds

S8 sets the amount of time for the pause command (,). Two seconds is usually enough, but if you need more time, you may either increase the value of the S8 register or simply add more commas to the command line.

S9 Wait To Accept

<u>Default</u>	<u>Range</u>	<u>Units</u>
6	fixed (1200)	1/10 sec
6	0-255 (2400)	

S9 determines how long (in tenths of seconds) the modem will wait after detecting a carrier's signal to accept the signal. This prevents the modem from mistaking other signals, such as rings, busy signals, and voices, as carrier signals. The higher the setting, the less chance the modem has of mistaking a signal. The default is 600 milliseconds.

S10 Wait Before Disconnect

<u>Default</u>	<u>Range</u>	<u>Units</u>
<7	fixed (1200)	100 msec
14	0-255 (2400)	

S10 controls the amount of time (in tenths of seconds) the modem waits between losing a signal and disconnecting. This allows the carrier to disappear and return without ending the connection.

S11 Dial Speed

<u>Default</u>	<u>Range</u>	<u>Units</u>
100	fixed (1200)	msec
95	50-255 (2400)	

S11 controls the dial speed by setting the amount of time between touch tones.

S12 Escape Code Guard Time

<u>Default</u>	<u>Range</u>	<u>Units</u>
50	fixed (1200)	20 msec
50	0-255 (2400)	

S12 sets the escape code guard time--the time you must pause before and after entering the escape command (+++) before the modem will recognize it as an escape command. The total time is one second.

❖ **NOTE: S13-S15 are for the 1200 only. You should avoid writing to these registers.** These registers are for factory testing. However, you may read from each of these registers and obtain useful information with no bad results.

S13 Bit Mapped

- Bit 0 Undefined. Can be set equal to 0 or 1.
- Bit 1 1 Extended result code selected
- Bit 2 0 Parity Disabled
1 Parity Enabled
- Bit 3 0 Odd Parity
1 Even Parity
- Bit 4 0 7 Data Bits
1 8 Data Bits
- Bit 5 Undefined
- Bit 6 Buffer Overflow Flag (causes ERROR result code to be sent)
- Bit 7 0 8th Data Bit Set to Space (if Bit 4=1)
1 8th Data Bit Set to Mark (if Bit 4=1)

S14 Bit Mapped

- Bit 0 1 Auto Answer Enabled
- Bit 1 0 Local Echo Disabled
1 Local Echo Enabled

Bit 2 0 Result Codes Enabled
 1 Result Codes Disabled.
 Bit 3 0 Result Codes Sent As Digits
 1 Result Codes Sent As Words
 Bit 4 0 Enable Command Recognition
 Bit 5 0 Touch Tone Dial
 1 Pulse Dial
 Bit 6 Bit 7
 0 0 Speaker Always On
 0 1 Speaker Always Off
 1 0 Speaker On Until Carrier
 1 1 Invalid

S15 Bit Mapped

Bit 0 Same function as Bit 4
 Bit 1 Same function as Bit 5
 Bit 2 0 Answer Mode
 1 Originate Mode
 Bit 3 1 Full Duplex
 Bit 4 Bit 5
 0 0 Invalid
 0 1 invalid
 1 0 300 bps
 1 1 1200 bps
 Bit 6 0 Carrier Off
 1 Carrier On
 Bit 7 Undefined

S16 Analog Loopback Test (DataLink 1200 only)

- ❖ *Note:* DataLink 2400 users should not change this register setting. DataLink 2400 tests are run using the &Tn command. See the AT commands chapter for instructions on running the 2400 tests.

<u>Default</u>	<u>Range</u>
0	0,1

S16 controls analog loopback. Analog loopback is one of the DataLink 1200's testing procedure. It is included as one of the menu options when you boot the back side of the DL disk and is fully explained in the Trouble Shooting section of this manual. Below is a brief description of the settings:

S16=0 Normal operation (non-test)

S16=1 On-line analog loopback

To enter, type: ATD16=1 

To exit, type: +++ (with 1 second pause before and after)

then: ATH 

- ❖ *Note:* While running the loopback test, the phone line must be disconnected.

