HyperTalk® Beginner's Guide
for the Apple IIGS®

Contents

About This Book

This book shows you how to start using HyperTalk®, the language that's built into HyperCard® IIGS®. With HyperTalk, you can write your own instructions, called *scripts,* for HyperCard to carry out. Writing scripts is called *scripting.*

You can create, customize, and personalize HyperCard stacks without learning how to write scripts; but scripting with HyperTalk gives you even more control over your computer.

If writing scripts sounds a lot like programming to you, you're right; however, you do not need *any* previous experience with programming to write scripts. If you can read this paragraph, you can write a script.

What you need to know to use this book

To get the most out of this book, you should already know the basics of using an Apple® IIGS computer; for instance, how to use the mouse, menus, and icons on the screen. You should also know how to find your way around in a HyperCard stack. If you have gone through the first three or four chapters of *Getting Started with HyperCard IIGS,* you probably know enough to begin.

Specifically, you should know how to use buttons to get around in stacks and how to use the HyperCard menus and tools. You should have browsed through some stacks, looked through part of the HyperCard IIGS Help stack, and perhaps personalized a stack—for example, you might have used the Address stack to store some information.

If you already have experience with programming in another language, you might want to go directly to the *HyperCard IIGS Script Language Guide,* published by Addison-Wesley Publishing Co.

This book is intended to help you get started and let you get a feel for scripting on your own. You won't find long, technical explanations of HyperTalk concepts here; but you will be able to see clearly how specific scripts work.

How to use this book

Most chapters in this book include exercises made up of numbered steps. Each step consists of a short instruction in boldface type and then (usually) further explanation in plain type. Depending on your level of expertise with HyperCard, you may find that you can save time in some of the exercises by reading just the boldface steps. Of course you can stop and read the more-detailed explanations in plain type whenever you need to.

Each chapter builds on what you've done in previous chapters, so it's important that you start at Chapter 1 and work through the book in order.

- In Chapter 1, "Getting Started," you'll create a practice stack, which you'll use for scripting throughout this book. You'll make some buttons for the stack and complete their scripts.
- In Chapter 2, "Fields and Other Containers," you'll write some simple scripts that explore the way HyperCard stores and retrieves information.
- In Chapter 3, "Scripts That Make Decisions," you'll write some more powerful scripts.
- In Chapter 4, "Handling Messages," you'll explore how buttons and other objects receive and send messages.
- In Chapter 5, "More Scripting Ideas," you'll look at other ways you can use scripts in stacks. You'll see how to create animation, a presentation stack, and a stack just for fun.
- The Appendix, "HyperTalk Summary," contains a complete list of HyperTalk commands, functions, and other elements.

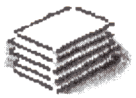
You'll also find a glossary of terms, an index, and a quick reference card, which you can remove from this book and keep handy while you work on your scripts.

At the end of the book is a Tell Apple card. By answering the questions and mailing the card to Apple, you help us improve our products and documentation. Fill the card out after you've worked with this book.

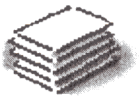
Other sources of information

Because this book is intended as an introduction to scripting for beginners, it is not comprehensive. HyperTalk comprises many commands, functions, keywords, and other elements that are not explained in this book. The HyperCard package includes the following reference materials:

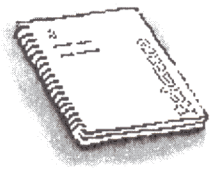
HyperTalk Help: A stack that provides easy access to information about HyperTalk. You will find this stack indispensable as you begin to learn scripting.



HyperCard IIGS Help: A stack that answers your questions about HyperCard's menus and tools.



HyperCard IIGS Reference: A book that contains reference information about all aspects of HyperCard other than scripting.



You may also want to consult the following books, which were written at Apple and are published by Addison-Wesley as part of the Apple Technical Library:

HyperCard Stack Design Guidelines: A book that provides information about how to design and build stacks. Its focus is the look and behavior of stacks (for example, navigation methods and card layouts) rather than the mechanics of scripts.

HyperCard IIGS Script Language Guide: A book that provides detailed reference information about scripts and HyperTalk. This book is for people with some programming or scripting experience.

Several other books have been written about HyperTalk. Check with your favorite bookseller to see what titles are currently available.

Getting Started

Have you ever wished your computer could do things your way? Most application programs are designed to perform one type of task, like word processing or creating graphics. But what about all the things you do that don't fit neatly into other people's categories?

HyperCard® IIGS® lets you create your own ways of doing things on your computer. If you have read *Getting Started with HyperCard IIGS*, you already know how to work with HyperCard tools such as the Button and Field tools. This guide introduces you to *scripting*—writing sets of instructions called *scripts* that give you even more control over the way HyperCard stacks work.

HyperCard scripts are written in the HyperTalk® language, which is similar to English in many ways. HyperTalk uses common words such as *go*, *put*, and *it* in much the same way that people use these words in everyday life. In this book you'll learn how to combine these words with other words to form instructions that HyperCard can understand. As you work through the book, you'll build your vocabulary of HyperTalk words. You'll also learn how to write larger, more powerful sets of instructions.

You do not need any prior experience with computer languages to use this book. You should, however, know how to get around in HyperCard stacks, and how to use some of the tools described in *Getting Started with HyperCard IIGS*.

What you will build

In this book you'll learn scripting by building a practice stack from scratch and writing scripts for it. If you work through Chapters 1–4 in order, you'll end up with a stack you can use to catalog a collection of record albums, cassettes, or compact disks. (Figure 1-1 shows a sample card from a completed version of the practice stack.)

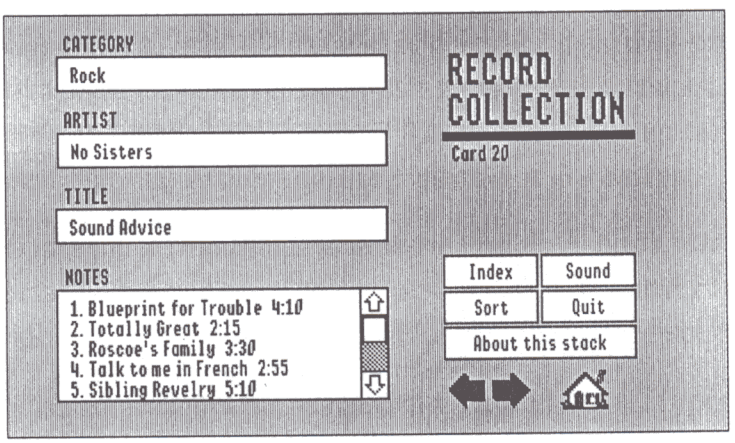


Figure 1-1 Sample card from the practice stack

If you don't feel like cataloging a collection of recordings, don't worry. In Chapter 5 you'll learn how to modify the practice stack for other purposes. You can modify it to keep track of books, baseball cards, computer software, your favorite restaurants, the inventory for a business, or anything else you might want to catalog. Here are some examples:

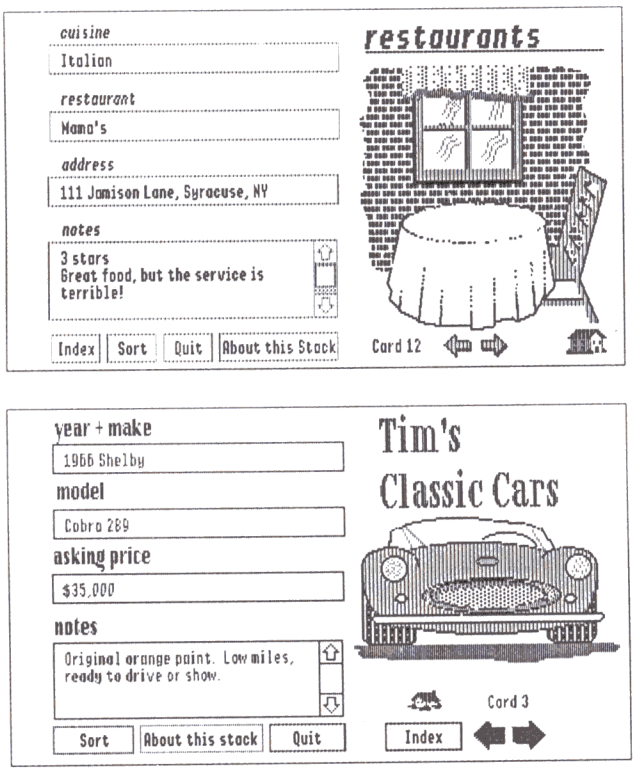


Figure 1-2 Some variations on the practice stack

As you build the practice stack, you'll learn basic scripting concepts and techniques. By the time you're finished with this book, you'll know enough to create stacks for your own purposes.

Each chapter in this book builds on material you've completed in previous chapters, so you should go through the chapters in order. In this chapter you'll create the practice stack and write some simple scripts to control the actions of buttons.

Starting up HyperCard

This book is meant to be used with HyperCard "up and running" on your Apple IIGS® computer. You'll need to perform the steps as directed in the sections that follow to get the most out of the material.

First, start up HyperCard as you normally would. (The *HyperCard IIGS Reference* includes instructions if you need them.) If you already have HyperCard running, go to the Home stack. You're ready to go on when you see the first card of the Home stack on your screen.

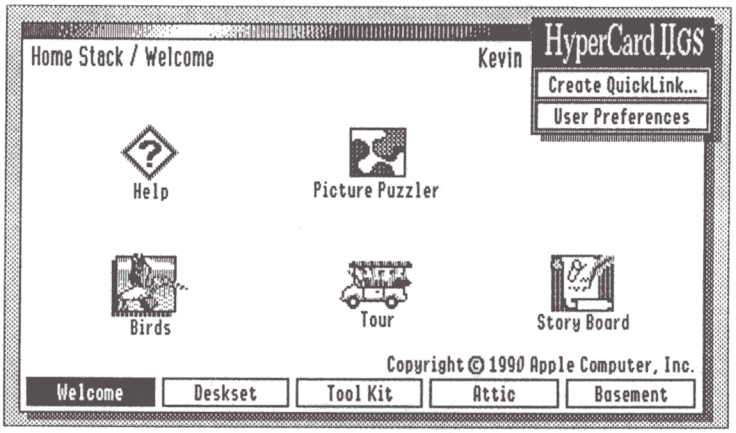


Figure 1-3 The first card of the Home stack

Setting your user level

To work with scripts, your user level must be set to Scripting. Start from the first card of the Home stack and set your user level as described in the following steps:

1. **Click the User Preferences button.**

   The User Preferences card appears.

2. **Click the Scripting button on the User Preferences card.**

   For now, leave the check box options Blind Typing, Power Keys, and Text Arrows unchecked. (For more information about these options, refer to the *HyperCard IIGS Reference.*)

   Figure 1-4 shows the User Preferences card with Scripting selected.

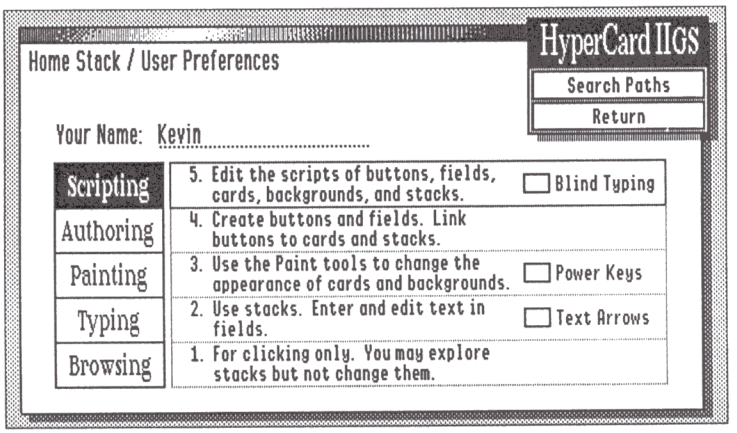


Figure 1-4 The User Preferences card of the Home stack

When you set the user level to Authoring or Scripting, a new menu title, Objects, appears in the menu bar. Commands in this menu allow you to get information about and change properties of HyperCard *objects*—buttons, fields, cards, backgrounds, and stacks. (You'll learn more about objects later on.) The user level must be set to Scripting before you can look at, write, or change these objects' scripts.

Creating a practice stack

Now that you've set the user level to Scripting, the next task is to create the stack that you'll work with throughout this book. You can make a new stack at any time from anywhere in HyperCard; you don't have to go back to the Home card. Just follow these steps:

1. **Choose New Stack from the File menu.**

   A dialog box appears in which you can name the stack.

2. **Type the name `Collection` for your stack:**

   If you make an error while typing the name, use the Delete key to erase it and retype. The dialog box should look similar to this:

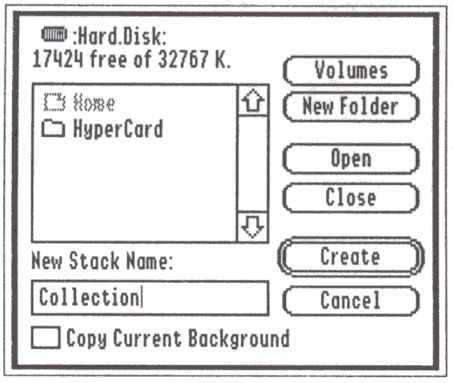


Figure 1-5 The New Stack dialog box

From now on your practice stack will be referred to as the Collection stack.

3. **When you're ready, click Create (or press Return).**

   You should see a completely blank card on your screen with the menu bar at the top. This card is the first—and right now the only—card of your Collection stack.

When you create a new stack, you automatically get three things: the stack itself, a background, and the first card. If you selected the Copy Current Background option, you would also get the background pictures, fields, or buttons of the card you were on when you chose the New Stack command. Otherwise, as in this case, you have a blank card to work with.

Working in the background

You can think of the *background* in HyperCard as a kind of "holding area" for general elements. If a picture, a field, or a button is in the background, it appears on every card that shares that background. If you put a button in the background, for example, you will have that button constantly available throughout a number of cards—you don't need to re-create it on every card. So far the Collection stack has only one background, so all the cards you create will share that background.

In the rest of this chapter you'll add buttons and fields to the background of the Collection stack.

Before you go on,

- **Choose Background from the Edit menu.**

  The word *Background* appears in the menu bar, indicating that you're working in the background:

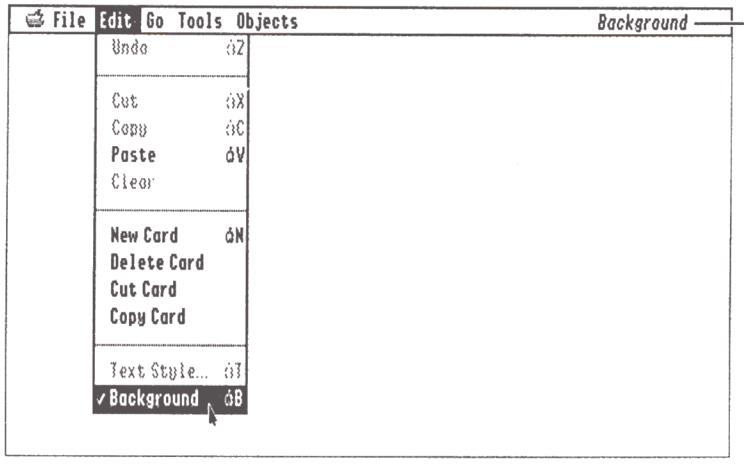


Figure 1-6 Working in the background

You can also work in the background by pressing ⌘-B. (The ⌘ key is called the Command key and is to the left of the Space bar on the keyboard.) Keyboard shortcuts like ⌘-B can save you a lot of time when you're creating a stack. You'll have many opportunities to practice HyperCard's most useful keyboard shortcuts as you work through this book.

And now . . . a little scripting

In this section you will create a button and write a script for it. You may already know how to copy and paste buttons with prewritten scripts. In this book you'll complete the scripts yourself.

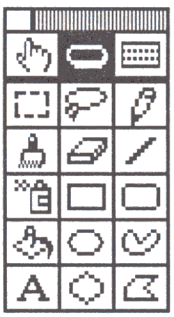
Creating a Home button

Whenever you see a small picture of a house in HyperCard, you can be pretty sure that clicking it will take you to the Home card. In this section you'll add a Home button to your stack and complete its script.

First you'll create the button. You may already know how to create buttons by choosing New Button from the Objects menu. In this book you'll use a keyboard shortcut to create buttons. Follow these steps:

1. **Make sure you're working in the background.**

   You should see the word *Background* in the menu bar. If you don't see *Background,* press ⌘-B.



The Button tool

2. **Choose the Button tool from the Tools menu.**

   The pointing hand (Browse tool) on the screen changes to an arrow pointer.

   If you prefer to work with a palette, you can turn the Tools menu into a palette by dragging past its bottom edge to "tear" it off the menu bar.

3. **With the pointer anywhere on the card, hold down the ⌘ key.**

   The arrow pointer changes to a crosshair.

4. **While holding down the ⌘ key, press the mouse button and drag to create a small button about half an inch square.**

   Release the mouse button and the ⌘ key when the button is approximately the correct size. The new button is automatically selected—you can tell by the moving dashed line around its edges. (This effect is sometimes called "marching ants.") While it's selected, you can stretch or shrink the button by dragging a corner.

5. **Move the button to the lower-right corner of the background.**

   To move the button, position the pointer near the center of the button and drag.

   Because the button is in the background, it will appear in this position on every card in the stack, so you can always go Home.

6. **Double-click the button to see its Button Info dialog box.**

   Or choose Button Info from the Objects menu.

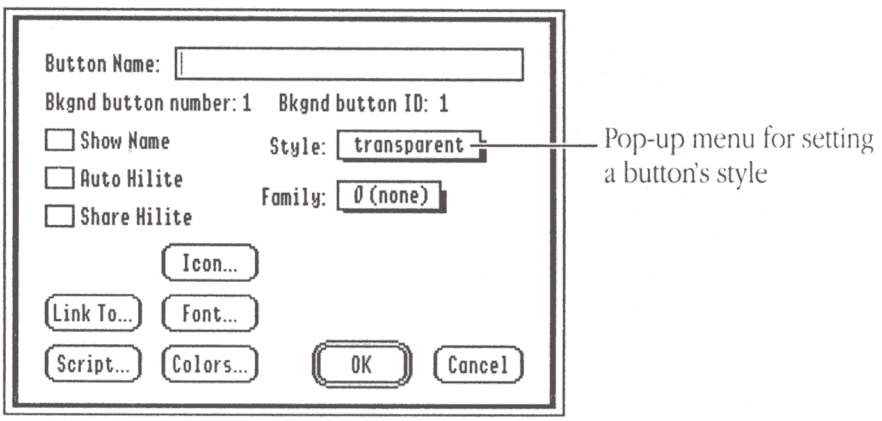


Figure 1-7 A Button Info dialog box

HyperCard buttons have a variety of styles and features from which to choose. You customize a button's appearance and actions through the Button Info dialog box.

A vertical bar marks the insertion point in the Button Name box, ready for you to type a name.

7. **Type** `Home` **to name the button (but don't press Return).**

   If you press Return prematurely, don't worry; just double-click the button again to get back to the Button Info dialog box.

8. **Click the Auto Hilite check box to select it.**

   The Auto Hilite option causes the button to briefly change color when it's clicked.

9. **Click the Icon button.**

   Another dialog box appears in which you can select an icon for the button.

Some house icons

10. **Choose one of the house icons.**

    Scroll through the window until you find the house icons and click the one you want.

11. **Click OK to close the list of icons.**

    You see the Button Info dialog box again.

Next you'll write a script for this button.

Writing the script

You create and change scripts in a dialog box called the *script editor.* To see the script for the new Home button, make sure the Button tool is selected, and follow these steps:

1. **Click the Script button in the Button Info dialog box.**

   The script editor for the Home button appears.

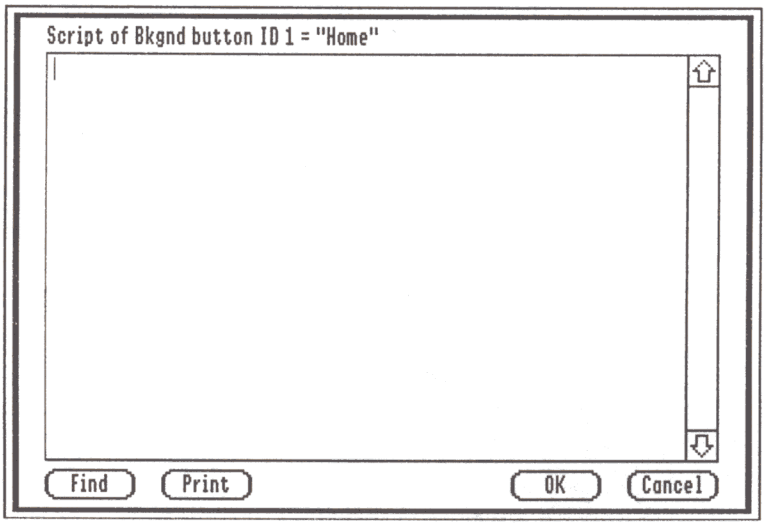


Figure 1-8 The script editor

Notice that the text at the top of the script editor identifies this script as "Script of Bkgnd button ID 1 = "Home""—your new button. Notice also the vertical bar cursor.