❖ **NOTE:** The following register settings are for the DataLink 2400 only.

S17 Reserved

S18 Testing Timer

<u>Default</u>	<u>Range</u>	<u>Units</u>
0	0-255	seconds

S18 controls the duration of the various test run with the AT&T command (see the "AT Commands" chapter for a description of the tests). You'll need to assign the register a number depending upon how thoroughly you want to test the modem. Leaving this register at the factory setting (0) will not test the modem at all.

S19-S27 Reserved

Appendix A

Trouble Shooting

If you don't get a dial tone from your phone or from the modem, try the following:

- ◇ Plug the phone directly into the wall to make sure it is working.
- ◇ If you are using an early style touch tone phone and it is not working, it may be because the plug does not match the new standards. Try using a "Y" connector to reverse the polarity. (You can find a "Y" connector at most telephone stores and at Radio Shack).
- ◇ Try a different cable. The one you are using could be bad.
- ◇ Make sure you are in either smart mode or terminal mode.
- ◇ DataLink 2400 users: Run the various tests detailed in the chapter "DataLink 2400 AT Commands" under the &T command.
- ◇ DataLink 1200 users: Run the Analog Loopback test.

To run the Analog Loopback test on your DataLink 1200, you can boot the back side of the DL disk and select it from the menu or run it manually following the steps below:

--First, disconnect the phone line(s)

--Get into the terminal mode (from basic, type **IN#2**  then **^AT** .

--Next, type the command **ATS16=1** .

--The modem speaker will then turn on. You should hear a tone.

--The result code **CONNECT** or **CONNECT 1200** will appear on the screen.

--Now type a message; it doesn't matter what. If what you are typing appears on the screen, the modem is working.

--You can exit the test by either typing in the escape code (+++ with a 1 second pause before and after is the default) or by resetting your computer.

--Type: **ATH** to hang up the connection.

If random characters and symbols are appearing on your screen, it could be due to:

Someone else on the same line. If someone on your end or the host computer's end picks up the phone while you are in the communications mode, it will result in random characters on the screen.

Different baud rates. You may need to make a voice call to the person or information service on the other end to see if your baud rates are compatible.

Different parity settings. Try changing them until the trash goes away.

- ❖ *//e Owners:* If you have an unenhanced //e, you may be getting random characters at the beginning of lines due to a scrolling problem in 80 column mode. You will need to either get the enhancement package from an authorized Apple dealer or request the host computer to sent you more nulls. The later option will slow down the transmission speed.

Different duplex settings. Once again, check with those in charge of the computer at the other end and adjust accordingly.

Loose phone cord. This will rarely be the problem but it does happen.

Phone off the hook. If the phone is not seated firmly, the connection will be weak.

If you have other problems *that are not addressed in this manual*, our Technical Support staff is ready to help you. Refer to the "Getting Help" section in the back of this manual.

Appendix B

Firmware Commands (^A) and Switch Settings (factory: All Closed)

Function	Switch Setting	DataLink (^A) Commands
Interrupts (switch 1)		
On	Sw1 - C	
Off	Sw1 - O	
Data Set Ready (DSR)/1200 Data Carrier Detect/2400 (switch 2)		
On All Time	Sw 2 - C	
Follows Modem	Sw 2 - O	
DSR and CTS (switch 3) (2400 only)		
On All Time	Sw 3 - C	
Follows Modem	Sw 3 - O	
Baud Rate (switch 4)		
50		1B
75		2B
110		3B
135		4B
150		5B
300 (DL 1200)	Sw 4 - O	6B
1200 (DL 1200)	Sw 4 - C	8B
1200 (DL 2400)	Sw 4 - O	8B
2400 (DL 2400)	Sw 4 - C	10B
Data Format (switches 5 and 6)		
8 Data/1 Stop	Sw 5 - C Sw 6 - C	0D
7 Data/1 Stop	Sw 5 - C Sw 6 - O	1D
8 Data/2 Stop	Sw 5 - O Sw 6 - C	4D

7 Data/2 Stop	Sw 5 - O Sw 6 - O	5D
Parity (switches 7 and 8)		
None	Sw 7 - C or O Sw 8 - C	0P (2, 4, 6)
Odd	Sw 7 - C Sw 8 - O	1P
Even	Sw 7 - O Sw 8 - O	3P
Space		7P

Function	DataLink (^A) Commands
Generate Line Feed	
Yes	L E
No	L D
Mask Line Feed	
Yes	M E
No	M D
Reset	R
CR Delay	
None	0C
32 msec	1C
250 msec	2C
2000 msec	3C
FF Delay	
None	0F
32 msec	1F
250 msec	2F
2000 msec	3F
LF Delay	
None	0L
32 msec	1L
250 msec	2L
2000 msec	3L

Translate

LC to UC	0T ([Plus default)
LC Stays LC	1T (/ /e and IIGS default)
LC to UC Inverse	2T
UC to LC Inverse	3T

Zap Control Commands

Z

Find Keyboard

Accept Input	F E
Suppress Input	F D

XOFF/XON

Check	X E
Do Not Check	X D

Redirect Output to Slot

sS
(s=Slot)

Echo to Screen

Echo (Half Duplex)	E E
No Echo	E D

Change Attention Code

Ctrl-Char

Terminal Mode Commands

	T
Transmit 233 ms Break	B
Special Char Enabled (ESC <i>n</i>)	S E
Special Char Disabled (Refer to "Escape Codes" in the <i>TTY Mode</i> section.)	S D
Quit Terminal Mode	Q
Communications Menu	?

ID Bytes

Super Serial ID Bytes: \$Cs05 = \$38
\$Cs07 = \$18
\$Cs0B = \$01
\$Cs0C = \$31

DataLink ID Bytes \$CsFD = \$AE Applied Engineering
 \$CsFE = \$D2 DataLink 2400
 \$CsFE = \$D1 DataLink 1200

Hardware Register Addresses

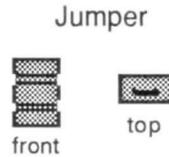
Hardware Registers at \$C080 + \$s0

	Read	Write
\$0	-	--
\$1	Read Dip Switch/Modem	--
	b7 Not Data Carry Detect	
	b6 2400 baud	
	b5 Not Ring Indicator	
	b4-b0 Dip Switches	
\$4	--	Reset to Bank 0
\$5	--	Set Bank 1 Bit
\$6	--	Set Bank 2 Bit
\$7	--	Set Bank 4 Bit
\$8	Read Data Received	Write Data to Transmit
\$9	Read Status Register	Programmed Reset
\$A	Read Command Register	Write Command Register
\$B	Read Control Register	Write Control Register

Appendix C

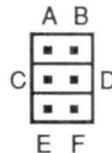
The Jumpers (2400)

The jumpers are the black plastic rectangles located toward the top center of the card.



We have included these jumpers to enable you to customize some of the signals from the modem. The most common case in which you would modify the signals is to run Bulletin Board System software.

Note the letter labels around the pins:



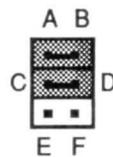
By moving the jumpers from one setup to another, you can alter the signals to match the requirements of your BBS package.

The signals available are:

A=DSR Out B=DSR In
C=DCD In D=DCD Out
E=CTS Out F=Not Used

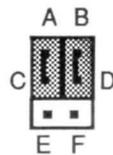
The Standard configuration is:

A and B connected
C and D connected
E and F not connected



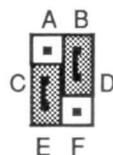
To reverse DSR and DCD, have the jumpers as follows:

A and C connected
B and D connected
E and F not connected



To connect DSR In to DCD out and DCD In to CTS Out:

C and E connected
B and D connected
A and F not connected



APPENDIX D

A Brief ProDOS Tutorial

This is a brief explanation of the Professional Disk Operating System, ProDOS, for those who are completely new to it. All of this information and more is included in your *Apple Owner's Guide* but we have provided it here for your convenience.