The next step is to type the statements that define the button's action.

2. **Type** `on mouseUp` **and press Return.**

   Be sure to type `mouseUp` as one word. If you make a mistake, use the Delete key to erase it and finish typing the script correctly.

3. Type `go to stack "Home"` and press Return.

4. Type `end mouseUp` and press Return.

   These three lines make up the complete script for the Home button.

```
on mouseUp
  go to stack "Home"
end mouseUp
```

   The script editor automatically indents lines within scripts. This indenting helps you check your scripts. `On` and `end` should always line up at the leftmost edge of the script editor when you're finished typing a script; if they don't line up, press the Tab key to check the script's formatting. If they still don't line up, you may have left out something important; check the script again.

❖ *By the way:* It doesn't matter how you capitalize HyperTalk words. Words that are formed from two words (such as `mouseUp`) are usually typed in small letters with a capital in the middle likeThis to make them more readable. ❖

To save your script and leave the script editor:

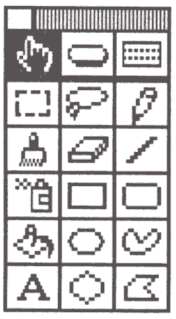
5. Click OK.

   The script editor disappears, and you're looking at the Collection stack with your new button.

   By clicking OK (or pressing the Enter key), you save any changes you made to the script and return to the stack you're working on. If you click Cancel, you close the script editor without saving changes.

Trying out the Home button

Now see if the Home button works as it's supposed to.



The Browse tool

1. **Choose the Browse tool from the Tools menu.**
2. **Click the Home button.**

   The Home stack appears. Welcome Home!

If something else appears, such as a dialog box saying "Can't understand," you may have made a typing mistake. Switch to the Button tool, double-click the Home button, and click Script in the Button Info box to check the script. Make sure everything is correct, then click OK and try out the Home button again.

How the script works

As you might guess, the script you wrote describes what should happen when someone clicks the Home button.

Whenever you move the mouse, your Apple IIGS computer and HyperCard software track the movement electronically. You see the movement as a change in the position of the pointer on the screen. When you press and release the mouse button, the mouse sends an electrical signal to the computer, much the way a light switch works when you turn it on or off. The same thing is true when you press different keys on the keyboard. The HyperCard software interprets these signals from the system and translates them into HyperTalk *system messages.*

`MouseUp` is a system message that means the mouse button has been released; an on-screen HyperCard button receives this message when someone clicks it (that is, positions the Browse tool on it and then presses and releases the mouse button).

Whether something happens when the on-screen button receives the `mouseUp` message depends on whether the button's script contains any instructions for that message.

The first line of your script, `on mouseUp`, signals HyperCard that instructions for the `mouseUp` message exist. The next line, `go to stack "Home"`, tells HyperCard to go to the Home stack.

The word `go` is a HyperTalk *command;* it means what you might expect. `Go` must be followed by a destination—a description of a stack or a card. In this case, you used the name of the stack `Home`.

Each line in a script is called a HyperCard *statement.* In a more-complicated script, the instructions signalled by `mouseUp` could consist of many statements. The last line of your script, `end mouseUp`, indicates the end of the instructions for the `mouseUp` message.

Translated into English, the instructions in your script say:

"When someone clicks this button, go to the Home stack. That's all."

Adding a button to the Home stack

Wouldn't it be convenient to have a button in the Home stack that would take you directly to your collection stack? In this section you'll create one.

Make sure you're looking at the Home stack and follow these steps:

1. **Choose the Button tool.**
2. **While holding down the ⌘ key, drag to create a new button.**

   Make the button about an inch wide and a half-inch high. Move it to any open space on the card.
3. **Double-click the button to see its Info box.**
4. **Name the button** `Collection`

5. **Click Show Name and Auto Hilite to select them.**

   When Show Name is selected, the button's name appears inside the button.

6. **Click Icon.**

   The list of icons appears.

Stack icon

7. **Choose the stack icon.**

8. **Click OK to close the list of icons.**

   The Button Info dialog box appears again.

Writing the script

Now you're ready to write the script.

1. **Click the Script button to see the script editor.**

2. **Type the following script (pressing Return at the end of each line):**

```
on mouseUp
  go to stack "Collection"
end mouseUp
```

3. **Click OK.**

   The Home stack appears with the Collection button in place.

4. **Try out the new button by clicking it with the Browse tool.**

   If your Collection stack appears, congratulations!

❖ *If something else happened:* You may have misspelled a word or left out a space in the button's script. If you got a directory dialog box asking where the stack is, you may have typed the stack's name incorrectly. ❖

The words `go to stack "Collection"` tell HyperCard to go to the Collection stack. HyperTalk is a flexible language; any of these statements would also have worked in the button's script:

```
go "Collection"

go to "Collection"

go to card 1 of stack "Collection"
```

Message handlers

You may already know that buttons, fields, backgrounds, cards, and stacks are HyperCard elements known as *objects*. An object can send and receive *messages*. (For example, when you click a button, the button receives a `mouseUp` message.) As you've seen, when an object receives a message, it can act on the message according to instructions in the object's script. More specifically, the object acts according to instructions in the message handler.

A *message handler* is a set of instructions to be carried out when a particular object receives a particular message. It's called a handler because it "handles" the message. Handlers always begin with the word `on` and end with the word `end`, and both words are followed by the name of whatever message the handler deals with—for example, `on mouseUp`. Each of the scripts you have written so far contain only one message handler, but an object's script can contain a number of handlers, each one handling a different message. The word *script* therefore refers to all the handlers for a given object.

In some ways writing a script for a HyperCard object is like training a dog (see Figure 1-9). The dog is like a HyperCard object, and a spoken command is like a message. Each of the dog's tricks—the response of a particular dog to a particular command—is like a message handler. And the sum total of all the dog's tricks represents the "script" for the dog. When the dog receives a message (for example, "fetch"), the dog searches through its script for the appropriate handler and then acts according to the instructions in that handler.

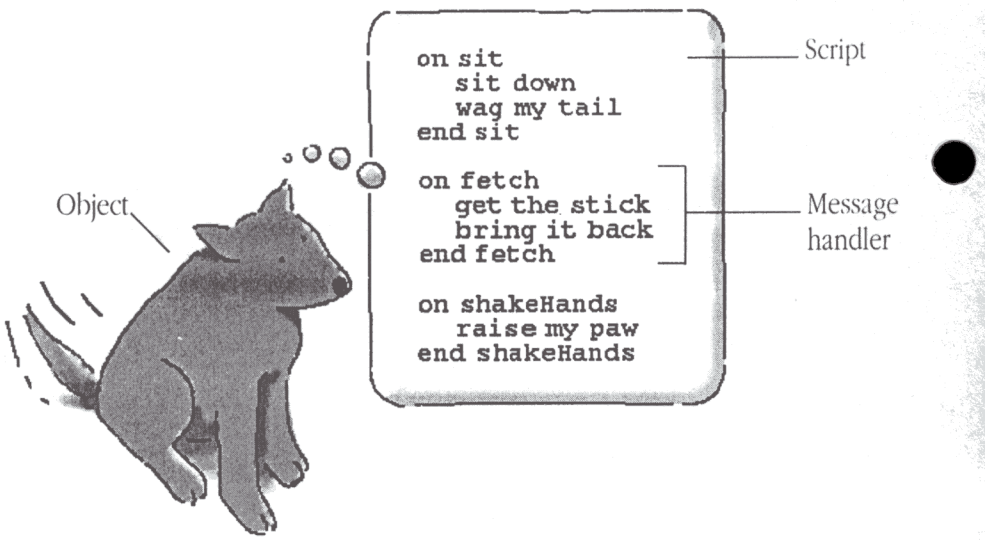


Figure 1-9 Message handlers: an analogy

❖ *By the way:* The words on and end belong to a special group of HyperTalk words known as *keywords*. Keywords are used to control which statements are executed in a script. ❖

Visual effects

Visual effects can make the movement from one card to another more obvious and interesting. In this section you'll learn how to write scripts to display visual effects.

Adding a visual effect to the Home button

First modify the script for the Home button.

1. **Choose the Button tool.**
2. **Double-click the Home button to see its Info dialog box.**
3. **Click Script.**

   The script editor appears showing the button's script.

❖ *By the way:* Even though you had to switch to the background when you created this button, you do not have to switch to the background to change its script. ❖

4. **Click before the word `go` to set the insertion point at the beginning of the second line.**
5. **Type `visual effect barn door close` and press Return.**

   The script should now look like this:

```
on mouseUp
  visual effect barn door close
  go to stack "Home"
end mouseUp
```

6. **Click OK.**
7. **Choose the Browse tool and click the Home button.**

   The first card of the Home stack gradually appears on the screen, closing in from the edges of the screen.

Adding a visual effect to the Collection button

Now you'll modify the script for the Collection button that you added to the Home stack. You'll use a shortcut for seeing a button's script.

1. **With the Browse tool chosen, hold down the ⌘ and Option keys.**

   Pressing these two keys lets you see the outlines of all buttons on the card.

2. **While holding down ⌘ and Option, click the Collection button.**

   The script editor appears showing the button's script. (Release the keys after the script editor appears.)

   The ⌘-Option-click shortcut allows you to go directly to a button's script without switching to the Button tool first—a handy feature when you're doing a lot of scripting.

3. **Click before the word `go` to set the insertion point at the beginning of the second line.**

4. **Type `visual effect barn door open` and press Return.**

   The Collection button's script should now look like this:

```
on mouseUp
  visual effect barn door open
  go to stack "Collection"
end mouseUp
```

5. **Click OK.**

6. **Try out the Collection button.**

   The first card of your Collection stack appears to open from the center of the screen.

The syntax of the visual command

All languages—for people and computers—have rules of *syntax.* Syntax is a description of the way in which words are combined to form meaningful statements. For example, in English the statement "Go to the store" makes sense because it follows the rules of English syntax. However, the statement "The go store to" doesn't make sense because it doesn't use proper syntax.

HyperTalk syntax is much like English syntax, which makes HyperTalk an easy language to use. It's not always true, however, that a statement that makes sense in English will make sense in HyperTalk. For example, HyperCard cannot understand the command

```
visual effect slowly dissolve
```

because the words are in the wrong order. (The correct order is `visual effect dissolve slowly`.) If you wrote this command, you would see a "Can't understand" dialog box like this:

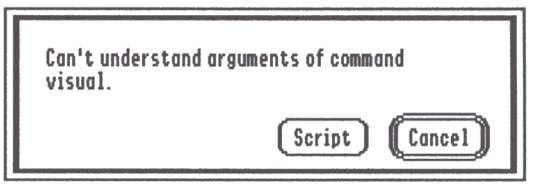


Figure 1-10 A "Can't understand" dialog box

Clicking Script in a "Can't understand" dialog box opens the script editor and places the insertion point in the statement HyperCard can't understand. You can then correct any errors in syntax or spelling and try your script again.

The syntax of a HyperTalk statement describes the general, underlying structure that a statement must follow. In order for HyperCard to understand a statement, it must contain the correct elements in the correct order. Certain conventions are used to show the syntax of HyperTalk statements. For example, here's the syntax of the `visual` command:

`visual [effect]` *effectName* `[`*speed*`] [to` *image*`]`

Syntax elements in `this kind of type` are typed exactly as they appear.

Elements in italic are placeholders. In an actual statement, you would replace *effectName* with the name of an actual visual effect, such as `barn door close`.

Syntax elements enclosed in brackets `[ ]` are optional. (You don't include the brackets in an actual command.) In the `visual` command, the elements `[effect]`, `[`*speed*`]`, and `[to` *image*`]` are optional.

Knowing a command's syntax is as important as knowing what it does. But don't worry—you don't have to memorize syntax. A reference section, "Syntax Summaries," appears at the end of each chapter in this book, describing the syntax of the commands you've learned. The Appendix and HyperTalk Quick Reference card list the syntax of every HyperTalk command. The HyperTalk IIGS Help stack and the *HyperCard IIGS Script Language Guide* describe the syntax of every command in detail.

Putting information into your stack

So far the Collection stack consists of a single card with a Home button. In this section you'll add fields to the background of the stack, type some text into the fields, and add some cards to the stack.

Adding fields to the background

First you'll add four fields to the background. When you're finished, the background will look similar to this:

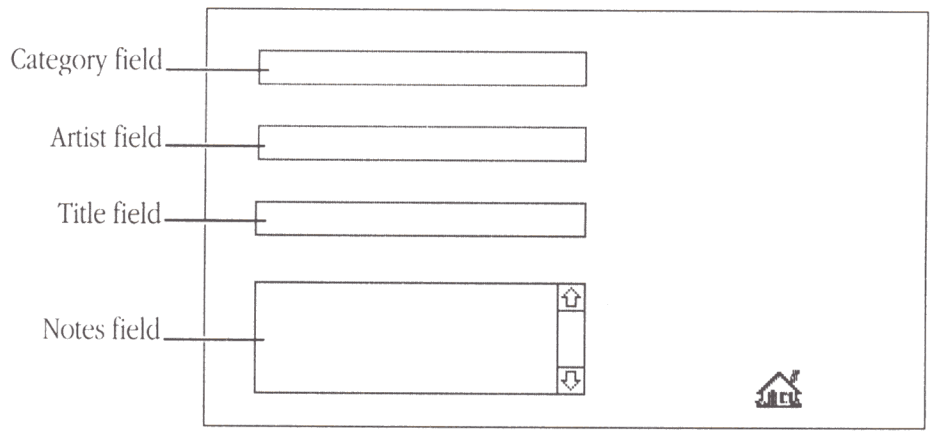


Figure 1-11 Background fields for the Collection stack.

Because you'll place these fields in the background, they will appear on every card in your stack. However, the text contained in the fields can be different on every card.

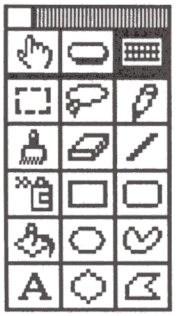
Creating the Category field

You can always get a new field by choosing New Field from the Objects menu. In this book you'll use a keyboard shortcut to make fields.

Follow these steps:

1. **Press ⌘-B to work in the background.**

   The word *Background* appears in the menu bar.



The Field tool

2. **Choose the Field tool.**

   The pointing hand (Browse tool) on the screen changes to an arrow pointer.

3. **With the pointer anywhere on the card, hold down the ⌘ key.**

   The arrow pointer changes to a crosshair.

4. **While holding down the ⌘ key, press the mouse button and drag to create a new field one line high and about three inches wide.**

   This method for creating a field is similar to the method you used to create your Home button. Release the mouse button and the ⌘ key when the field is the size you want. The new field is automatically selected, as indicated by the "marching ants" around it. While it's selected, you can stretch or shrink the field by dragging a corner.

5. **Move the field to the top of the background (as shown in Figure 1-11).**

   To move the field, position the pointer near the center of the field and drag. Because the field is in the background, it will appear in this position on every card in the stack.

6. **Double-click the field to see the Field Info dialog box.**

   Or choose Field Info from the Objects menu.

   HyperCard fields have a variety of styles and features from which to choose. You customize a field's appearance and actions through the Field Info dialog box.

   A vertical bar marks the insertion point in the Field Name box, ready for you to type a name.

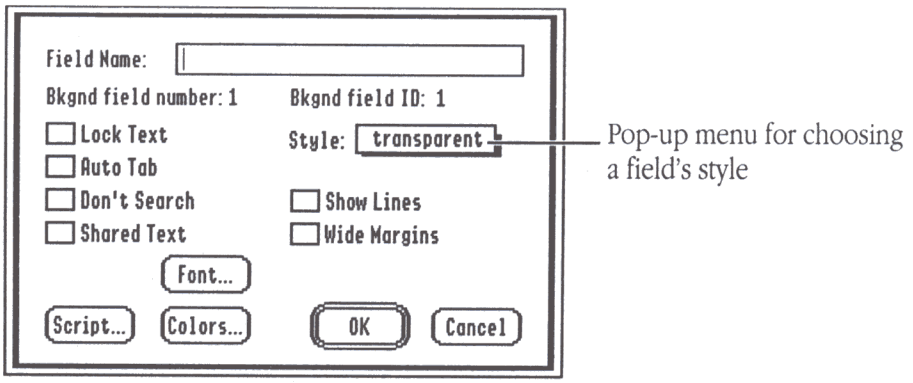


Figure 1-12 The Field Info dialog box.

7. **Type `Category` to name the field (but don't press Return).**
8. **Choose "rectangle" from the pop-up menu to set the field's style.**
9. **If you'd like, choose a font for the field.**

   Click the Font button to display the Text Style dialog box. Then choose a font and size. (Choose a font that's easy to read, such as Shaston 8.) When you've selected a font, click OK to return to the Button Info dialog box.

10. **If you'd like, choose colors for the field.**

    Click the Colors button to display the Field Color dialog box. Then choose a color for the frame of the field and the text inside the field. When you've selected the colors you want, click OK to return to the Field Info dialog box.

11. **Click OK to close the Field Info dialog box.**

Creating the Artist, Title, and Notes fields

Now you need to add three more fields to the background. This time you'll use a shortcut to create each field. Make sure you're still in the background and that the Field tool is still selected, then follow these steps:

1. **While holding down the Option and Shift keys, position the pointer near the center of the Category field and drag down.**

   You should see an exact duplicate of the Category field move down the screen, leaving the original Category field in place. Dragging the field while you hold down the Option key creates an exact duplicate of the field. Dragging the field while you hold down the Shift key restricts your movement of the field to straight up and down or straight left and right. Dragging the field while you hold down both keys produces both effects simultaneously. (Both of these shortcuts also work for buttons.)

   Now all you need to do is change the name, and you'll have a new field with the same size and other characteristics as the Category field.

2. **Double-click the new field to see its Field Info dialog box, and name the field** `Artist`

   Except for its name, number, and ID, the Artist field will have all the same characteristics as the Category field.

3. **Using the same shortcut, Option-Shift-drag the Artist field to create a third background field, and name it** `Title`

4. **Option-Shift-drag the Title field to create a fourth background field, and name it** `Notes`

   In addition to changing the name of this field, you should change the field's style to "scrolling." After you rename the field, enlarge it by dragging a corner, until it's a few inches high, as shown in Figure 1-11.

Typing in the fields

Now that you've created all the fields for your stack, you're ready to type some text into them. Figure 1-13 shows some examples of cards with text typed in the fields. For your own stack, type in information about your own records, tapes, or compact disks.

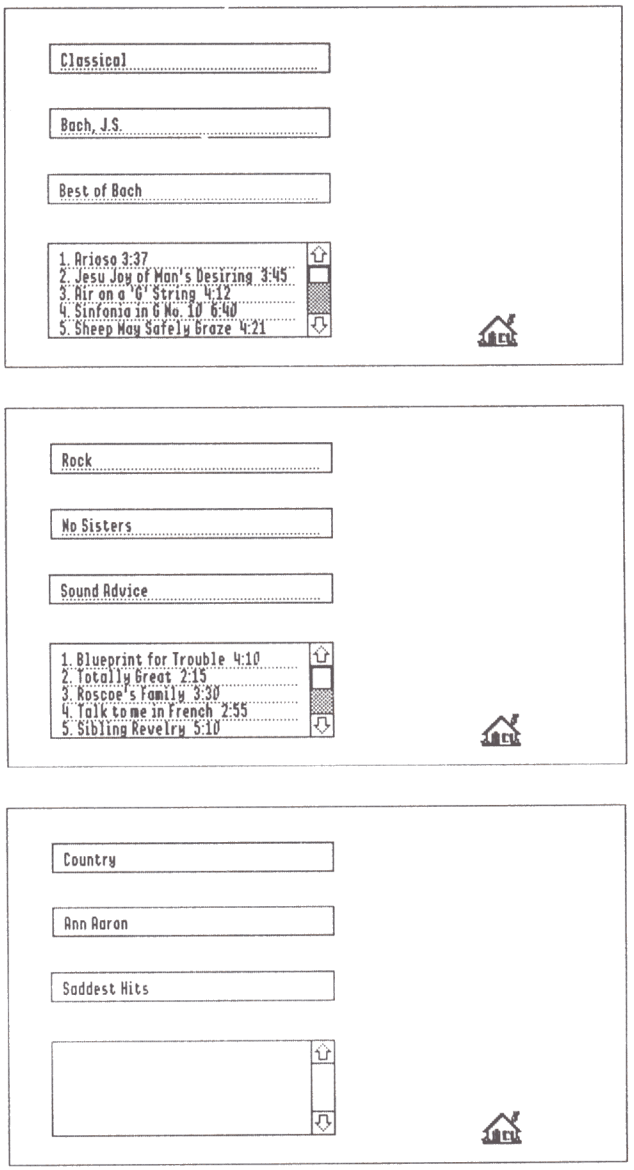


Figure 1-13 Sample record cards

To type text into the fields, follow these steps:

1. **Choose the Browse tool.**

   Choosing the Browse tool automatically takes you out of the background. In this case, it takes you to the first and only card in the stack.

2. **Click inside the Category field and type the category of music to which the recording belongs.**

   Type "Rock," "Jazz," "Classical," "Country," or any other category you want to use. Don't press Return.

3. **Press the Tab key.**

   The insertion point moves to the next field you created—in this case, the Artist field.

4. **Type the name of the artist featured on the recording.**

   Type the name as you would like it to be sorted alphabetically. For example, if you want your cards to be sorted by the artist's last name, you should enter "Johann Sebastian Bach" as "Bach, Johann Sebastian."

5. **Press the Tab key to move to the Title field and type the title of the recording.**

6. **If you'd like, press the Tab key to move to the Notes field and type the names of songs or any other information you want to keep about the recording.**

Adding more cards to the stack

Now add at least two more cards to the stack. Follow these steps:

1. **Select New Card from the Edit menu.**

   Or press ⌘-N. A new card appears on the screen.

   ❖ *If a field disappears when you create a new card:* You may have placed the field in the card layer rather than the background layer. To move a field from the card layer to the background, go back to the card where you last saw the field; then click the field with the Field tool to select it. Press ⌘-X to cut the field, press ⌘-B to go to the background, and press ⌘-V to paste the field in the background. (You'll also have to return to the card layer and retype the contents of the field.) ❖

2. **Type information about another recording into the fields on the new card.**

Repeat these steps to add as many cards as you want to your stack.

Buttons for traveling

Now that your stack contains several cards you'll create two buttons that allow you to move forward and backward between cards.

Creating Next and Previous buttons

To make the buttons, use the same steps you followed when you made the Home button:

1. **Press ⌘-B to work in the background.**

   The word *Background* appears in the menu bar.

2. **Choose the Button tool.**

3. **While holding down the ⌥ key, drag to create two new transparent buttons.**

   Make each new button about the same size as the Home button.

4. **Position the two new buttons side-by-side, near the Home button.**

   Drag each button by its center to move it.

Customizing the button on the right

Make the button on the right into a Next button:

1. **With the Button tool still selected, double-click the button on the right.**

   The Button Info dialog box appears.

2. **Name the button** `Next`.

3. **Click the Icon button to see the available icons.**

A right arrow icon

4. **Choose any icon that points to the right.**

   Click the icon you want.

5. **Click OK to close the list of icons.**

   You see the Button Info dialog box again.

You want the Next button (the button on the right) to take you to the next card in the stack. Put your instructions into the button's script now.

6. **Click the Script button to see the script editor.**

7. **Type the following script (pressing Return at the end of each line).**

```
on mouseUp
  visual effect scroll left
  go to next card
end mouseUp
```

8. **Click OK.**

   The script editor disappears. You should see the icon you chose on the button.

Now try out the Next button to see how it works.

9. **Choose the Browse tool and click the Next button.**

   Each time you click the button you go to the next card in the stack.

You can use the Next button to move forward through the cards in the Collection stack. Cards in a stack are arranged in a circle, so the first card is the next one after the last card.

Customizing the button on the left

Make the button on the left a Previous button:

1. **Choose the Button tool and double-click the button on the left.**

   The Button Info dialog box appears.

2. **Name the button** `Previous`

3. **Click the Icon button to see the available icons.**

4. **Choose an icon that points to the left.**

   It's best to use the same kind of arrow that you chose for the first button, but pointing the opposite way.

5. **Click OK to close the list of icons.**

   The Button Info dialog box appears again.

Now you'll write a script for the Previous button.

6. **Click Script to open the script editor and type the following script:**

```
on mouseUp
  visual effect scroll right
  go to previous card
end mouseUp
```

7. **Click OK.**

   The script editor disappears. You should see the icon you chose on the button.

8. **Try out the Previous button.**

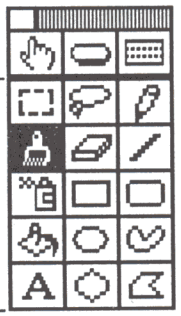
   Choose the Browse tool and click the Previous button. Each time you click the button you go to the previous card in the stack.

Moving to adjacent cards isn't the only possibility, of course; you can create other buttons to take you to any card of any stack you want by specifying in a script where you want to go.

Adding graphics

If you'd like to give your stack a distinctive look, you can take some time now to design graphics for the background. Well-designed graphics can make your stack easier to use, as well as more appealing visually.

You can create graphics by using the Paint tools, or you can copy clip art from the Art Ideas stack. You may also want to change the fonts in the background fields or the position of the fields and buttons. You'll be adding more buttons to the background later, so be sure to leave space for them.



The Paint tools

(For instructions on how to use paint tools, see the *HyperCard IIGS Reference.* For tips on how to design stacks, see *HyperCard Stack Design Guidelines,* published by Addison-Wesley.)

You can leave your stack as it is, copy one of the designs suggested in Figure 1-14, or have fun creating a design of your own. When you're satisfied with the way your stack looks, you can move on to Chapter 2.

Figure 1-14 Some possible designs

What you've done so far

In this chapter you've created a stack in which you can practice scripting in the rest of this book. You've created fields and added cards to the stack. You've also created some buttons and written their scripts.

Here's a list of the HyperTalk words you have learned:

Keywords

`on` — This word signals the beginning of a set of instructions. It must be followed by the name of a message, such as `mouseUp`.

`end` — This word signals the end of a set of instructions. It must be followed by the name of a message, such as `mouseUp`. All HyperTalk message handlers conclude with an end statement.

System Messages

`mouseUp` — When you click something, such as a button on the screen, the system sends `mouseUp` when the mouse button is released. (If the pointer is moved off the screen button before the mouse button is released, `mouseUp` is not sent.)

Commands

`go` — This command is used to move from one card to another, within a stack or between stacks.

`visual [effect]` — Causes the visual effects you specify. A `visual` command must eventually be followed by a `go` command.

Syntax summaries

The following reference section describes the basic structure of the two HyperTalk commands you've learned so far.

Go

The `go` command takes you to the specified card or stack. If you name a stack without specifying a card, you go to the first card in the stack. If you don't name a stack, you go to the specified card in the current stack. You can specify a visual effect to be used on opening the card by using the `visual` command before you use the `go` command.

Syntax

```
go [to] stack
go [to] background [of stack]
go [to] card [of background] [of stack]
```

The words *stack*, *background*, and *card* are placeholders. You would replace them with a word or phrase that describes a stack, a background, or a card.

Examples

```
go "Home"
go to first card
go to card 3 of background 2 of "Presentation"
```

Visual

The `visual` command lets you display visual effects while going from one image to another. The `visual` command must eventually be followed by a `go` command.

Syntax

`visual [effect]` *effectName* `[`*speed*`] [to` *image*`]`

EffectName is one of the following:

```
barn door close
barn door open
checkerboard
dissolve
fade
iris close
iris open
plain
scroll down
scroll left
scroll right
scroll up
venetian blinds
wipe down
wipe left
wipe right
wipe up
zoom close
zoom in
zoom open
zoom out
```

Speed is one of the following:

```
fast
slow[ly]
very fast
very slow[ly]
```

Image is one of the following:

```
black
card
color number
gray
inverse
white
```

Note: *number* is a number between 1 and 16, representing one of the colors in the color palette.

Examples

```
visual effect barn door open
visual dissolve slowly to white
```

Fields and Other Containers

In everyday life a container is something you can put things into. In HyperTalk a *container* is a place in the computer's memory where you can put a *value* such as a number or some text. You can put values into containers; you can also get values out of containers to use elsewhere as needed.

In this chapter you'll learn about three different kinds of containers: the Message box, fields, and variables. You'll also learn how you can use scripts to work with values in containers. You'll add some more features to your Collection stack, and you'll increase your vocabulary of HyperTalk commands.

If you took a break at the end of the previous chapter, start up HyperCard and go to the Collection stack before you read on.

Putting values into containers

You use the `put` command to put a value into a container. In this section, you'll practice using the `put` command to put values into the Message box. Later in this chapter you'll use the `put` command in scripts.

Putting values into the Message box

First open the Message box.

1. **Press ⌘-M to open the Message box.**

   Or choose Message from the Go menu.

   The vertical bar that marks the insertion point should be inside the Message box, ready for you to type. If for any reason you previously typed something into the box, the earlier entry will still be there. When you start typing, whatever you type will replace the old text.

Figure 2-1 The Message box

2. **Type** `put "Hello" into the message box` **and press Return.**

   The word `Hello` appears in the Message box.

The `put` command does what you would expect—it puts a value where you want it to go. In its most basic form, the syntax of the `put` command is:

`put` *expression* `[into` *container* `]`

The placeholder *expression* is a word or phrase that specifies a value. For example, the expression `2 + 2` specifies the value `4`.

The placeholder *container* can be a field, a variable, or the Message box. If you don't specify a container, the value is put into the Message box.

❖ *By the way:* After you press Return, you can start typing a new message into the Message box right away, even though you can't see the vertical bar. Whatever you type will replace the old text. ❖

3. **Type** `put "The time is" && the time` **and press Return.**

   Some text appears in the Message box. For example:

   ```
   The time is 12:00 PM
   ```

Including quotation marks around text characters tells HyperTalk to interpret literally whatever is inside. It treats what's inside the quotation marks as a string of text characters.

If you don't include quotation marks, HyperTalk evaluates the expression. That is, it replaces the expression with *the value of* the expression. For example, it replaces `the time` with the time currently set in your Apple IIGS.

The double ampersand (`&&`) joins two pieces of text together with a space in between. In this case, it joins the words `the time is` and the current system time. (If you wanted to join two pieces of text together without a space, you would use a single ampersand.)

4. **Close the Message box.**

   Click the close box in the upper-left corner, or press ⌘-M.

Fields as containers

Fields are objects. They can receive and send messages and can have scripts. Fields are also containers that can hold text and numbers.

Putting values into a field

In Chapter 1 you put text into fields by typing in the fields. In this section you'll write a script that puts text into a field.

First you need to create a background field named `Label`. This field will display the number of each card in your stack, so you can easily tell where you are in the stack.

Creating the Label field

To create the field, follow these steps:

1. **Press ⌘-B to work in the background.**

   The word *Background* appears in the menu bar.

2. **Choose the Field tool from the Tools menu.**

3. **Hold down the ⌘ key and drag to create a field one line high and about an inch long.**

   Move the field to any available space in the background by dragging its center.

4. **Double-click the field to see its Info box.**

   Or choose Field Info from the Objects menu.

5. **Name the field `Label` and set the field's characteristics.**

   Choose "rectangle" for the field's style. If you'd like, specify the field's font and colors.

6. **Click OK to close the Field Info dialog box.**

Writing a script for the background

You could label all cards in your stack by going to each one and typing its number into the Label field. But you can also write a script telling HyperCard to do it for you.

You'll write a script that puts a description of each card into the Label field. The field will contain a text string with two pieces: the word `Card` and the number of the current card.

To write the script, follow these steps:

1. **Choose Bkgnd Info from the Objects menu.**

   The Info dialog box for the background appears.

2. **Click the Script button.**

   The script editor for the background appears. The line at the top of the script editor identifies it as the background script.

3. **Type the following script:**

```
on openCard
  put "Card" && number of this card into background field "Label"
end openCard
```

   In English, the script says, "When a card opens, put the word *Card* and the number of the card into the background field named Label. That's all."

4. **Click OK.**

5. **Try out the script by choosing the Browse tool and clicking the Next button several times.**

   Each time you go to another card, you should see in the Label field the word `Card` followed by the number of the current card.

❖ *If something else happened:* Open the background script and check it for spelling errors. Also make sure that the Label field is in the background and that its name matches the name you used in your script. ❖

How the script works

Just as HyperCard sends the system message `mouseUp` every time you click the mouse button, it sends the message `openCard` every time you go to a different card in a stack. When you open any card in the Collection stack, the `openCard` message handler executes and puts the number of the current card into the Label field. Because the `openCard` handler is in the script for the background, it affects every card sharing this background—not just a particular card.

The advantage of using a script to label cards is that you won't have to worry about labeling the cards yourself, even if you add or delete cards. HyperCard will take care of it for you.

Script editor tips

As you begin to write longer scripts, you'll find it helpful to know the keyboard commands for cutting, copying, and pasting text in the script editor:

Key combination	Action
⌘-C	Copies the selected text to the Clipboard.
⌘-X	Cuts the selected text to the Clipboard.
⌘-V	Pastes the contents of the Clipboard at the insertion point.
Option-Return	Breaks long statements into more than one line (so that they will fit in the script editor dialog box). Pressing Option-Return inserts a "soft" Return character at the end of a line, symbolized by this character (¬), in your script.

The Appendix and the HyperTalk Quick Reference Card contain complete lists of keyboard shortcuts you can use while working in the script editor.

Creating a pop-up field

Now it's time to give yourself a well-deserved pat on the back; you'll create a field that displays the credits for your stack. You'll create a button that makes the field appear, and write a script that makes the field disappear when you click it.

Figure 2-2 shows an example of how the new field and button might look:

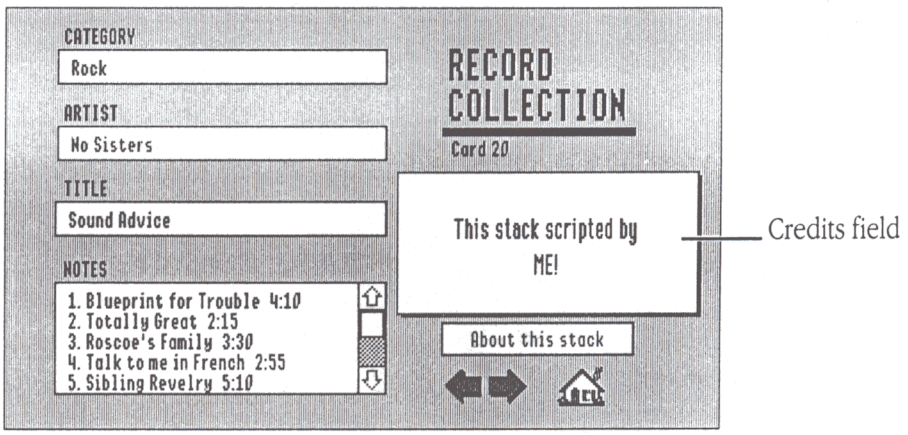


Figure 2-2 A sample Credits field

Making the Credits field

You can start from any card in the Collection stack. Create the field by following these steps:

1. **Press ⌘-B to work in the background.**

   The word *Background* appears in the menu bar.

2. **Create a new field.**

   Use any method you want. Make the field about two-inches long and an inch high. It's okay if the field covers other fields or buttons.

3. **Double-click the field to see its Info box.**

4. **Name the field** `Credits`

5. **Click Shared Text.**

   Background fields with shared text contain the same text on every card.

6. **Choose "shadow" from the pop-up menu to set the field's style.**

7. **If you want to, choose a font and colors for the field.**

8. **Click OK to close the Field Info dialog box.**

Now you'll type your message in the field. Because it's a background field with shared text, the message you type will appear on every card in the stack.

9. **Choose the Browse tool.**

10. **Click inside the Credits field to see the insertion point, then type the credits for your stack.**

    Type any message you want.

Making an About This Stack button

Next you'll create a button that makes the Credits field appear and disappear. Make sure you're still working in the background, and follow these steps:

1. **Choose the Button tool and create a new button about an inch wide and one-half inch high.**

   Drag the button to any available space in the background.

2. **Double-click the button to see its Info dialog box.**

3. **Name the button** `About This Stack` **and select Auto Hilite.**

4. **Choose "rectangle" for the button's style.**

5. **If you want to, choose a font and colors for the button.**

6. **Click Script to see the script editor and type the following script:**

```
on mouseUp
  show bg field "Credits"
end mouseUp
```

The letters `bg` are an abbreviation for the word `background`. The appendix includes a complete list of HyperTalk abbreviations.

In HyperTalk, you must use `card` or `cd` in front of `field` to specify a card field. If you leave out `card`, HyperCard assumes you mean a background field. Conversely, you must use `background`, `bkgnd`, or `bg` in front of `button` to specify a background button, otherwise HyperCard assumes you mean a card button. To avoid confusion, it's a good idea to always use `card` or `background` when referring to fields and buttons.

7. Click OK.

Writing a script for the Credits field

Next you'll write a script that makes the Credits field disappear when you click it.

1. **Choose the Field tool and double-click the Credits field to see its Info box.**

2. **Select Lock Text to lock the field.**

   When a field is locked, you can't type in the field. (You have to unlock the field if you want to type in it.)

   When you click a locked field, HyperCard sends `mouseUp` and other system messages to the field.

3. **Click Script.**

   The script editor for the Credits field appears.

4. **Type the following script:**

```
on mouseDown
  hide me
end mouseDown
```

   `MouseDown` is a system message that's sent as soon as the mouse button is pressed.

   The HyperTalk word `me` refers to the object in whose script the word appears. In this case, `me` refers to the Credits field.

5. **Click OK.**

Trying out the scripts

Now see how the About button and Credits field work.

1. **Choose the Browse tool and click the Credits field.**

   The field disappears.

2. **Click the About This Stack button.**

   The Credits field reappears.

❖ *If something else happened:* Make sure the script for the button is spelled correctly. Also make sure that the name of the Credits field is spelled correctly.

If the Credits field still won't appear when it is supposed to, open the Message box and type: `show last bg field`. Then check the spelling of the Credits field name in the Field Info box. ❖

3. **Click the Credits field to make it disappear.**

How the scripts work

When someone clicks the About This Stack button, the `mouseUp` handler in the button's script executes. The statement, `show bg field "Credits"` makes the Credits field visible.

When you press the mouse down when the cursor is in the Credits field, the field's `mouseDown` handler executes. The statement `hide me` makes the Credits field disappear.

To be able to send messages to a field by clicking it, the field must be locked. Otherwise, clicking the field merely places the insertion point inside the field.

You can use the `hide` command to hide a field, a button, a window (such as the Message box), the menu bar, the background picture (graphics in the background), or the card picture (graphics on the card that aren't in the background). The `show` command does just the opposite; you use `show` to reveal hidden elements.

Variables

A *variable* is a named container that can have any value you choose to put into it. In this section you'll create a button that uses a variable in its script.

Creating a Sort button

First you'll create a button that sorts all the cards in your stack alphabetically. When a user clicks the Sort button, a dialog box will appear asking the question "Sort by what?" and presenting three possible replies: Category, Title, or Artist. When the user chooses, the stack is sorted alphabetically according to the contents of the chosen field.

Follow these steps to create the Sort button:

1. **Press ⌘-B to work in the background.**
2. **Choose New Button from the Objects menu.**

   A new button appears. When you choose the New Button command, you automatically switch to the Button tool, and the new button is automatically selected.

   Drag the button to any available space in the background.
3. **Name the button** `Sort`.

   The Show Name and Auto Hilite options are already selected.
4. **If you want to, choose a font and colors for the button.**
5. **Click Script to see the script editor and type the following script:**

```
on mouseUp
  answer "Sort by what?" with "Category" or "Title" or "Artist"
  put it into reply
  sort by background field reply
end mouseUp
```

6. **Click OK.**

Now try the Sort button to see how it works:

7. **Choose the Browse tool and click the Sort button.**

   The following dialog box appears.

Figure 2-3 Dialog box displayed by the Sort button

8. **Click Artist.**

   HyperCard reorders the cards in the stack alphabetically according to the contents of the Artist field. Browse through your stack with the arrow buttons to see that the names of the artists are in alphabetical order.

If you would rather sort your cards by category or title, you can use the Sort button to do that, too.

How the script works

The `answer` command asks the user of your stack a question, and presents up to three possible replies in the form of buttons in a dialog box. In this case it asks the question `Sort by what?` and presents three possible replies: `Category`, `Title`, and `Artist`. (The `answer` command always highlights the last reply, so it's a good idea to list the safest or "most correct" answer last.)

When someone clicks a reply in the dialog box, that reply is put into a special HyperTalk variable named `it`. For example, when you click Artist, the value `Artist` is put into `it`.

The next statement in the script, `put it into reply`, puts the contents of `it` into another variable, which you've named `reply`. The names of variables can be almost anything you choose, but it's a good idea to name them something that describes what's contained in them.

If you clicked Artist, the variable `reply` would then contain the value `Artist`. Therefore, the statement

```
sort by background field reply
```

is evaluated as

```
sort by background field Artist
```

and HyperCard sorts all the cards in your stack according to the contents of the Artist field.