Operating System

ProDOS is one of several operating systems for the Apple. Others include DOS 3.3 and Pascal. Operating systems, as defined in the *Apple Owner's Guides*, are programs that control how information is loaded into memory, how the computer handles the information, how the information is stored on a disk, and how the computer communicates with the printer and other peripherals.

Naming Volumes

ProDOS must have a way to locate which disk (often called "volume") you want to access. Instead of typing in the location of the disk as in DOS 3.3 (ex: S6,D1), you simply type in the name of the disk (the volume name). Some rules for volume names are

- 1) Name can include letters, numbers, or periods but not spaces
- 2) Name must begin with a letter
- 3) Name can be up to 15 characters long

These rules also hold true for subdirectory names.

Root Directory and Subdirectory

The main directory of the volume is called the root directory. The root directory uses the same name as your disk. Subdirectories are ProDOS' way of organizing information on a disk.

Think of the root directory as a file drawer and the subdirectories as folders within the drawer. You can

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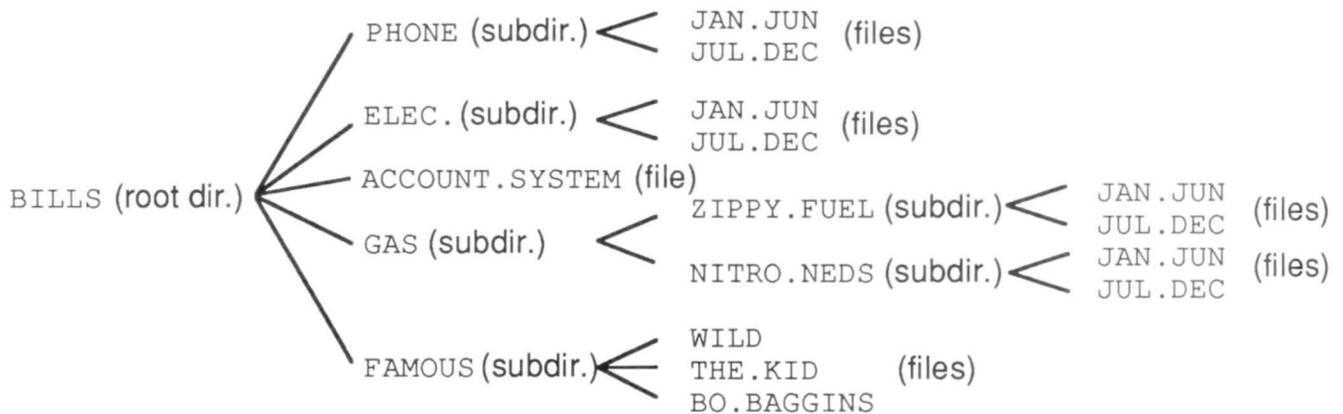
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Think of the root directory as a file drawer and the subdirectories as folders within the drawer. You can

- 1) Put files directly into the root directory like putting documents straight into the file drawer
- 2) Put files within subdirectories like putting documents in folders
- 3) Put subdirectories within subdirectories like putting folders within folders.

Pathname

The name of the directory combined with the names of one or more subdirectories is called a pathname. Volume names and subdirectory names are preceded by a slash, "/". (Note that some applications add the slash for you.) For example, you could have a volume named /MY.DISK and a file called /MY.FILE on the root directory of that disk. To access that file, you would use the pathname /MY.DISK/MY.FILE. You could also have a file /JUL.AUG in a subdirectory (folder) called /PHONE on a disk called /BILLS. To access that file, you would use the pathname /BILLS/PHONE/JUL.DEC. Refer to the diagram below.



ProDOS Directory Structure

Now when an application asks you for the pathname of a file, you'll have a basic understanding of what it expects.