- *Local versus global:* The variables discussed here are *local variables;* that is, they and their values exist only within the handler in which they're created. HyperCard also has *global variables,* whose values are available to all handlers everywhere. You declare a variable as a global variable by using the `global` keyword. For information about global variables and the `global` keyword, see the HyperTalk IIGS Help stack or the *HyperCard IIGS Script Language Guide.* ❖

Putting comments in the handler

The following version of the handler for the Sort button shows comments that describe the action of the handler's statements. *Comments* are text lines typed into a script that are not part of the instructions. In HyperTalk, a comment must be preceded by a double hyphen (--); a double hyphen indicates to HyperCard that the text following is a comment and should be ignored.

You don't have to type these comments into your own script; they are shown for example only.

```
-- This button sorts the stack according to a field chosen by the user
on mouseUp
  answer "Sort by what?" with "Category" or "Title" or "Artist"
  -- The user's response is now in the variable it
  put it into reply   -- Response is now in reply
  sort by background field reply  -- Sorts the stack
end mouseUp
```

As you see, comments can be placed either at the beginning of a line or after a statement.

Although HyperCard ignores comments, other scripters generally appreciate them. Adding comments to your scripts is an excellent way to document what your scripts do. Comments not only help other scripters understand what you've done, but also help *you* remember when you look at old scripts long after you've written them.

What you've done in this chapter

You've learned how to use fields, variables, and the Message box as containers for text and numbers.

You've also added some features to your Collection stack: a handler that automatically numbers the cards in the stack, a pop-up field, and a Sort button.

System messages

`openCard`	A message sent by HyperCard when a card is opened.
`mouseDown`	A message sent by HyperCard when the mouse button is pressed down.

Commands

`answer`	Puts a box on the screen containing a question and up to three response buttons.
`hide`	Makes buttons, fields, windows, and pictures invisible.
`put`	Takes something and puts it somewhere. The word `put` must be followed by the name of the thing you want to put somewhere and the name of the place where you want to put it.
`show`	Causes hidden buttons, fields, windows, and pictures to become visible.
`sort`	Sorts all the cards in a stack.

Operators

`&`	(Ampersand) This symbol joins two pieces, or strings, of text together with no space between them.
`&&`	(Double ampersand) This combination symbol joins two pieces of text with a space between them.
¬	("Soft" return character—produced by pressing Option-Return at the end of a line) Breaks long statements into more than one line in the script editor window.
`--`	(Double hyphen) Indicates that what follows is a comment and should be ignored by HyperCard.

Script editor keyboard commands

⌘ - C	Copies the selected text to the Clipboard.
⌘ - X	Cuts the selected text to the Clipboard.
⌘ - V	Pastes the contents of the Clipboard at the insertion point.

Miscellaneous

`bg`	Abbreviation for `background`.
`me`	The object in whose script the word appears.
`it`	The name of a special HyperTalk variable. Certain commands, such as `answer`, put a value into `it`.

Syntax summaries

This section describes the syntax of the commands you used in this chapter.

Answer

The `answer` command displays a dialog box with a question and up to three buttons for the user to choose from, each representing a different reply. If you don't specify a reply, HyperCard displays a single OK button in the box.

HyperCard puts the label of whatever button gets clicked into a variable named `it`.

Syntax

```
answer question
answer question with reply
answer question with reply1 or reply2
answer question with reply1 or reply2 or reply3
```

Question can be any text you like—usually a question that invites the user to answer. *Reply1, reply2,* and *reply3* are the labels for buttons representing the choices. The size limit for a reply is about 11 characters, depending on the width of the characters.

Example

```
answer "Pick a color:" with "Red" or "Blue" or "Green"
```

Hide

The `hide` command makes invisible a button, field, picture, or window. (See also "Show," later in this section.)

Syntax

```
hide button
hide field

hide card picture
hide picture of card
hide background picture
hide picture of background

hide menuBar
hide message box
hide tool window
hide pattern window
hide go window
hide card window
```

Button, *field*, *card*, and *background* are expressions identifying objects (for example, `background button 1`.)

`Card picture` consists of all elements on the card level created with a Paint tool. `Background picture` consists of all graphic elements on the background level.

Examples

```
hide background field "Credits"
hide picture of card 1
hide message box
```

Put

The `put` command places the value of an expression into a container.

Syntax

```
put expression
put expression into [chunk of] container
put expression after [chunk of] container
put expression before [chunk of] container
```

Expression can be any description of a text string or a number.

Chunk consists of the words `character`, `word`, `item`, or `line` preceded by an ordinal or followed by a number, range of numbers, or another chunk expression.

Container is an expression that identifies a field, a variable, the Message box, or the selection. If you don't specify a container, *container* is the Message box.

The preposition `into` causes anything already in the destination container to be replaced by the expression. The preposition `before` places the expression at the beginning of what's in the container (if anything), and `after` puts the expression at the end.

Examples

```
put 256
put 256 into Total
put 256 into line 1 of card field 3
put 256 before word 4 of line 1 of card field 3
put 256 after word 3 of line 1 of card field 3
```

Show

The `show` command makes visible a button, field, picture, or window.

Syntax

```
show button [at point]
show field [at point]

show card picture
show picture of card
show background picture
show picture of background

show menuBar
show message box
show tool window [at point]
show pattern window [at point]
show go window [at point]
show card window
```

See "Hide," earlier in this section, for a description of the placeholders.

Point consists of the horizontal and vertical coordinates of a point on the screen, separated by a comma. This optional phrase, `at` *point,* lets you place a button or field wherever you want. If you don't include it, the window or object appears wherever it was before it was hidden.

Examples

```
show background field "Credits"
show background field "Credits" at 10,20
show Message box
show picture of card 1
```

Sort

The `sort` command allows you to reorder all the cards in a stack from within a script.

Syntax

```
sort [sortDirection] [sortStyle ] by expression
```

SortDirection is `ascending` or `descending`. If you don't specify a direction, the direction is `ascending`. *SortStyle* is `text`, `numeric`, `dateTime`, or `international`. If you don't specify a style, the style is `text`.

Expression is any expression. The `sort` command orders all the cards in a stack according to the value of *expression*, which is evaluated individually for each card in the stack.

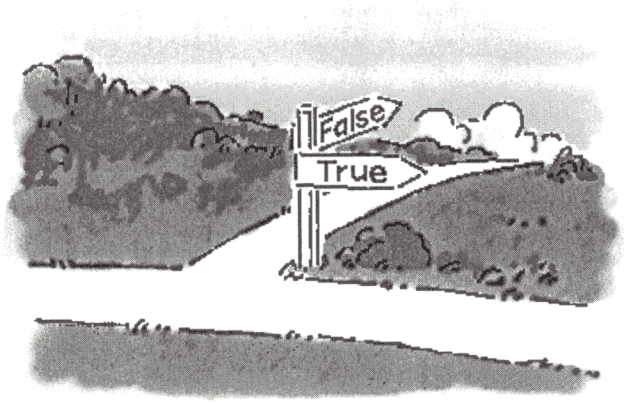
Examples

```
sort by card field 1
sort descending numeric by card field 1
```

Scripts That Make Decisions

In this chapter you'll learn how to control which statements are executed in a message handler, as well as the order in which they are executed. You'll create some buttons for your Collection stack and write scripts that use the HyperTalk words `if` and `repeat`. By using `if` and `repeat` you can write scripts that are more responsive and efficient.

If you took a break at the end of Chapter 2, start up HyperCard and go to the Collection stack before you go on.



If structures

In English, we use the word *if* to talk about an action that depends on a certain condition. For example, we might say "If I am hungry, then I'll eat dinner." If the condition "I am hungry" is true, then the action "I'll eat dinner" will be performed.

In HyperTalk, the word `if` is used in much the same way. `If` and `then` are HyperTalk keywords that work together in arrangements called `if` structures. `If` structures are used to test conditions and specify different actions, depending on the results.

`If` structures come in a few varieties; the most basic version is:

```
if condition then
  action
end if
```

The placeholder *condition* stands for the thing being tested. It's an expression that HyperCard can evaluate as either true or false. The placeholder *action* stands for the instruction lines that follow if the condition is true. The last line, `end if`, signals the end of the instructions.

Here's how the English example would look if it could be written in HyperTalk:

```
if I am hungry then
  I'll eat dinner
end if
```

(In English, the word *then* is often implied; in HyperTalk you must always include it.)

Creating a Quit button

In this section you'll create a button that uses an `if` structure in its script. When you click the button, a dialog box will appear asking you whether you want to quit HyperCard. The dialog box will display two options: OK and Cancel. If you click OK, you quit HyperCard. If you click Cancel, the dialog box disappears and nothing else happens.

Follow these steps to make the Quit button:

1. **Press ⌘-B to work in the background.**
2. **Select New Button from the Objects menu, and move the new button to any available space in the background.**
3. **Name the button `Quit` and select Auto Hilite.**
4. **If you want to, choose a font and colors for the button.**
5. **Click Script to see the script editor, and type the following script:**

```
on mouseUp
  answer "Quit HyperCard?" with "OK" or "Cancel"
  if it is "OK" then
    doMenu "Quit HyperCard"
  end if
end mouseUp
```

   Notice that the contents of the `if` structure are automatically indented. The statements beginning with `if` and `end if` should always line up. If they don't line up, you may have misspelled a word or left out something.

6. **Click OK.**

Trying out the Quit button

Now try the Quit button to see how it works:

1. **Choose the Browse tool and click the Quit button.**

   This dialog box appears:

Figure 3-1 Dialog box displayed by the Quit button

2. **Click Cancel.**

   The text string `Cancel` is put into the variable `it`.

   Because the condition `it is "OK"` is not true, HyperCard doesn't execute the action specified within the `if` structure. The dialog box disappears, and nothing else happens.

3. **Click the Quit button again.**

   The dialog box appears again.

4. **Click OK.**

   The text string `OK` is put into the variable `it`.

   The condition `it is "OK"` is true, so HyperCard executes the statement within the `if` structure—and you quit HyperCard.

The `doMenu` command lets you execute any of HyperCard's menu commands from within a script. In this case it executes the Quit HyperCard command. (Be sure to put quotes around the name of the menu command.)

To continue in this chapter you'll need to start up HyperCard again and return to the Collection stack.

Adding an additional action

An `if` structure can specify not only an action to be taken when a condition is true, but also an alternative action to be taken when the condition is false. `If` structures of this type have the general form

```
if condition then
  action
else
  anotherAction
end if
```

In this version the placeholder *anotherAction* stands for an alternative instruction line or lines. An example in English might be something like this: "If I am hungry, then I'll eat dinner; otherwise [else] I'll go to the movies." Here's how it would look if it could be written in HyperTalk:

```
if I am hungry then
  I'll eat dinner
else
  I'll go to the movies
end if
```

Modifying the Quit button

In this section you'll add two statements to the script for the Quit button. You'll add an `else` statement and a statement that specifies an alternative action for when a user clicks Cancel.

1. **Open the script for the Quit button.**
2. **Click before `end if` to position the insertion point at the beginning of the next-to-last line.**
3. **Type the following lines (press Return after each line):**

```
else
answer "Glad you reconsidered." with "No problem!"
```

The lines will automatically indent. When you press Return for the final time, `end mouseUp` should line up at the leftmost margin.

Here's the completed script (the two new statements are shown in boldface type):

```
on mouseUp
  answer "Quit HyperCard?" with "OK" or "Cancel"
  if it is "OK" then
    doMenu "Quit HyperCard"
  else
    answer "Glad you reconsidered." with "No problem!"
  end if
end mouseUp
```

4. **Click OK.**

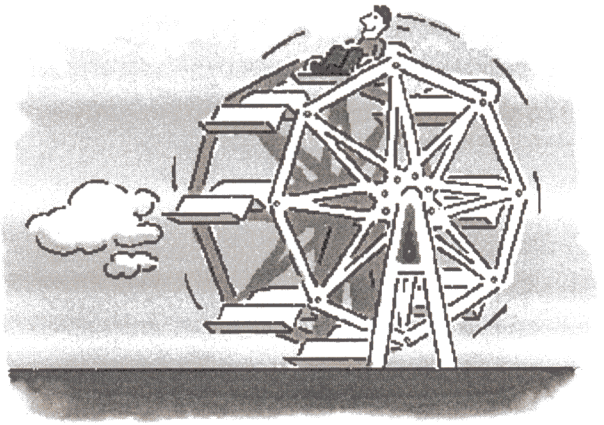
5. **Try the Quit button.**

   When you click the Quit button with the Browse tool, you get the alert box, just as before. Clicking Cancel (the choice represented by `else`) makes another alert box appear with a friendly comment and reply—just for fun. (No further instructions are specified for the "No problem!" button.)

Decisions within decisions

It's possible to specify more than two separate actions by nesting `if` structures inside other `if` structures. Here's how an English example might look if it could be written in HyperTalk:

```
if I am hungry then
  if there's some food in the house then
    I'll cook
  else
    I'll order a pizza
else
  if there's a good movie at the theater then
    I'll go to the movies
  else
    I'll watch television
end if
```



Repeat structures

`Repeat` is a keyword that tells HyperCard to perform a command or series of commands over and over again. Suppose you wanted to create a sequence in which your stack moved through a series of six cards, with a one-second pause between cards. You could write the instructions this way:

```
go to next card
wait 1 second
go to next card
wait 1 second
go to next card
wait 1 second
go to next card
wait 1 second
go to next card
wait 1 second
go to next card
wait 1 second
```

Or you could write a `repeat` structure, like this:

```
repeat 6 times
  go to next card
  wait 1 second
end repeat
```

`Repeat` structures cause HyperCard to go around in a "loop," repeating steps until a particular endpoint occurs. Being able to use `repeat` structures saves you from having to retype or duplicate statements over and over again.

`Repeat` structures come in several varieties. The first line of a `repeat` structure can have any of these general forms:

```
repeat [for] number [times]
repeat with variable = startingValue to endingValue
repeat with variable = startingValue down to endingValue
repeat until condition
repeat while condition
repeat [forever]
```

The statement or list of statements that you want to have repeated can follow any of these first lines. At the end, you must include `end repeat` to indicate the end of the list. (For more information about variations of the `repeat` structure, see the end of this chapter.)

Creating an Index button

In this section you'll create a button that uses a repeat structure to generate an index for your stack. Each index entry will include the name of the recording artist and the title of the record. (Figure 3-2 shows what the index might look like.)

Later in this chapter you'll write a script that lets you go to a card by simply clicking an index entry.

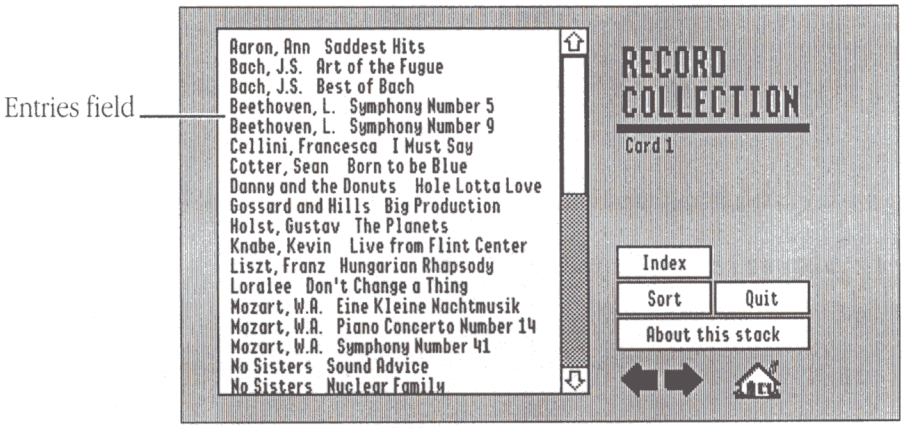


Figure 3-2 A sample index card

Creating the Index card

First you need to add a new card to your stack. Make sure you're looking at the Collection stack, and follow these steps:

1. **Choose New Card from the Edit menu.**

   Or press ⌘-N. A new card appears.

2. **Choose Card Info from the Objects menu.**

   The Card Info dialog box appears.

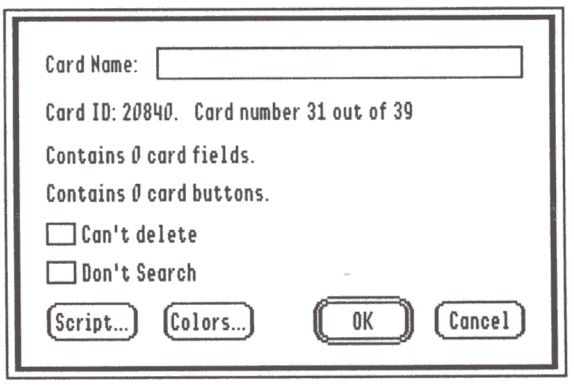


Figure 3-3 Card Info dialog box

3. **Name the card** `Index`

4. **Click Don't Search to select it.**

   When the Don't Search option is selected, HyperCard will not search this card when you use the `find` command.

5. **Click OK.**

Creating the Entries field

Now you'll add a field to the Index card that will display the list of index entries. Make sure you are *not* in the background, and follow these steps:

1. **Choose the Field tool.**

2. **While holding down the ⌘ key, drag to create a large field (like the scrolling field shown in Figure 3-2).**

   Make the field large enough to cover the Category, Artist, Title, and Notes fields.

3. **Double-click the field to see its Info box.**

   Notice that the field is a card field (not a background field). The field appears only on this card.

4. **Name the field** `Entries`

5. **Select "scrolling" for the field's style.**

6. **If you want to, choose a font and colors for the field.**

   Use a small font, such as Shaston 8.

7. **Click OK to close the Field Info dialog box.**

Creating the Index button

Now you'll create the button that automatically generates the index.

1. **Press ⌘-B to work in the background.**

   The Index button will appear on every card in your stack, so make sure you see the word *Background* in the menu bar.

2. **Choose New Button from the Objects menu and move the new button to any available space in the background.**

3. **Name the button** `Index`

4. **If you want to, choose a font and colors for the button.**

Writing a script to go through all the cards

You will write the script for the Index button in several stages. First you'll use a repeat structure to go through all the cards in the Collection stack.

Follow these steps:

1. **Click Script in the Button Info dialog box and type the following script:**

```
on mouseUp
  repeat with count = 1 to the number of cards
    go to card count
  end repeat
end mouseUp
```

   The contents of a `repeat` structure are automatically indented. The `repeat` and `end repeat` statements should always line up.

2. Click OK.

3. **Try out the Index button.**

   HyperCard goes to the first card in the stack, then to the second, then to the third, and so on—until it reaches the last card in the stack.

How the script works so far

The handler uses a `repeat` structure to go through all the cards in the stack. The `repeat` statement uses the `repeat with` form, which has this syntax:

`repeat with` *variable* `=` *startingNumber* `to` *endingNumber*

In this case you've named the variable `count`. The starting number is 1 and the ending number is the number of cards in the stack.

The first time through the loop, `count` equals 1. Therefore HyperCard evaluates the statement

```
go to card count
```

as

```
go to card 1
```

The next time through the loop, `count` equals 2, so HyperCard goes to card 2 of the stack. The process continues and HyperCard goes to card 3, and 4, and so on—until `count` equals the number of cards in your stack. At that point, the loop finishes and the handler moves on to the next statement, which is `end mouseUp`.

Adding statements that compile the index

Now you will add statements to the script that put information into the index. As you go to each card, you'll put the contents of the Artist field and Title field into a variable. Each time the handler goes to another card, it will put the entry for that card *after* what is already in the variable. In this way the variable will accumulate all of the index entries. Finally the handler will put the contents of the variable into the Entries field.

Follow these steps:

1. **Open the script for the Index button.**

2. **Type the statements that are shown in bold in the following script:**

   You'll need to break the long `put` command into two lines by pressing Option-Return after `"Title"`

```
on mouseUp
  put empty into list
  repeat with count = 1 to the number of cards
    go to card count
   put bg field "Artist" & "    " & bg field "Title" ¬
   & Return after list
  end repeat
  go to card "Index"
  put list into card field "Entries"
end mouseUp
```

   Make sure everything is spelled correctly and that the statements are in the right order.

3. **Click OK.**

4. **Try the Index button.**

   You go to the first card in the stack, then the second, and so on until you reach the end of the stack. Then you go back to the Index card, where a list of recordings appears inside the Entries field.

❖ *If something else happened:* Check your spelling and try the script again. Make sure that the names of the Index card and Entries field are spelled correctly and match the names you used in your script. ❖

Each index entry consists of the contents of the Artist field, followed by a few spaces and the contents of the Title field.

Because you put a Return character at the end of each entry, all the entries begin on new lines. Some entries may take up more than one line. Entries take up more than one line if they are long and "wrap" onto a second line or if you typed Return characters when you entered text into the Artist and Title fields.

Some finishing touches

The index includes an entry for every card in your stack—including the Index card itself. Because the Index card has nothing in its Artist and Title fields, the entry for the Index card is a blank line. If you have any blank cards in your Collection stack, they also appear as blank lines in the index.

Now you'll add an `if` structure to the script that checks each card to make sure that something has been typed into the Artist field. If the Artist field is blank, the index won't include that card.

You'll also add a `lock screen` command at the beginning of the handler to freeze the screen while HyperCard goes from card to card "behind the scenes."

Follow these steps:

1. **Open the script for the Index button.**

2. **Type the statements that are shown in bold in the following script:**

```
on mouseUp
  lock screen
  put empty into list
  repeat with count = 1 to the number of cards
    go to card count
    if bg field "Artist" is not empty then
      put bg field "Artist" & "    " & bg field "Title" ¬
      & Return after list
    end if
  end repeat
  go to card "Index"
  put list into card field "Entries"
  unlock screen
end mouseUp
```

   The `put` statement should automatically indent and the `if` statement should line up with the `end if` statement.

3. Click OK.

4. **Try the Index button.**

   After a pause, you go to the Index card where the list of recordings is displayed. The list should contain only cards for which you typed something into the Artist field.

As you probably guessed, the `lock screen` command locks the screen. When you lock the screen, the screen image won't change until either an `unlock screen` command is executed or all handlers have finished executing. Because HyperCard doesn't have to redraw the screen every time the script goes to another card in your stack, it can compile the Index more quickly.

Creating a keyboard command

Every time you click the Index button, HyperCard recompiles the index for your stack. This process can be time-consuming, especially if your stack contains many cards. Now you'll modify the Index button's script so that it recompiles the index only if you hold down the Option key when you click the button. Otherwise you go directly to the Index card without compiling the index.

Follow these steps:

1. **Open the script for the Index button, and type the statements shown in bold in the following script:**

```
on mouseUp
  if the optionKey is down then
    lock screen
    put empty into list
    repeat with count = 1 to the number of cards
      go to card count
      if bg field "Artist" is not empty then
        put bg field "Artist" & "   " & bg field "Title" ¬
        & Return after list
      end if
    end repeat
    go to card "Index"
    put list into card field "Entries"
    unlock screen
  else
    go to card "Index"
  end if
end mouseUp
```

2. Click OK.

3. Try out the Index button.

When you click the Index button, HyperCard tests the condition `the optionKey is down`. If the option key is pressed, HyperCard compiles the index. Otherwise you go directly to the Index card.

Properties and functions

In this section you'll write a script that lets you go to a card by simply clicking its index entry. To understand how the script works, you'll first need to understand two important HyperTalk concepts: properties and functions. You'll practice using properties and functions in the Message box, and then you'll write another script.

Setting properties

The *properties* of a HyperCard object are characteristics of the object that you can set. For example, every button has a `name` property that specifies the name of the button, a `style` property that specifies the style of the button, and so on.

Usually you set properties by choosing options in the object's Info dialog box or on the User Preferences card of the Home stack. But you can also set properties by using HyperTalk's `set` command. Follow these steps to see how:

1. **Open the Message box.**
2. **Type** `set the hilite of bg button "Home" to true` **and press Return.**

   The Home button becomes highlighted. (You might need to move the Message box to see it.)

   The `hilite` is a property of buttons, which has a value of `true` when the button is highlighted and `false` when it's not.
3. **Type** `set the hilite of bg button "Home" to false` **and press Return.**

   The Home button returns to normal.

The syntax of the `set` command is:

`set [the]` *property* `[of` *object* `] to` *expression*

The placeholder *property* is a HyperCard property. What *expression* may be depends on the property.

A complete list of properties appears in the Appendix. You can find detailed information about properties in the HyperTalk Help stack or the *HyperCard IIGS Script Language Guide.*

Using functions

HyperTalk contains both commands and functions. A command (such as `go` or `put`) carries out an action, whereas a *function* returns a value of some sort. For example, `the time` is a HyperCard function that returns the current time set in your Apple IIGS.

To practice using some other functions, make sure the Message box is still open and follow these steps:

1. **Type `put the date` and press Return.**

   The date set in your Apple IIGS appears in the Message box.

Next you'll use the `clickLoc` function (short for "click location"), which returns a description of the point where you last clicked on the screen.

2. **Click anywhere on the screen, then type `put the clickLoc` and press Return.**

   Two numbers separated by a comma appear in the Message box.

These numbers represent the horizontal and vertical position of the point where you last clicked on the screen. The first number tells you how far the point is from the left edge of the card, and the second number tells you how far it is from the top of the card. The distances are measured in pixels. (A *pixel* is the smallest dot you can draw on the screen.)

For example, if you clicked 20 pixels from the left edge of the card window and 35 pixels from the top of the card, `the clickLoc` would have a value of `20,35`. The value of the upper-left corner of the screen is `0,0`.

3. **Type** `set the location of bg button "Home" to the clickLoc` **and press Return.**

   The Home button instantly moves to where you last clicked the mouse.

   The `location` is a property of buttons (and fields), which describes the location of the center of the button. In English, the command says: "Move the Home button so that its center is located where the mouse was last clicked."

4. **Close the Message box and move the Home button back to where you want it to appear.**

The Appendix contains a complete list of HyperTalk functions. The HyperTalk Help stack and the *HyperCard IIGS Script Language Guide* describe how to use each function, as well as how to write your own functions.

Going from an index entry to a card

In this section you'll write a script that lets you go to a card by clicking its index entry. This script is a little trickier than the others you've written. You'll write the script in stages to get a better idea of how it works.

Go to the Index card (if you're not already there) and follow these steps:

1. **Select the Field tool.**
2. **Double-click the Entries field to see its Info dialog box.**
3. **Click the Lock Text and Don't Search options to select them.**

   Selecting the Lock Text option locks the field so you can't type in it. When a field is locked, clicking the field with the Browse tool doesn't place the insertion point in the field; instead it sends a `mouseUp` message to the field.

   Selecting Don't Search tells HyperCard not to search this field when you execute a `find` command. If you are searching for a particular record, you would want to find the card for that record, not its index entry.

4. **Click the Script button and type the following script for the Entries field:**

```
on mouseUp
  set the lockText of me to false
  click at the clickLoc
  put the selectedLine
  set the lockText of me to true
end mouseUp
```

   When you're finished, press Enter to close the script editor.

5. **Try out the script by clicking any index entry with the Browse tool.**

   A description of the line you clicked appears in the Message box. For example, if you clicked the second line, the message would say:

   ```
   line 2 of card field 1
   ```

❖ *If something else happened* Check your spelling and try the script again. Also make sure that the Entries field is locked. ❖

How the script works so far

You haven't finished the script, but here's how it works so far.

Because the Entries field is locked, clicking the field does not set the insertion point inside the field. Instead it sends a `mouseUp` message to the field, causing the `mouseUp` handler in the field's script to execute.

The statement `set the lockText of me to false` temporarily unlocks the Entries field. (`LockText` is a property of fields, which has a value of `true` when the field is locked and `false` when it's unlocked.)

The next statement `click at the clickLoc` tells HyperCard to click at the point where you last clicked the mouse. This temporarily places the text cursor in the line that you clicked.

The statement `put the selectedLine` puts into the Message box a description of the line you clicked. (`The selectedLine` is a function that returns a description of the line in which the text cursor is placed.)

Finally, the statement `set the lockText of me to true` relocks the Entries field so that it can respond to a `mouseUp` message the next time you click it.

Finishing the script

The script now knows which line you clicked. But what does that line contain?

1. **Open the script for the Entries field and type the boldface words in the following script:**

```
on mouseUp
  set the lockText of me to false
  click at the clickLoc
  put the value of the selectedLine
  set the lockText of me to true
end mouseUp
```

   When you're finished, press Enter.

2. **Click an index entry with the Browse tool.**

   The contents of the line you clicked should appear in the Message box.

`The value of` is a function that returns the value of any expression. In this case, it returns a text string consisting of the contents of the line you clicked—that is, the index entry for that line.

Now that your handler knows which recording you're interested in, the next step is to go find the right card. You'll use HyperCard's `find` command to do that.

3. **Open the script for the Entries field, select the word `put`, and change it to `find`**

The completed script should look like this:

```
on mouseUp
  set the lockText of me to false
  click at the clickLoc
  find the value of the selectedLine
  set the lockText of me to true
end mouseUp
```

When you're finished, press Enter.

4. **Click an index entry with the Browse tool.**

   If you went to the correct card, congratulations! You're doing great.

The `find` command tells HyperCard to search through the fields in the stack for the index entry that the user clicked. (Because you selected the Don't Search option for the Entries field, it won't search the Entries field.)

❖ *If something else happened:* Check your spelling and try the script again. Make sure that the Lock Text and Don't Search options are selected in the Entries field's Info dialog box. ❖

What you've done in this chapter

In this chapter you learned how to use `if` structures and `repeat` structures, how to set properties, and how to use functions. You added a Quit button to your stack, and you wrote a script that compiles an index for your stack, and a script that lets you go to a card by clicking an index entry.

Here are the new HyperTalk words you learned.

Keywords

`if`	Begins an `if` structure.
`then`	Used in `if` structures to mark the beginning of a list of actions to be carried out.
`else`	Used when you want to specify an alternative action in an `if` structure.
`repeat`	Begins a `repeat` structure.

Commands

`click`	Causes the same actions that happen when you click a specified point on the screen.
`doMenu`	Lets you execute a menu command from within a script.
`find`	Searches all the cards in a stack for a text string.
`lock screen`	Prevents HyperCard from updating the screen until an `unlock screen` command is encountered or until all handlers have finished executing.
`set`	Changes the value of HyperCard properties.

Properties

`hilite`	Determines whether a button is highlighted.
`location`	Determines the location of the center of a button or field.
`lockText`	Determines whether a field is locked.

Functions

`clickLoc`	Returns the location where the user last clicked.
`date`	Returns the current date set in your Apple IIGS.
`selectedLine`	Returns a description of the line in a field where the text cursor has been placed.
`value`	Returns the value of an expression.

Syntax summaries

This section describes the syntax of the commands you used in this chapter, along with the syntax of the `if` and `repeat` keywords.

Click

The `click` command causes the same actions that happen when you click the mouse at a specified point.

Syntax

```
click at point
click at point with key1
click at point with key1, key2
click at point with key1, key2, key3
```

Point is a description of a point on the screen: two integers separated by a comma, representing the horizontal and vertical distance from the top-left corner of the screen.

Key1, *key2*, and *key3* can be any of the following key names: `shiftKey`, `optionKey`, or `commandKey`.

Examples

```
click at 50,60
click at the clickLoc with optionKey
```

DoMenu

The `doMenu` command lets you execute any of HyperCard's menu commands from within a script.

Syntax

`doMenu` *menuItem*

MenuItem can be the name of a menu command or the name of a desk accessory in the Apple menu. Include three typed periods if that's how a command is shown in the menu; for instance, `"Card info..."`. You must type the three periods; don't use the ellipsis character (Option-semicolon).

Examples

```
doMenu "New Card"
doMenu "Print Stack..."
```

Find

The `find` command searches for a text string in all the card and background fields (visible or not) of the current stack. You can limit the search to a specific background field by specifying a field.

Syntax

`find` *text* `[in` *backgroundField* `]`

Text can be any text string. *BackgroundField* is an expression that identifies a background field.

When HyperCard finds a word beginning with *text*, it stops searching and places a rectangle around the word.

Examples

```
find "Moz"
find "Mozart" in background field "Artist"
```

If

The `if` keyword begins an `if` structure. An `if` structure tests a condition, then executes one or more statements if the condition is true. If the condition is false, statements following the optional `else` keyword are executed.

Syntax

```
if condition then statement

if condition then statement else statement

if condition then
  statements
else
  statements
end if

if condition then
  statements
end if
```

Condition is an expression that evaluates to either true or false. *Statement* is a single HyperTalk statement. *Statements* can be one or more statements.

Example

```
if Response = "Correct" then
  answer "That's correct!"
else
  answer "Sorry, try again."
end if
```

DoMenu

The `doMenu` command lets you execute any of HyperCard's menu commands from within a script.

Syntax

`doMenu` *menuItem*

MenuItem can be the name of a menu command or the name of a desk accessory in the Apple menu. Include three typed periods if that's how a command is shown in the menu; for instance, `"Card info..."`. You must type the three periods; don't use the ellipsis character (Option-semicolon).

Examples

```
doMenu "New Card"
doMenu "Print Stack..."
```

Find

The `find` command searches for a text string in all the card and background fields (visible or not) of the current stack. You can limit the search to a specific background field by specifying a field.

Syntax

`find` *text* `[in` *backgroundField* `]`

Text can be any text string. *BackgroundField* is an expression that identifies a background field.

When HyperCard finds a word beginning with *text*, it stops searching and places a rectangle around the word.

Examples

```
find "Moz"
find "Mozart" in background field "Artist"
```

If

The `if` keyword begins an `if` structure. An `if` structure tests a condition, then executes one or more statements if the condition is true. If the condition is false, statements following the optional `else` keyword are executed.

Syntax

```
if condition then statement

if condition then statement else statement

if condition then
  statements
else
  statements
end if

if condition then
  statements
end if
```

Condition is an expression that evaluates to either true or false. *Statement* is a single HyperTalk statement. *Statements* can be one or more statements.

Example

```
if Response = "Correct" then
  answer "That's correct!"
else
  answer "Sorry, try again."
end if
```

Lock screen and unlock screen

The `lock screen` command prevents HyperCard from updating the screen until HyperCard encounters an `unlock screen` command or all handlers have finished executing.

Syntax

```
lock screen
unlock screen
unlock screen with visualEffect
```

visualEffect is any of the forms of the `visual` command.

Examples

```
lock screen
unlock screen with visual effect zoom out slowly
```

Repeat

A `repeat` statement identifies the first line of a `repeat` structure.

Syntax

```
repeat [forever]
```

This loop repeats forever, or until an `exit` statement is encountered.

```
repeat [for] number [times]
```

Number specifies how many times the loop executes.

```
repeat until condition
repeat while condition
```

Condition is an expression that evaluates to true or false. The `repeat until` loop repeats as long as *condition* is false. The `repeat while` loop repeats as long as *condition* is true.

```
repeat with variable = start to finish
repeat with variable = start down to finish
```

Variable is a variable name, and *start* and *finish* are integers. At the beginning of the loop, *variable* equals the value of *start*. With each pass through the loop, the value of *variable* increases by 1. (In the `down to` form, the value of *variable* decreases by 1 with each pass through the loop.) Execution ends when the value of *variable* equals the value of *finish*.

Example

```
repeat for 100 times
  add 1 to Message Box
end repeat
```

Set

The `set` command allows you to change various HyperCard properties from within a script.

Syntax

`set [the]` *property* `[of` *object*`] to` *expression*

Property stands for a changeable characteristic of the HyperCard environment or of an object.

Object is an identifier for an object, such as its number, ID, or name.

What *expression* is depends on the property. Some properties, such as `hilite`, have the values `true` or `false`. Others, such as `userLevel`, have numeric values. Still others—such as the `name` property of a button—have as their value a string of characters.

Examples

```
set the userLevel to 5
set the hilite of card button 1 to true
set the name of card field 1 to "Horse"
```

Wait

The `wait` command causes HyperCard to pause for a specified period of time, or until a specified condition is true.

Syntax

```
wait [for] number
wait [for] number seconds
wait until condition
wait while condition
```

Number specifies how long you want HyperCard to pause. If you want seconds, you must add `second`, `seconds`, or the abbreviation `sec` or `secs`; otherwise, HyperCard uses ticks, which have a value of 1/60 second. No other measurements (such as minutes) can be used.

Condition is an expression that evaluates to `true` or `false`. The `wait until` form pauses until *condition* is `true`. The `wait while` form pauses until *condition* is `false`.

Examples

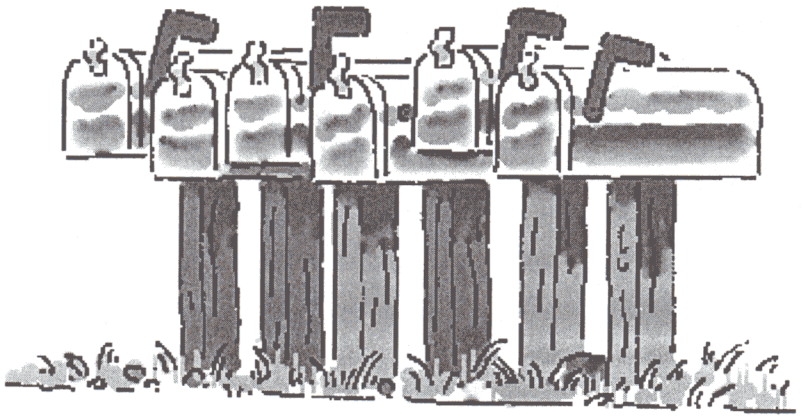
```
wait 2 seconds
wait 30 -- waits 30 ticks (or one-half second)
wait until the mouse is down
wait while the mouse is up
```

Handling Messages

As you know, a message handler is a group of HyperTalk statements beginning with an `on` statement, such as `on mouseUp` and ending with an `end` statement. All the scripts you've written so far contain only one message handler, but scripts often contain more than one handler.

In this chapter you'll write new handlers and explore the way messages travel between objects. You will add another feature to your Collection stack—a button that plays a sound when you click it.

If you took a break at the end of Chapter 3, start up HyperCard and go to your Collection stack before you go on.



How messages travel

HyperCard can send system messages to a button, a field, or the current card. For example, if you click a button, HyperCard sends a `mouseUp` message to the button. If you click a locked field, HyperCard sends `mouseUp` to the field. If you click anywhere else on the card, HyperCard sends `mouseUp` directly to the card.

A message can travel from one HyperCard object to another—until it is handled. For example, when someone clicks a button, a `mouseUp` message is sent to the button. If that button's script doesn't have a handler for `mouseUp`, the message is passed to the current card. If the current card's script doesn't have a `mouseUp` handler, the message is passed to the background. As long as the message does not encounter a handler, it continues traveling—to the stack, then to the Home stack, and finally to HyperCard itself.

This sequence is called the *message-passing order;* it's illustrated in Figure 4-1.

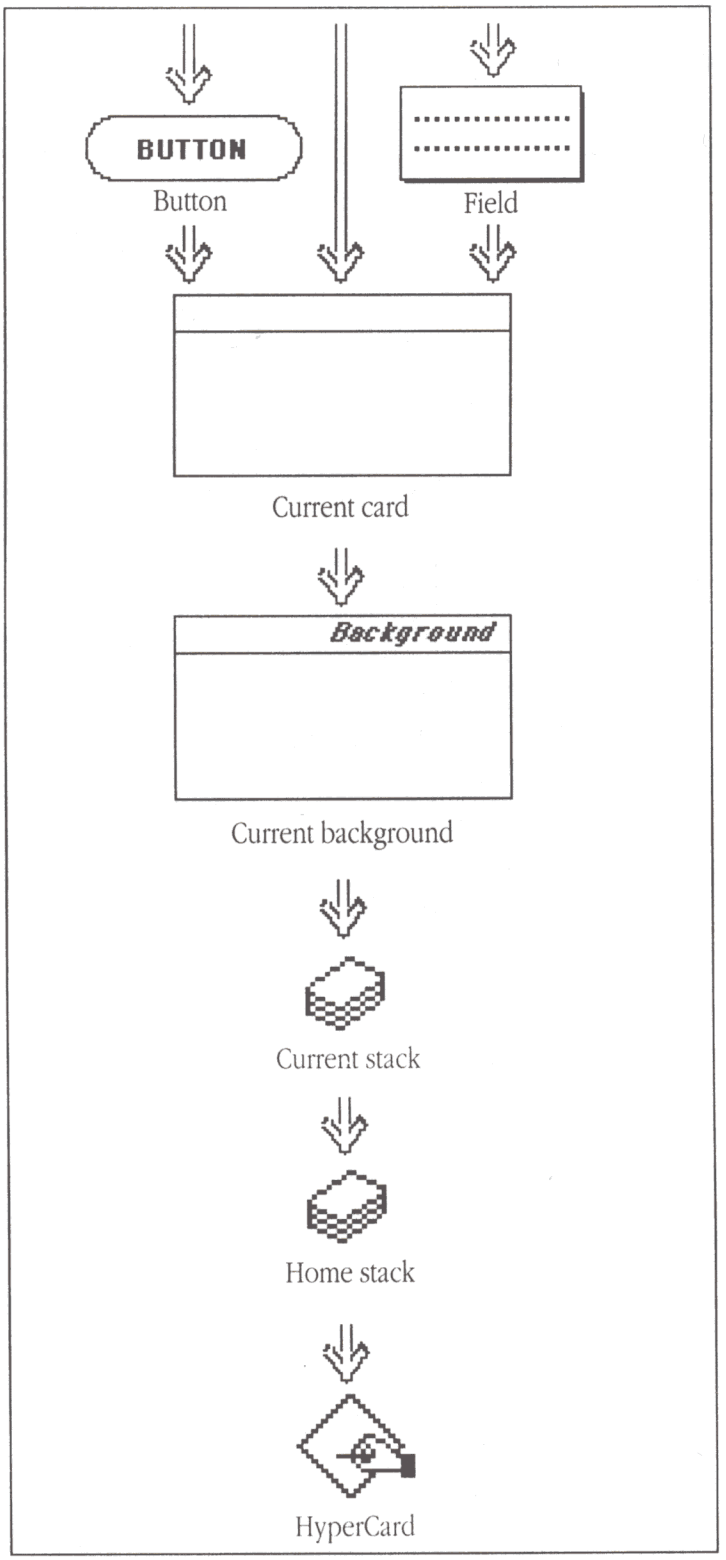


Figure 4-1 The message-passing order

You can place handlers at different levels. Where you place a handler has an effect on its availability. For example, in Chapter 2, when you wrote the handler to label all the cards of the Collection stack, you placed it in the background script; that placement meant that the handler was available for every card sharing that background. If you had placed the handler in the script for one of the cards, it would have been available only to that card; no other cards would have been labeled.