System Files

A system file is a ProDOS file that starts an application. Typically, these files have the suffix .SYSTEM (e.g. /APLWORKS.SYSTEM, /ACCOUNT.SYSTEM [see above], etc.). When you boot ProDOS, it runs the first system file listed in its directory. So, if BASIC.SYSTEM is the first system file on your ProDOS boot disk, ProDOS will boot and then put you in BASIC.

Additional Resources

The following books are available through most book stores:

Apple II Owner's Manual (Apple Computer, Inc.)

Supplied with your Apple Computer. Take the time to read it.

Basic Programming with ProDOS (Addison-Wesley Publishing) Gives a detailed explanation of how to use ProDOS from AppleSoft Basic.

Beneath Apple ProDOS (Quality Software) Provides information about ProDOS for both the novice Apple user and the advanced programmer.

ProDOS Inside and Out (TAB Books) Very good book for both the beginning and advanced BASIC Programmer.

ProDOS User's Manual (Apple Computer, Inc.)

Provides an overview of ProDOS and explains how to use the ProDOS User's Disk.

APPENDIX E

Bird's Better 'Bye'

The DataLink Communications disk contains a modified version of ProDOS. It incorporates a program selector, Bird's Better 'Bye,' that lets you exit one system program and easily run another system program (e.g. APLWORKS.SYSTEM, BASIC.SYSTEM, FILER) from a menu.

To use this 'BYE' command, boot your copy of the Æ disk or copy the 'PRODOS' file from the Æ disk to your boot disks. Then, anytime you quit a system program (such as AppleWorks), a menu of the first 13 SYS type files of subdirectory entries on that disk will be displayed on the screen. This menu can also be called from the Applesoft BASIC prompt by entering the 'BYE' command.

```
ESC: CHANGE VOLUME
RETURN: SELECT FILE

/AW2.EXP
  PRODOS
  AE.AW.SYSTEM
  FILER
  GSTEST.SYSTEM
  RWTEST.SYSTEM
  RFTEST.SYSTEM
  AECACHE.SYSTEM
```

Sample screen display

The sample screen above shows the AW 2 Expander disk on-line and lists its executable system files.

Use the up and down arrow keys to highlight the selection you want to run. The ESC key will change the volume (disk) selection to the next on-line volume.  selects the currently highlighted file or subdirectory name.

Subdirectory names on the disk will be indicated by a '/' as the first character of the file name.

About The Program

Bird's Better Bye was created by Alan Bird of "Beagle Bros."

APPENDIX F

Getting Help

If you have a technical question relating to your DataLink card that is not covered in the manual, please contact the dealer from whom you purchased the card. If you are experiencing difficulties with one particular program, contact the program's author or publisher.

In the event that the dealer or the publisher's support personnel cannot answer your question, call Applied Engineering Technical Support. The support representatives are experienced in the applications and uses of Applied Engineering products, but in order to provide a quick and effective answer to your question, they will need to know as much as possible about the hardware and software specifically related to your question. Please provide the technical support representative with the following information:

- ◇ The Applied Engineering product related to your question and its revision number.
- ◇ The original and current memory configuration of the card (if applicable).
- ◇ The model and revision of your computer.
- ◇ What peripherals are being used and what cards are in each slot.
- ◇ The name, version, and revision level of the software that you are experiencing problems with.
- ◇ The results of any test programs, diagnostics, or troubleshooting done by you, your dealer, or your software publisher's support department.

**Applied Engineering
Technical Support
(214) 241-6069**

**9 AM to 12:30 PM & 1:35 PM to 5 PM(CST)
Monday Through Friday**

(Please call only the number above for technical support.
Our sales office cannot transfer calls to the support lines.)

Returning a Product

Include

If your product needs to be returned, the technical support representative will give you a Return Material Authorization (RMA) number.

- Record the RMA number for your own records.
- Write the RMA number on the outside of the package you send to us.
- Write the RMA number at the top of the return form included with your product package.