In this section you'll see how messages move around in HyperCard. First you'll make a button and write a message handler for the button's script. Later you'll move the handler to different levels in the message-passing order and observe the difference in the handler's action.

Creating a Sound button

You'll create a button that plays a sound when you click it. Follow these steps:

1. **Press ⌘-B to work in the background.**
2. **Choose New Button from the Objects menu.**

   Drag the button to any available space in the background.
3. **Name the button** `Sound`
4. **If you want to, choose a font and colors for the button.**
5. **Click Script and type the following message handler:**

```
on mouseUp
  play "boing"
end mouseUp
```

   The `play` command lets you play sounds from within scripts. `Boing` is the name of the sound that plays.

❖ *Alternative for hearing-impaired people:* If you can't hear well, type this line in place of or in addition to the `play` statements to see the effect of the handler:

```
flash 3
```

This command causes the entire screen image to flash rapidly three times when the button is clicked. (The white parts of the card switch to black and the black parts to white; then they change back again.) ❖

6. **Click OK.**

7. **Click the Sound button with the Browse tool.**

   You hear the "boing" sound (or see the screen image flash).

❖ *If something else happened:* Check the script's spelling and make sure you have included quotation marks in the right places. If the script is correct, make sure you have the Sound Volume in the Control Panel turned up far enough. ❖

When you click the Sound button, a `mouseUp` message is sent to the button. This causes the `mouseUp` handler to execute, and the boing plays (or the screen flashes).

Moving the handler to the card level

Where you place a handler in HyperCard affects its action. A handler at the "top" level—that is, in a button script or a field script—can respond only to a message received by that button or field. The same handler further "down" in the message-passing order—that is, at the card, background, or stack level—can respond to a message sent by any objects higher up, unless those objects intercept the message with their own handlers. (See Figure 4-1 earlier in this chapter.)

What the message-passing order means to you is that you can control whether your handlers act very locally—only for a particular button, for example—or more globally, for an entire card, background, or stack.

In this section you'll move the `mouseUp` handler of the Sound button to a different level in the object hierarchy to experience the change in its response.

First notice that the handler works only if you click the Sound button. If you click anywhere else on the card, you won't hear anything.

The next step is to move the handler to the script for one particular card. You'll cut the `mouseUp` handler from the Sound button's script and paste it into the script for the Index card that you created in Chapter 3. Follow these steps:

1. **Go to the Index card.**
2. **Open the script for the Sound button.**
3. **Select the `mouseUp` handler.**

   Drag the mouse across the entire handler to select it.
4. **Press ⌘-X to cut the handler and place it on the Clipboard.**

   The script editor should now have nothing in it. If you still see the handler there, try steps 2–4 again. Every object has a script, even if there's nothing in it. Scripts with nothing in them are called *empty* scripts.
5. **Click OK.**

Now you'll open the script for the Index card.

6. **Choose Card Info from the Objects menu.**

   The Card Info dialog box appears.
7. **Click Script.**

   The script for the Index card appears.

8. **Press ⌘-V to paste the handler into the script for the Index card.**

   The `mouseUp` handler appears in the script for the Index card.

9. **Click OK.**

Trying out the card script

Now test the effects of moving the handler to the card level.

1. **Click the Sound button with the Browse tool.**

   The "boing" plays (or the screen flashes) just as it did before. The `mouseUp` message passes through the empty button script and goes on to the card script.

2. **Click anywhere else on the Index card (except on a button or field).**

   The "boing" plays (or the screen flashes) because whenever you click the card, `mouseUp` goes directly to the card, which now contains the handler for `mouseUp` in its script.

3. **Click the Next button.**

   You go to the next card as usual—without hearing a sound. The `mouseUp` message goes to the Next button, where the message is handled by the `mouseUp` handler in the button's script.

Now that you are on a card other than the Index card, notice what happens when you click the card.

4. **Click anywhere on the card (except on a button or field).**

   Nothing happens because there is no `mouseUp` handler in this card's script.

Moving the handler to the background level

Now you'll take the handler out of the card script and move it to the background script:

1. **Go to the Index card.**
2. **Choose Card Info from the Objects menu.**

   The Card Info dialog box appears.
3. **Click Script to see the script editor.**

   The script for the Index card appears.

❖ *Keyboard shortcut:* You can press ⌘-Option-C to see the script editor of the current card without having to go through the Info box. ❖

4. **Drag the mouse across the entire handler to select it.**
5. **Press ⌘-X to cut the script and place it on the Clipboard.**

   The card script should now be empty.
6. **Click OK to close the Index card's script.**
7. **Choose Bkgnd Info from the Objects menu.**

   The Background Info dialog box appears.
8. **Click Script.**

   The script for the current background appears.
9. **Press ⌘-V to paste the handler into the background script.**
10. **Click OK to close the background script.**
11. **Test the effects.**

    Using the Browse tool, click the Sound button, then click elsewhere on the card, just as before. You should hear the "boing" (or see the screen flash) in every case. The `mouseUp` message goes through the empty Sound button script and empty card script to the background script, which now contains the handler.

Now move to any other card in the stack and click any area except a button or field. You should still hear the "boing" (or see the screen flash). The handler is now available to any card sharing the background.

If you moved the handler to the stack level, the same thing would happen because the Collection stack has only one background; however, if a stack has more than one background, only a handler at the stack level or above would be available to all cards of all backgrounds.

Handlers calling handlers

All the handlers you've written so far respond to system messages sent by HyperCard (such as `mouseUp` and `openCard`). HyperCard sends system messages in response to events such as mouse clicks, keyboard actions, and the creation or deletion of objects. (The Appendix contains a list of all HyperCard system messages.) But there are other ways for handlers to "get the message."

Each time HyperCard executes a statement within a handler, it sends that statement as a message. A message sent from one handler can cause another handler to execute. It's as though the handlers are talking to each other, with one handler telling the other to begin executing.

In this section you'll write a handler that "calls" another handler. First you'll write a handler that sends a message, then you'll write a handler that responds to that message.

Writing the "calling" handler

You will write a script for the Sound button so that a message named `playSound` is sent whenever someone clicks the button. Later you'll change the `mouseUp` handler in the background script so that it responds to the `playSound` message. Follow these steps:

1. **Open the script for the Sound button.**

   The script should be empty.

2. **Type the following handler.**

```
on mouseUp
  playSound
end mouseUp
```

   In English, the script says, "When someone clicks this button, send a message named `playSound`. That's all."

   The message name `playSound` is arbitrary. You could use any other word (except a HyperTalk keyword); this name seems appropriate because it describes the action of the handler.

❖ *Alternative for hearing-impaired people:* If you are using the `flash 3` alternative instead of the notes, you could use a different name, such as `razzleDazzle` (but don't use `flash`). Be sure, however, that you use your alternative name in the steps that follow. ❖

3. **Click OK.**

You will need to write a handler that handles the `playSound` message. But for now, see how the script works so far.

4. **Click the Sound button with the Browse tool.**

   You see a "Can't understand" dialog box. HyperCard can't understand the `playSound` message because it can't find a `playSound` handler anywhere. In other words, there's no handler that begins with the statement `on playSound` and ends with the statement `end playSound`.

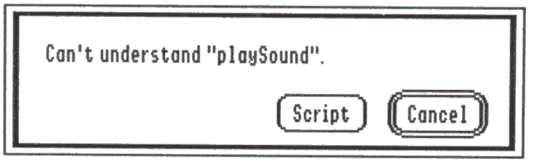


Figure 4-2 "Can't understand" dialog box

5. **Click Cancel to close the "Can't understand" dialog box.**

Writing the "called" handler

Now you'll create a handler that responds to the `playSound` message that's sent when someone clicks the Sound button. You could write a handler from scratch, but in this case you'll simply change the `mouseUp` handler in the background script to a `playSound` handler.

1. **Choose Bkgnd Info from the Objects menu.**
2. **Click the Script button.**

   The script for the background appears.

❖ *Keyboard shortcut:* You can press ⌘-Option-B to see the script for the current background. ❖

3. **Select the word `mouseUp` in the first line of the handler.**

   Drag across the word as you would when selecting any text, or just double-click the word.

4. **Type `playSound`**

   `playSound` replaces `mouseUp`.

5. **Select `mouseUp` in the last line of the handler and replace it by typing `playSound`**

   The completed handler looks like this:

```
on playSound
  play "boing"
end playSound
```

   You have changed the handler from a `mouseUp` handler to a `playSound` handler. It now responds to the message `playSound` instead of the message `mouseUp`.

6. **Click OK.**

You have created a handler that sends a message named `playSound`, as well as a handler that responds to `playSound`. Now see how the two handlers work together.

7. **Click the Sound button with the Browse tool.**

   When the Sound button receives `mouseUp`, its handler in turn sends the message `playSound`. That message goes through the message-passing order until it's intercepted by the `playSound` handler in the background script. The `playSound` handler executes, and you hear the "boing." Figure 4-3 shows the path taken by the `playSound` message.

Clicking anywhere else on the card won't cause the notes to play, because the background handler isn't a `mouseUp` handler any more.

In this section you've essentially defined a new command named `playSound`. The `playSound` command plays a "boing" sound. That's really all there is to defining your own commands. Think of what you want a command to do, think of a name for it, and write a handler that uses the name after `on` and `end`, with the appropriate HyperTalk statements in between.

First, HyperCard sends a `mouseUp` message to the Sound button.

Then, the Sound button sends a `playSound` message.

Finally, the `playSound` message is handled by the background

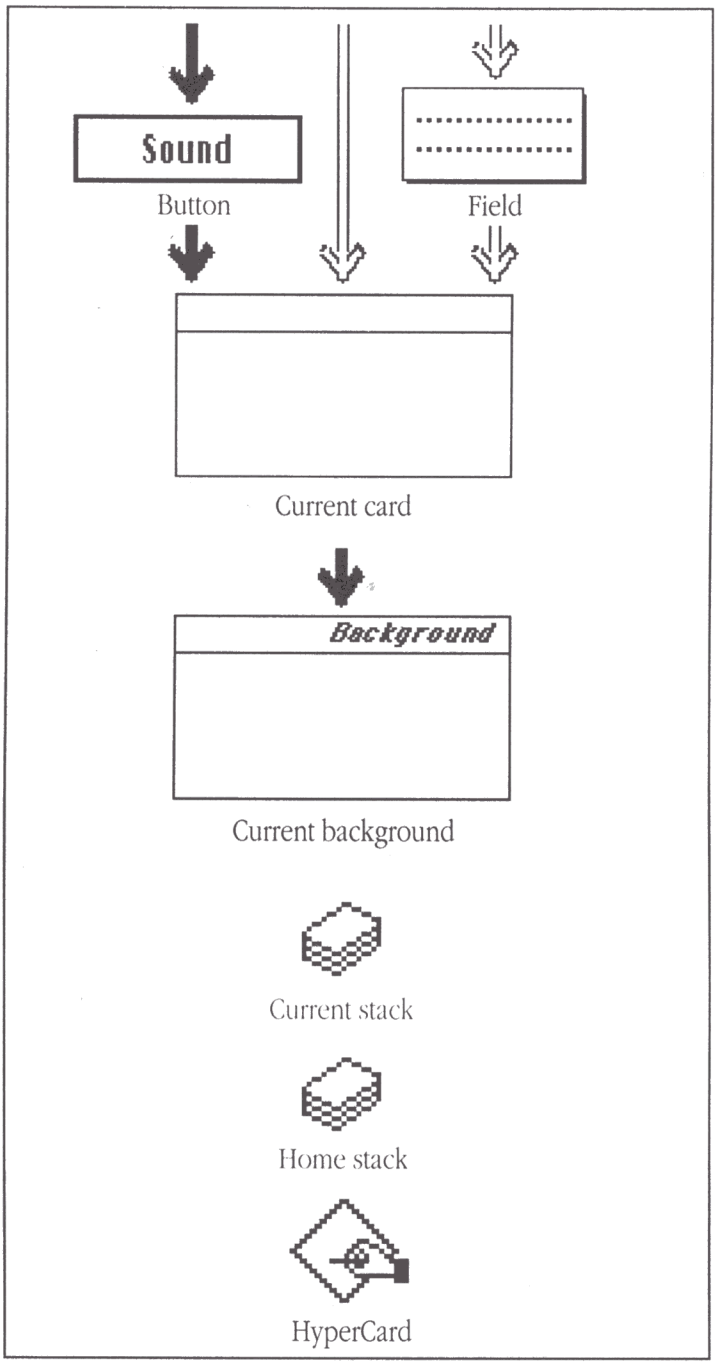


Figure 4-3 Message traveling to a handler in the background script

❖ *By the way:* It's generally best to avoid using the name of an existing HyperTalk command or function as the name of a command you create. See the *HyperCard IIGS Script Language Guide* for details on naming commands. ❖

Intercepting a message

When HyperCard sends a statement within a handler as a message, the message goes first to the object that contains the handler being executed. (For example, when the Sound button sends a `playSound` message, the message first goes to the button itself.) If the object's script doesn't have a handler for the message, the message next travels to the current card. If the script for the current card doesn't have an appropriate handler, the message continues through the message-passing order, as shown earlier in Figure 4-1.

Once a message is handled, it does not continue passing through the message-passing order. Therefore it's possible for an object at the "top" of the message-passing order to intercept a message before the message can travel to objects at the "bottom."

In this section, you'll write a `playSound` handler for the script of the Index card. This card-level handler will make the Sound button play a different sound when you're on the Index card.

Follow these steps to write the script:

1. **Go to the Index card.**
2. **Choose Card Info from the Objects menu, then click the Script button to see the card's script.**

   Or press ⌘-Option-C.
3. **Type the following handler:**

```
on playSound
  play "harpsichord" "c e g"
end playSound
```

   This handler plays three notes using the `harpsichord` sound.

4. **Click OK.**

5. **Click the Sound button with the Browse tool.**

   The `playSound` handler in the card script executes, and you hear the three notes.

6. **Go to any other card in the stack and click the Sound button.**

   The `playSound` handler in the background script executes, and you hear the "boing."

How the handlers work

When you click the Sound button, the button's `mouseUp` handler sends a `playSound` message. Because there is no `playSound` handler in the button's script, the message passes to the script for the current card.

When the Index card is the current card, the `playSound` handler in the card script handles the `playSound` message. The card script intercepts the message before it can pass to the background script. Figure 4-4, on the next page, shows the path taken by the `playSound` message when the Index card is the current card.

When the Index card is not the current card (that is, when there is no `playSound` handler in the script for the current card) the `playSound` message continues passing from object to object in the message-passing order until it gets to the `playSound` handler in the background script, as shown in Figure 4-3.

❖ *By the way:* You can allow a message to continue passing through the message-passing order after it has been handled by using the `pass` keyword. (For more information about `pass`, see the HyperTalk Help stack or the *HyperCard IIGS Script Language Guide.*) ❖

First, HyperCard sends a `mouseUp` message to the Sound button.

Then, the Sound button sends a `playSound` message.

Finally, the `playSound` message is handled by the Index card's script.

(The `playSound` message does not pass to the background.)

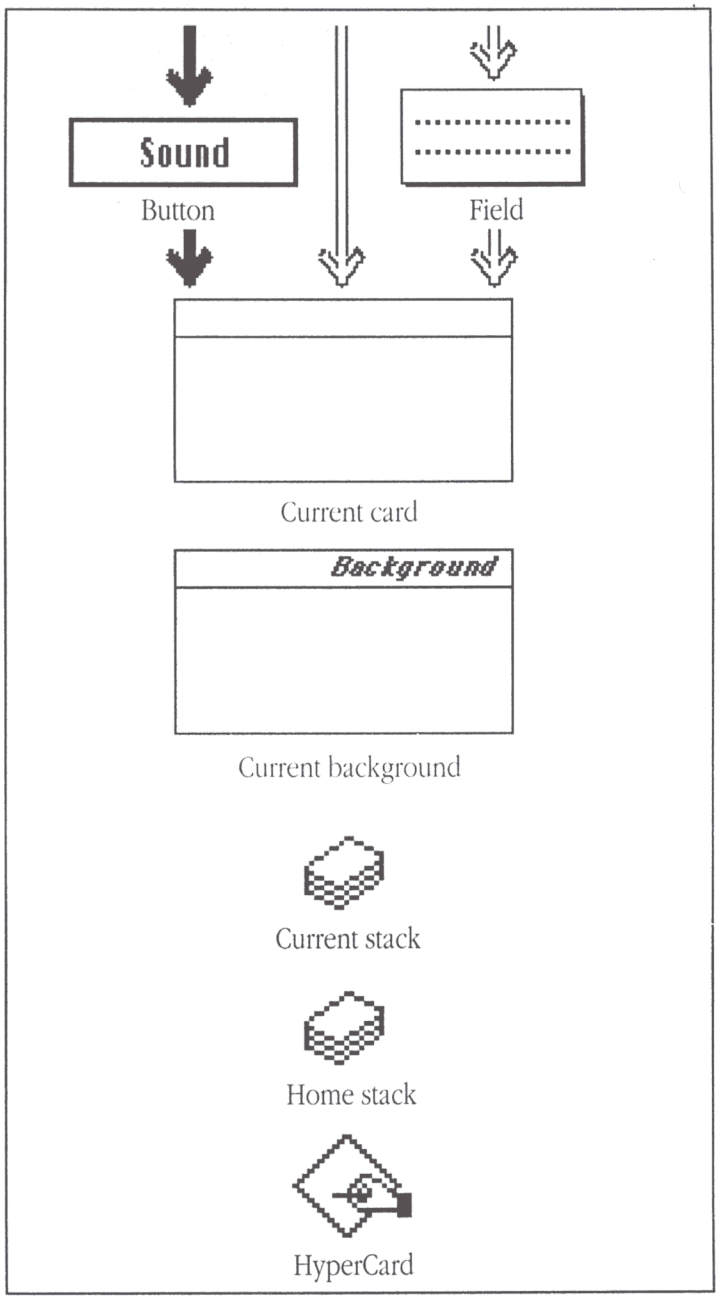


Figure 4-4 Message being intercepted by a handler in the card script

By writing a different `playSound` handler for the script of each card, you can play a different sound on each card in your Collection stack. (The reference section at the end of this chapter explains how to use the `play` command.)

Calling handlers from the Message box

Whenever you type something into the Message box and press Enter, the contents of the Message box are sent as a message to the current card.

In this section you'll use the Message box to call the `playSound` handler. Follow these steps:

1. **Open the Message box.**
2. **Type `playSound` and press Return.**

   A `playSound` message is sent from the Message box to the current card. If you're still on the Index card, the message is handled by the `playSound` handler in the card script and you hear the three harpsichord notes. If you're on another card, the `playSound` message travels to the background script, and you hear "boing."

   You can use the Message box this way when you want to test how a particular handler works. All you do is type the name of the handler and press Return.

You can send a message directly to a specific object, bypassing the message-passing order, by using the `send` keyword. The `send` keyword works in the Message box as well as in handlers. Now you'll send a `mouseUp` message from the Message box directly to a button.

3. **Type** `send mouseUp to bg button "next"` **and press Return.**

   A `mouseUp` message goes to the Next button. The `mouseUp` handler in the button's script executes, and you go to the next card in the stack, just as if you had clicked the button.

The `send` keyword lets you send messages against the normal flow of the message-passing order—for example, from a stack script to a button or from one button to another button.

4. **Close the Message box.**

Handlers as building blocks

In some ways getting things done in HyperTalk is no different from getting things done in everyday life. When you want to perform a large, complex procedure, you can divide the procedure into smaller, more easily manageable parts. These smaller parts of a complex procedure are sometimes called *subprocedures.*

For example, suppose you want to make spaghetti. You might divide the main procedure, "make spaghetti," into three subprocedures: "cook pasta," "cook sauce," and "add sauce to pasta." If you could describe the procedure of making spaghetti as a HyperTalk script, it would look something like this:

```
on makeSpaghetti
  cookPasta
  cookSauce
  addSauceToPasta
end makeSpaghetti
```

The handler for the main procedure (`makeSpaghetti`) calls handlers for three subprocedures (`cookPasta`, `cookSauce`, and `addSauceToPasta`).

HyperCard handlers can be used as subprocedures in much the same way. Understanding how handlers can call other handlers will be a big help you as you begin to write longer, more complex scripts.

What you've done in this chapter

In this chapter you have demonstrated the three ways that HyperCard can send messages:

- *System messages* (such as `mouseUp`) are sent in response to some event, such as a mouse or keyboard action.
- *Statements within handlers* (such as `playSound`) are sent when the statements are executed.
- *The contents of the Message box* are sent when you type something in and press Return.

You've learned how a message handler can "call" other handlers, how messages can travel from one object to another, and how handlers can be used as subprocedures.

Here's a list of the HyperTalk words you have learned:

Commands

`play`	Causes sounds to play.

Keywords

`send`	Sends messages directly to objects.

Miscellaneous

`harpsichord` `boing`	Names of sounds used with the `play` command.

Syntax summaries

This section describes the syntax of the `play` command and the `send` keyword.

Play

The `play` command lets you play sounds from within a script.

Syntax

```
play [sound] [tempo] [notes]
play stop
```

Sound is `harpsichord` or `boing`—which are included with HyperCard—or the name of a digitized sound from some outside source.

Tempo is the word `tempo` followed by a positive integer that sets the speed of play. The value 100 is a medium speed; higher numbers play faster. If you don't specify a tempo, `tempo 100` is assumed.

Notes make up the melody sequence. Notes are represented by the letters *A* through *G*. Rests (or pauses) are represented by the letter *R*.

If you don't specify any notes, HyperCard plays a single note in the sound you specify. You should include quotation marks around the sound and the notes.

You can include further modifiers after the note name, such as an accidental (a sharp or flat), an octave specification, and a duration code. Here's the syntax for a note:

noteName [*accidental*] [*octave*] [*duration*]

Accidental is either `#` for sharp or `b` for flat.

Octave is a whole number that specifies the pitch range. For example, `g#4` would be the G-sharp note in the middle range, or what musicians call the *middle-C octave*. Higher numbers give higher ranges, and vice versa. If you don't specify a number, HyperCard uses 4.

Duration is a letter code indicating how long to hold the note before the next note sounds. Here are the codes for note duration:

`w`	whole note (four counts)
`h`	half (two counts)
`q`	quarter (one count)
`e`	eighth (one-half count)
`s`	16th (one-fourth count)
`t`	32nd (one-eighth count)
`x`	64th (one-sixteenth count)

If you don't specify a duration code, HyperCard assumes a quarter note.

A period (`.`) after the duration code indicates a dotted note, which means a note with a duration value of half again as much; that is, `w.` would indicate six counts (four plus half of four). A numeral 3 after the duration code indicates a triplet.

The codes for octave and duration carry over to subsequent notes unless you change them; this feature saves you from having to type numbers and letters over and over.

Here are some examples of notes with modifiers:

Note specification	Meaning
`d#5w`	D-sharp above high C held for four counts
`Bb4q`	B-flat above middle C heldfor one count
`e5h.`	E above high C held for threecounts (because of the period after the duration code `h`)

Example

```
play "harpsichord" tempo 300 "cq d#q gq c5w"
```

Dealing with long lines

You can put a long sequence of notes into a script; however, the script editor doesn't wrap lines or let you scroll to see lines that extend beyond the window. You can press Return or Option-Return to wrap a long line temporarily while you type the notes; however, if you use this method you *must* delete the Returns to "unwrap" the lines when you're finished. If you don't, the script won't work properly. HyperCard doesn't understand a line break of any sort inside quotation marks.

Another alternative is to wrap a long line permanently by inserting a closing quotation mark and the double ampersand (`&&`) followed by an Option-Return (¬):

```
play "harpsichord" "c3 d e f g a b c4 d e f " && ¬
"g a b c5 d e f g a b c6"
```

Notice that you must also begin the wrapped line with a quotation mark.

Send

The `send` keyword directs a message to any object in the current stack or to another stack, but not to a specific object in another stack. It sends a message directly to the specified object, bypassing any other objects in the usual message-passing hierarchy.

Syntax

`send "`*messageName*`" [to` *object*`]`

The quotation marks around the name of the message aren't needed if the message is a single word, like `mouseUp`.

Object is an identifier for any object, such as its number, ID, or name. If you use the name, you must enclose it in quotation marks.

Example

```
send mouseUp to background button "Home"
```

More Scripting Ideas

As you built your Collection stack, you learned some of the basic methods you can use for HyperTalk scripting. In this chapter you'll learn other ways of using scripts in stacks.

This chapter explains how to modify the Collection stack for other purposes. It also describes some other simple stacks you can build—including a presentation stack, animation stacks, and a stack just for fun—and explains the basic steps involved in building and scripting these stacks. You can try building the stacks if you wish, or you can use them as a source of ideas for creating stacks on your own.

Customizing your Collection stack

You can easily modify the Collection stack to catalog things other than records. For instance, you could modify the stack along the lines shown in Figure 5-1.

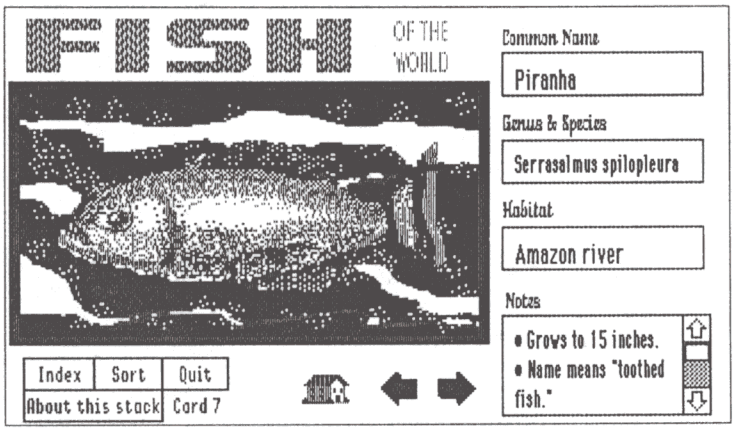


Figure 5-1 Another variation on the records stack

To modify the Collection stack for some other purpose, follow these basic steps:

1. **Save a copy of the Collection stack by choosing Save a Copy from the File menu.**
2. **Change the names of the Artist and Title fields to indicate the new contents of the fields.**
3. **Change the scripts of the Sort and Index buttons, replacing all references to the Artist and Title fields with the new field names.**

You might also want to delete the Sound button and create more appropriate graphics.

Presentation stacks

You can use HyperCard to combine text, graphics, animation, and sound into a dazzling presentation. This section shows you how to create a basic presentation stack. You can fill in the contents of the presentation (and the dazzle) yourself.

There are many ways you can organize a presentation. One way is to tell a story from beginning to end by having users go forward or backward from card to card. In most stacks, though, users have opportunities to branch to different parts of the stack, depending on what interests them. (See *HyperCard Stack Design Guidelines*, published by Addison-Wesley, for a discussion of different ways to structure a stack and how to make stacks easy to navigate.)

The stack described in this section uses a simple tree structure that users can easily navigate. The first card of the stack lists the topics of the presentation. A user chooses a topic of interest by clicking a button. Once a topic has been chosen, the user can navigate through a series of cards about that topic. The user can also return to the main topics card at any time. Figure 5-2 illustrates the structure of the stack.

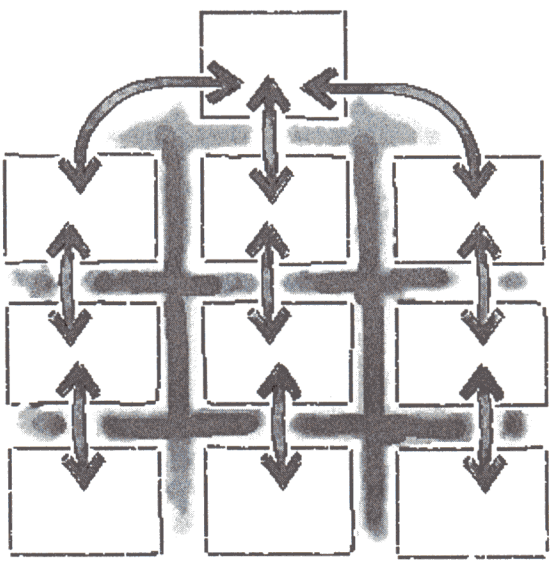


Figure 5-2 Stack with a tree structure

Creating a main topics card

Here is an example of a main topics card.

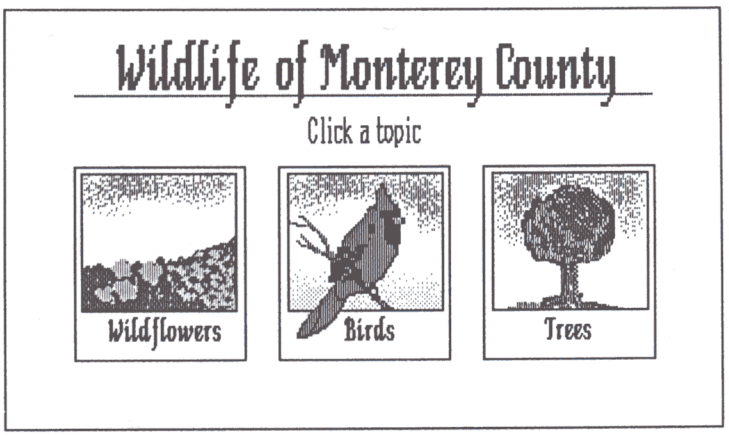


Figure 5-3 Main topics card with art the user can click

The card shows several pictures, each corresponding to a topic the user can pick. Each picture is covered with a transparent button that takes the user to a card about the chosen topic. For example, the button covering the flower picture has this script:

```
on mouseUp
  visual effect dissolve
  go to card "Wildflowers"
end mouseUp
```

In this case, `Wildflowers` is the name of the first card in a series of cards about wildflowers.

Creating cards about a topic

Once you have decided what the topics of your presentation are, you can create a series of cards about each topic. Figure 5-4 shows an example of a card about a topic.

You can create topic cards by following these basic steps:

1. **If you want the background of the topic cards to be different from the background of the main topics card, create a second background for your stack.**

You do this by choosing New Background from the Objects menu.

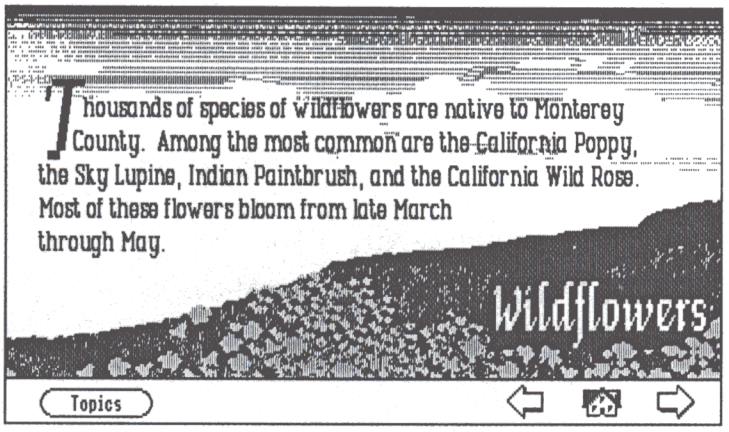


Figure 5-4 A topic card

2. **Create buttons for the background.**

   You'll probably want a Next button, a Previous button, and a button that returns the user to the main topics card.

   The Topics button in Figure 5-4 takes the user back to the main topics card; it has the following script.

```
on mouseUp
  visual effect dissolve
  go to card "Topics"
end mouseUp
```

3. **Create background fields.**

   You will probably want a field for the heading, as well as a field for the text on each card.

4. **Add cards to your stack.**

   Write the text and create the graphics for your presentation.

Animation

You can use HyperTalk commands to create animation effects. Animation combined with visual effects and sound can turn a presentation, a demonstration, or a training stack into an exciting audiovisual experience. This section explains two ways to create animation effects with HyperTalk commands.

Animating a series of cards

You can animate a series of cards by painting slightly different images on successive cards, then showing the cards rapidly—creating the appearance of movement. Figure 5-5 shows an example of a multiple card animation sequence.

You can practice creating an animation sequence by following these steps:

1. **Create a new stack.**

   Name the stack Animation or any other name you'd like.

2. **Add a few cards to the stack, and create graphics for each card.**

   You can paint your own graphics or copy them from the Art Ideas stack.

   Each card should look slightly different from the card before it. To create each card, copy the image from the previous card, then change the image by moving graphics or adding graphics to the card.

3. **Create a button that makes HyperCard flip through the cards.**

   In Figure 5-5, the button is named Drive the Train. Here's the script for the button:

```
on mouseUp
  go to first card
  show 4 cards
end mouseUp
```

The `show cards` command goes rapidly through a specified number of cards. You specify how many cards you want to show.

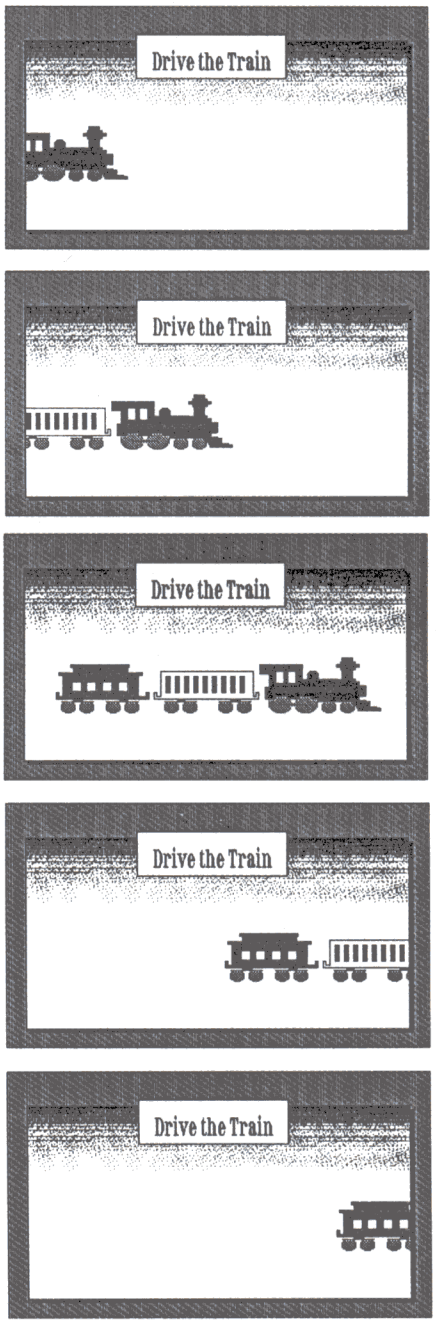


Figure 5-5 Example of multiple card animation

Animating with Paint tools

You can create animation effects by using HyperCard's paint tools within scripts. In this section you'll learn the basics of paint animation, and you'll write a script that creates computer-generated art.

You'll write a script that paints rectangles and lines of random sizes, shapes, and colors. Each "painting" is unique, but Figure 5-6 shows an example of what one might look like.

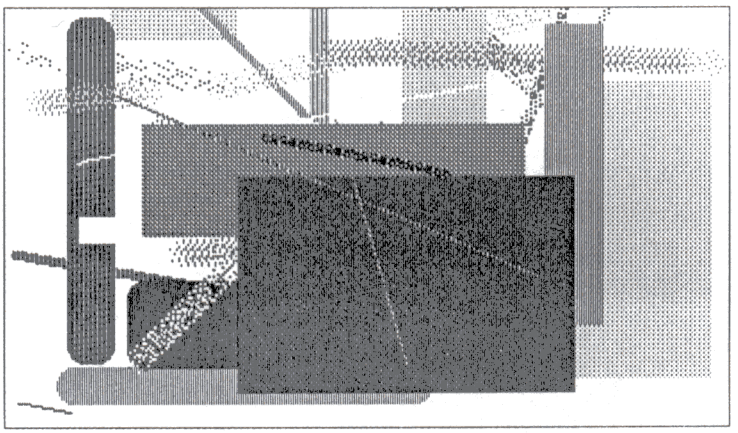


Figure 5-6 A HyperTalk-generated "painting"

To paint each shape, your script will:

- choose the appropriate tool (either the Rectangle tool or the Brush tool)
- choose a random color or pattern (When the Brush tool is selected, it will also choose a brush shape.)
- drag from a random point on the screen to another random point.

Follow these steps to make the stack:

1. **Create a new stack.**

   Name the stack Painting or any other name you'd like.

2. **Open the stack script.**

   Choose Stack Info from the Objects menu and click Script. Or press ⌘-Option-S.

3. **Type the following script:**

```
on mouseUp
  set the dragSpeed to 200
  set the filled to true
  repeat until the mouse is down
    choose rectangle tool
    set the pattern to random(32)
    drag from random(320),random(200) to ¬
    random(320), random(200) with optionKey
    choose brush tool
    set the brush to random(32)
    set the pattern to random(32)
    drag from random(320,random(200) to ¬
    random(320),random(200)
  end repeat
  choose browse tool
end mouseUp
```

4. **Try out the script by clicking anywhere on the stack with the Browse tool.**

   Watch the screen as lines and rectangles of different colors appear.

5. **To stop the animation, click the mouse again.**

If you'd like to start a new painting on a blank card, choose New Card from the Edit menu.

❖ *If something else happened:* Check your script and try again. You cannot open the script editor while a Paint tool is chosen. To open the script editor you must have the Browse tool, Button tool, or Field tool chosen. ❖

How the script works

When you click anywhere on the stack, a `mouseUp` message travels to the stack and the `mouseUp` handler executes.

The statement `set the dragSpeed to 200` determines how fast drags will occur. The higher the `dragSpeed`, the faster the drag. If you don't specify a speed, drags occur instantly.

The next statement sets the `filled` property to true, which means that rectangles and other polygons will be painted as solid shapes, instead of outlines.

Next comes a repeat structure that keeps looping until you click the mouse (that is, `until the mouse is down`). Each time through the loop, the script paints one rectangle and one line.

First the script chooses the Rectangle tool, as though you had chosen it from the Tools menu.

The next statement `set the pattern to random(32)` sets the `pattern` property to a random number between 1 and 32. Each position in the Patterns menu has a corresponding number, as shown in Figure 5-7.

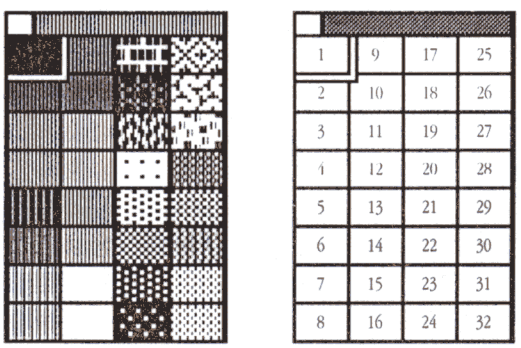


Figure 5-7 Values for the pattern property

To choose a pattern randomly, the script uses the `random` function, which has this syntax:

`random(`*number*`)`

The random function returns an integer from 1 to *number*. Thus evaluate the expression `random(32)` as a random integer from 1 to 32.

The next statement

```
drag from random(320),random(200) to random(320),random(200) with optionKey
```

uses the drag command to drag from a random point on the screen to another random point while holding down the Option key. (Holding down the Option key paints rectangles as solid shapes without showing black outlines.) The syntax of the drag command is:

`drag from` *startingPoint* `to` *endingPoint* `[with` *key*`]`

StartingPoint and *endingPoint* are points on the screen. Each point is specified by two numbers separated by a comma. The first number specifies the distance (in pixels) from the left edge of the screen, and the second number specifies the distance from the top of the screen.

The top-left point on the screen has the coordinates 0,0; the bottom-right point has the coordinates 320,200. Therefore, the expression `random(320),random(200)` specifies any random point on the screen.

After the rectangle has been drawn, the script chooses the Brush tool and a random brush shape. The brush property determines which brush shape is used; it can have a value from 1 to 32, as shown on the next page in Figure 5-8.

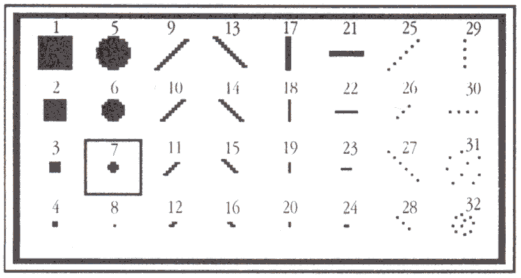


Figure 5-8 Values for the brush property

The second drag command drags the Brush tool to paint a straight line.