Fill out the Return Form on back of the yellow sheet marked "Attention!" A correctly completed form will greatly reduce the time it takes to process and return your product.

Attach a copy of your original invoice to the return form.

- ❖ **Warning:** If you don't include an invoice, products will be treated as out of warranty products and will be returned to you C.O.D. for the amount of the service charge.

A completed form should look something like the one below.

Invoice

If you should ever have to return your AE product for repair, please complete this form and attach a copy of your original invoice.

RMA Number: 9006921

Computer: <input type="checkbox"/> II <input type="checkbox"/> II Plus <input type="checkbox"/> IIc <input type="checkbox"/> IIe Non-Enhanced <input type="checkbox"/> IIe Enhanced <input type="checkbox"/> IIGS ROM# <u>01</u> <input type="checkbox"/> Other (list) _____	Peripherals: <input checked="" type="checkbox"/> Monitor <u>Apple Color</u> <input checked="" type="checkbox"/> Printer <u>ImageWriter II</u> <input checked="" type="checkbox"/> Modem <u>DataLink</u> <input type="checkbox"/> Other (list) <u>15 year old son</u>	GS Slot Settings 1: <input type="checkbox"/> Your <input type="checkbox"/> Printer 2: <input type="checkbox"/> Your <input type="checkbox"/> Modem 3: <input type="checkbox"/> Your <input type="checkbox"/> Text 4: <input type="checkbox"/> Your <input type="checkbox"/> Mouse 5: <input type="checkbox"/> Your <input type="checkbox"/> Smart 6: <input type="checkbox"/> Your <input type="checkbox"/> Disk 7: <input type="checkbox"/> Your <input type="checkbox"/> A-Talk Startup: <u>ROM</u>
--	---	--

Slot 0 (II Plus) : _____ Slot 5 : _____
Slot 1 : _____ Slot 6 : Transporter
Slot 2 : DataLink Slot 7 : Apple HD Controller
Slot 3 : _____ Aux. Slot (I/e) : _____
Slot 4 : Ramfactor Mem. Exp. (IIGS) : RamKeeper
64-RAMIG8-BAM

Symptoms: My DataLink keeps calling 976 numbers every time I leave the room. These calls average about \$9 apiece but one was \$132! I have my son watch it while I'm at work and sure enough, he says it just starts dialling and making a whistling sound.

Description of Software (name, version number, any enhancements, etc.):
I've only been using your DataTerm software. By the way, I have noticed that there is a dial macro (open-apple 0) called "ooh, baby baby", that isn't mentioned in your manual. Can you tell me what this is?

Steps to Duplicate Problem:
1) tell 15 year old son to keep an eye on modem 2) leave house 3) well, there is no 3). That's all I do and then I get these horrendous phone bills every month. I wouldn't mind so much if it would download something for me.

When You Ship

If you don't have the original packing material, wrap the board in anti-static material (preferably the anti-static bag in which the card was originally shipped; however, aluminum foil will work fine). Pack it in a sturdy box cushioned with wadded papers (i.e. used computer paper or newspaper).

- ❖ **Warning:** If your product is damaged due to inadequate packing, your warranty will be void.

Include the return form and invoice.

Send the package, shipping prepaid, to:

RMA# __?__
Applied Engineering
Technical Support
3210 Belt Line Road, Suite 154
Dallas TX 75234

You should insure your package. Æ will not assume any responsibility for inadequate packing or loss or damage during shipping.

When We Receive

Our service department will use your completed form in an attempt to duplicate the problem.

If it is determined that your product is defective due to a manufacturing defect, your card will be repaired or replaced at Æ 's option.

Any misuse, abuse, or non- Æ authorized alteration, modification, and/or repair to the Applied Engineering product will void the warranty. This warranty will also be void if you use the Æ product for any purpose other than its intended use.

Your product will be fully tested before it is shipped back to you, transportation prepaid, via UPS regular delivery.

Once your product is received by Technical Support, it will be processed and delivered to our shipping department within 7 to 10 working days.

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