When you click the mouse, the script stops looping through the repeat structure.

Finally the script chooses the Browse tool again.

A stack for fun

Here's another stack that produces random events with interesting results. It's easy to build and fun to play with. It randomly generates newspaper headlines from lists of words that you supply.

1. **Create a new stack.**

   Name the stack Headlines or whatever you like.

Next you'll add some fields and buttons to the first (and only) card in the stack.

2. **Create three fields named Man, Bites, and Dog.**

   Choose "scrolling" for the field's style.

3. **Type some words or phrases into the fields.**

   In the field named Man, type the names of some friends. In the field named Bites, type some verbs. In the field named Dog, type some nouns. Press Return after each word or phrase to put it on a separate line.

For now you can just type two or three lines into each field. It will be easy to add more words later. Figure 5-9 suggests some words you can type into these fields. Have fun making up your own.

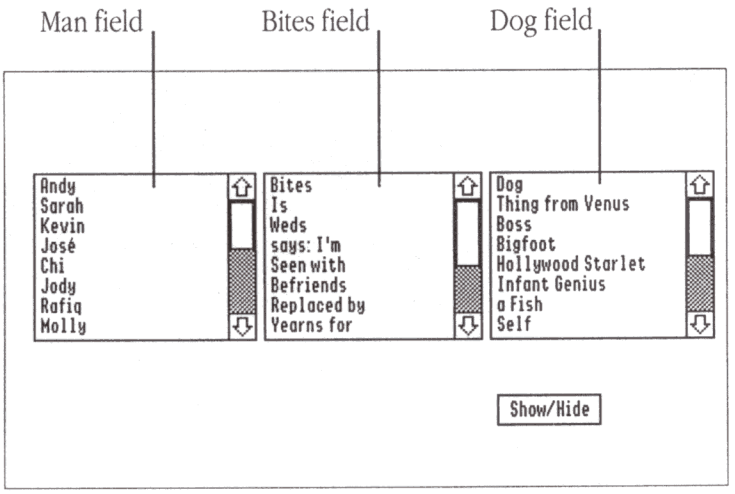


Figure 5-9 Some text for the Man, Bites, and Dog fields

4. **Create a button named Show/Hide that makes the scrolling fields appear and disappear.**

   Write the following script for the button:

```
on mouseUp
  if the visible of card field "Man" is false then
    show card field "Man"
    show card field "Bites"
    show card field "Dog"
  else
    hide card field "Man"
    hide card field "Bites"
    hide card field "Dog"
  end if
end mouseUp
```

The `visible` property of a field determines whether the field is shown or hidden. When a field is shown, the `visible` property of the field has a value of `true`. When the field is hidden, the `visible` property has a value of `false`.

This script tests whether the Man field is hidden. If the Man field is hidden, the script shows all three scrolling fields. Otherwise, if the Man field is shown, the script hides all three fields.

Select the Browse tool and try out the Show/Hide button. By clicking the button, you should be able to make the scrolling fields appear and disappear.

Now you'll create a field for the headline and a button that randomly generates headlines.

5. **Create a field named Headline.**

   Choose a large, bold font. Choose "center" for the field's text alignment.

6. **Create a button named Write Headline.**

   Write the following script for the button. Press Option-Return to insert a "soft" return character (¬) where necessary.

```
on mouseUp
  put any line of card field "Man" && ¬
  any line of card field "Bites" && ¬
  any line of card field "Dog" ¬
  into card field "Headline"
end mouseUp
```

7. **Try out the Write Headline button.**

   Each time you click the button, a different headline appears. If something else happens, check your script and try again.

8. **Paint some graphics on the card to make it look like the front page of a newspaper.**

   Here is one possible design:

Figure 5-10 Sample graphics for the Man Bites Dog stack

How the Make Headline button works

The script combines any line from the Man field, any line from the Bites field, and any line from the Dog field into a single string of text—which is put into the Headline field.

Games are often based on randomly occurring events, such as the roll of dice. One way to create random events in HyperTalk is to list all of the possible outcomes in a field and then get `any line` of the field.

Where to go from here

Now that you're an experienced scripter, you can go on to other sources to learn more about HyperTalk and more ways of using HyperCard. Many people have written books on HyperCard and scripting that you might find helpful. The *HyperCard IIGS Script Language Guide* contains complete descriptions of HyperTalk elements. The HyperTalk Help stack is also a good reference to consult while you're working.

Look again at the stacks that come with HyperCard, especially Button Ideas. See what you can observe about the way their scripts work, and how you might modify some of the scripts to suit your own ways of doing things. Create a stack you can use as a repository for buttons with prewritten handlers and other scripts that you can copy and paste when you want them. Talk to other HyperCard scripters about the stacks they've built and how they've built them.

Most of all, enjoy the creative environment that HyperCard provides. Experiment. Build your own stacks for your own purposes, learning more about HyperTalk as you need to. Your most valuable knowledge of scripting is likely to come from your own experience.

What you've done in this chapter

You've learned how to modify your Collection stack for different purposes, how to create a simple presentation stack, two ways to add animation effects to stacks, and a fun way to use the `random` function.

Commands

`choose`	Chooses a tool just as though you chose it from the Tools menu by using the mouse.
`drag`	Does the same thing as dragging the mouse.
`show cards`	Shows cards one after another on the screen. The cards to be shown (all or some number) must be in sequence.

Properties

`dragSpeed`	A global property that determines how fast the `drag` command is executed.
`filled`	A painting property—when set to `true`, shapes are filled as they are drawn.
`pattern`	A painting property with a value of 1 to 32, corresponding to the pattern selected in the Patterns menu.
`visible`	A property of fields and buttons that has a value of `true` when the object is shown and `false` when it is hidden.

Functions

`mouse`	Gives the state of the mouse button: either `up` or `down`.
`random`	Gives a random integer between 1 and a specified number.

Syntax summaries

Here is the syntax of the commands you learned in this chapter.

Choose

The `choose` command allows you to select a HyperCard tool from within a script.

You can use the `choose` command only when the user level is set to Painting, Authoring, or Scripting. You can set and reset the `userLevel` property inside a handler with the `set` command, if you don't want to change the user level permanently in a stack.

Syntax

```
choose toolName tool
choose tool number
```

ToolName is any one of the HyperCard tools from the Tools menu. You must always use `tool` after the name. Here are the HyperTalk names for the tools that you can use:

```
browse          field           reg[ular] poly[gon]
brush           lasso           round rect[angle]
bucket          line            select
button          oval            spray
curve           pencil          text
eraser          rect[angle]
```

Number is a positive integer corresponding to one of the tools.

The only tool you can't choose from within a script is the Polygon tool.

Examples

```
choose button tool
choose tool 9
```

Drag

The `drag` command allows you to manipulate objects and graphics on a card from within a script. It has the same effect as dragging the mouse manually from one point to another.

Syntax

```
drag from point to point
drag from point to point with key1
drag from point to point with key1, key2
drag from point to point with key1, key2, key3
```

Point consists of the horizontal and vertical coordinates of a point on the screen, separated by commas. You can find the coordinates of a point by placing the pointer there and typing `the mouseLoc` into the Message box.

Key1, *key2*, and *key3* can be `shiftKey`, `optionKey`, or `commandKey`.

Examples

```
drag from 5,5 to 80,130
drag from 5,5 to 80,130 with commandKey
```

Show cards

The `show cards` command lets you quickly display a number of cards in sequence.

Syntax

```
show [all] cards
show positiveInteger cards
```

PositiveInteger is the number of cards you want to show if you don't want to show all of them.

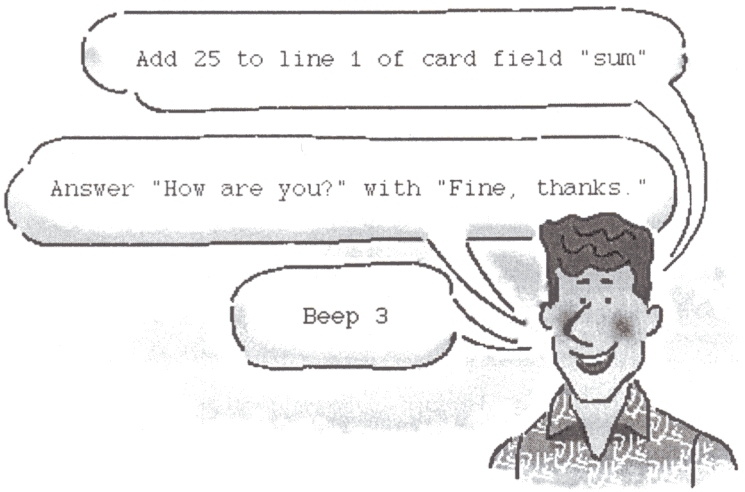
Examples

```
show all cards
show 5 cards
```

HyperTalk Summary

This appendix contains

- Syntax statements for all built-in HyperTalk commands, functions, and keywords
- Lists of system messages, properties, and constants
- A table of operators and their order of precedence
- Script editor keyboard commands
- Shortcuts for seeing scripts
- Synonyms and abbreviations



Syntax statement notation

Syntax statements show the most general form of a command or function, with all elements in the correct order. The syntax statements in this book use the following typographic conventions:

- Words or phrases in `this kind of type` are Hypertalk language elements that you type exactly as shown.
- Square brackets [ ] enclose optional elements that may be included if you need them. (Don't type the brackets.) In some cases optional elements change what the command does; in other cases they simply make the command more readable.
- Words in *italic* are placeholders describing general elements, not specific names; you must replace them in an actual command. For example, *effectName* stands for any of the HyperTalk visual effect names, such as `barn door`, `checkerboard`, or `zoom out`.

It doesn't matter whether you use uppercase or lowercase letters in HyperTalk, but names formed from two words are often shown in small letters with a capital in the middle (`likeThis`) to make them more readable.

Commands

This section lists the syntax of all HyperTalk commands. For more information about other HyperTalk commands, see the HyperTalk Help stack or the *HyperCard IIGS Script Language Guide.*

```
add number to [chunk of] container

answer question
answer question with reply
answer question with reply1 or reply2
answer question with reply1 or reply2 or reply3
answer file text [of type fileType]

arrowKey direction

ask question [with defaultAnswer]
ask password question [with defaultAnswer]
ask file text [with fileName]

beep [number]

choose toolName tool
choose tool number

click at point
click at point with key1
click at point with key1, key2
click at point with key1, key2, key3

close file fileName

close printing

controlKey keyNumber

convert [chunk of] container to format [and format]

create stack stackName [with background]

delete chunk of container
delete [stack] stackName

dial number
dial number with modem [modemCommands]

divide [chunk of] container by number
```

```
doMenu menuItem [without dialog]

drag from point to point
drag from point to point with key1
drag from point to point with key1, key2
drag from point to point with key1, key2, key3

edit script of object

enterKey

export paint to file filename

find text
find text [in backgroundField]
find chars text [in backgroundField]
find word text [in backgroundField]
find whole text [in backgroundField]
find string text [in backgroundField]

functionKey keyNumber

get expression

go [to] stack
go [to] background [of stack]
go [to] card [of background] [of stack]

help

hide button
hide field

hide card picture
hide picture of card
hide background picture
hide picture of background

hide menuBar
hide message box
hide tool window
hide pattern window
hide go window
hide card window

import paint from file filename
```

```
lock [the] printTemplate

lock screen

multiply [chunk of] container by number

open [fileName with] applicationName

open file fileName

open printing [with dialog]

play sound [tempo] [notes]
play stop

pop card
pop card into [chunk of] container
pop card after [chunk of] container
pop card before [chunk of] container

print field
print fileName with applicationName

print card
print number cards
print card
print all cards

push card

put expression
put expression into [chunk of] container
put expression after [chunk of] container
put expression before [chunk of] container

read from file fileName at start for numberOfChars
read from file fileName for numberOfChars
read from file fileName until character
read from file fileName until end
read from file fileName until eof

reset paint

returnKey
```

```
save this stack as fileName
save this stack as pathName
save [stack] stackName as fileName
save [stack] stackName as pathName

select button
select field

select text of container
select before text of container
select after text of container

select chunk of container
select before chunk of container
select after chunk of container
select empty
```

Note: *container* is a field or the Message box.

```
set [the] property [of object] to expression

show button [at point]
show field [at point]

show card picture
show picture of card
show background picture
show picture of background

show menuBar
show message box
show tool window [at point]
show pattern window [at point]
show go window [at point]
show card window

show number cards
show all cards

sort [sortDirection] [sortStyle] by expression

subtract number from [chunk of] container

tabKey
```

```
type text
type text with key1
type text with key1, key2
type text with key1, key2, key3

unlock [the] printTemplate

unlock screen
unlock screen with visualEffect
```

Note: *visualEffect* is any form of the `visual` command.

```
visual [effect] effectName [speed] [to image]

wait [for] number [seconds]
wait until condition
wait while condition

write text to file fileName [at start]
```

Functions

This section lists the syntax for all of HyperTalk's built-in functions, as well as the value returned by the function.

When using functions in HyperTalk statements you must either use the word `the` before the function name or add parentheses after it (both forms are shown in the list that follows). The parentheses are used to enclose any values on which the function operates. These values are called *parameters.* If the function takes several parameters (for example, the `average` function), you must separate the parameters with commas. For a more complete discussion of functions and parameters, see the HyperTalk Help stack or the *HyperCard IIGS Script Language Guide.*

Syntax of function	Value returned by function
`the abs of (`*number*`)` `abs (`*number*`)`	Absolute value of *number*
`annuity (`*rate, periods*`)`	Current or future value of an annuity
`the atan of (`*number*`)` `atan (`*number*`)`	Arc tangent of *number,* expressed in radians
`average (`*numberList*`)`	Average of the numbers in *numberList*
`the charToNum of` *character* `charToNum (`*character*`)`	ASCII value of a character
`the clickLoc` `clickLoc ()`	Horizontal and vertical coordinates of the point where the user last clicked
`the commandKey` `commandKey ()`	Position of the Command key (the ⌘ key): `up` or `down`
`compound (`*rate, periods*`)`	Present or future value of a compound interest-bearing account
`the cos of` *number* `cos (`*number*`)`	Cosine of *number,* expressed in radians

Syntax of function	Value returned by function

`the date`
`the long date`
`the short date`
`the abbreviated date`
`date()`
	Current date set in the Apple IIGS

`the diskSpace` `diskSpace()`	Amount of free space on the current disk
`the exp of` *number* `exp(`*number*`)`	Mathematical exponential (*e* raised to the power of *number*)
`the exp1 of` *number* `exp1(`*number*`)`	1 less than mathematical exponential: `exp()-1`
`the exp2 of` *number* `exp2(`*number*`)`	The value of 2 raised to the power of *number*
`the foundChunk` `foundChunk()`	Description of where the text is found in a field
`the foundField` `foundField()`	Which field the found text is in
`the foundLine` `foundLine()`	Which line the found text is in
`the foundText` `foundText()`	Characters found by the `find` command
`the length of` *text* `length(`*text*`)`	Number of characters in a text string
`the ln of` *number* `ln(`*number*`)`	Base-*e* (natural) logarithm of *number*
`the ln1 of` *number* `ln1(`*number*`)`	Base-*e* (natural) logarithm of (1 + *number*)
`the log2 of` *number* `log2(`*number*`)`	Base-2 logarithm of *number*
`max(`*numberList*`)`	Highest number in *numberList*

Syntax of function	Value returned by function
`min(`*numberList*`)`	Lowest number in *numberList*
`the mouse` `mouse()`	Position of the mouse button: `up` or `down`
`the mouseClick` `mouseClick()`	`True` or `false`, depending on whether the mouse button is clicked
`the mouseH` `mouseH()`	Horizontal position of the pointer on the screen
`the mouseLoc` `mouseLoc()`	Horizontal and vertical coordinates of the pointer
`the mouseV` `mouseV()`	Vertical position of the pointer
`[the] number of` *objects* `number(`*objects*`)`	Number of buttons/fields on the current card or background, or the number of backgrounds or cards in the current stack
`[the] number of` *chunks* `in` *text* `number(`*chunks* `in` *text*`)`	Number of characters, words, lines, and so on in a specified text string
`[the] number of cards in` *background* `number(cards in` *background*`)`	Number of cards in specified background
`the numToChar of` *number* `numToChar(`*number*`)`	Character corresponding to an ASCII value
`offset(`*text1*`,` *text2*`)`	Number of characters between the beginnings of two strings
`the optionKey` `optionKey()`	Position of the Option key: `up` or `down`
`the param of` *number* `param(`*number*`)`	Value of a parameter in a list
`the paramCount` `paramCount()`	Total number of parameters

Syntax of function	Value returned by function
`the params` `params()`	Entire list of parameters
`the random of` *number* `random(`*number*`)`	Random integer from 1 to *number*
`the result` `result()`	A text string if `find` or `go` is unsuccessful
`the round of` *number* `round(`*number*`)`	Nearest integer to *number* (odd integer plus 0.5 rounds up; even integer plus 0.5 rounds down)
`the screenRect` `screenRect()`	The rectangle of the screen in which HyperCard's card window is displayed.
`the seconds` `seconds()`	Number of seconds between midnight January 1, 1904, and the current time in your Apple IIGS
`the selectedChunk` `selectedChunk()`	Description of the location of the selected text
`the selectedField` `selectedField()`	Which field the selected text is in
`the selectedLine` `selectedLine()`	Which line the selected text is in
`the selectedText` `selectedText()`	Text currently selected
`the shiftKey` `shiftKey()`	Position of the Shift key: `up` or `down`
`the sin of` *number* `sin(`*number*`)`	Sine of *number*, expressed in radians
`the sound` `sound()`	Name of the sound resource currently playing (or `done` if none is playing)

Syntax of function	Value returned by function
`the sqrt of` *number* `sqrt(`*number*`)`	Square root of a number—if *number* is negative gives the result NAN(001) meaning "not a number"
`the tan of` *number* `tan(`*number*`)`	Tangent of *number*, expressed in radians
`the target` `target()`	Description of the original recipient of a message
`the ticks` `ticks()`	Number of ticks (1/60 second) since the Apple IIGS was last started

`the time`
`the long time`
`the short time`
`the abbreviated time`
`time()`
	Current time set in the Apple IIGS

`the tool` `tool()`	Name of the currently chosen tool
`the trunc of` *number* `trunc(`*number*`)`	Integer part of *number*
`the value of` *expression* `value(`*expression*`)`	Value of *expression*

Keywords

The following list includes HyperTalk keywords and their syntax. Keywords are predefined; you can't redefine them—for instance, you can't use a keyword as the name of a variable.

`Send` is the only keyword that can be used in the Message box.

`do` *expression*

`else`

`end` *functionName*
`end` *messageName*
`end if`
`end repeat`

`exit` *functionName*
`exit` *messageName*
`exit repeat`
`exit to HyperCard`

`function` *functionName*
`function` *functionName parameterList*

`global` *variableList*

`if` *condition* `then`

`next repeat`

`on` *messageName*
`on` *messageName parameterList*

`pass` *functionName*
`pass` *messageName*

`repeat [forever]`
`repeat [for]` *number* `[times]`
`repeat until` *condition*
`repeat while` *condition*
`repeat with` *variable* `=` *start* `to` *finish*
`repeat with` *variable* `=` *start* `down to` *finish*

`return` *expression*

`send "`*messageName*`[`*parameterList*`]" [to` *object*`]`
`send "`*messageName*`[`*parameterList*`]" to HyperCard`

System messages

HyperCard sends these messages to the objects specified to inform them of system events. Some messages include a variable (*var*), which depends on the message. For example, the `arrowKey` variable can be `left`, `right`, `up`, or `down`.

Messages sent to a button

```
deleteButton
mouseDown
mouseEnter
mouseLeave
mouseStillDown
mouseUp
mouseWithin
newButton
```

Messages sent to a field

```
closeField
deleteField
enterInField
mouseDown
mouseEnter
mouseLeave
mouseStillDown
mouseUp
mouseWithin
newField
openField
returnInField
tabKey
```

Messages sent to the current card

```
arrowKey var
closeBackground
closeCard
closeStack
controlKey var
deleteBackground
deleteCard
deleteStack
doMenu var
enterKey
functionKey var
help
hide var
idle
mouseDown
mouseStillDown
mouseUp
newBackground
newCard
newStack
openBackground
openCard
openStack
quit
resume
returnKey
show var
startup
suspend
tabKey
```

Properties

This section lists the properties of the HyperCard environment and of objects.

Background properties

```
cantDelete
cantModify
colorSet
dontSearch
ID
name
number
script
showPict
useColorSet
```

Button properties

```
autoHilite
bottom
bottomRight
family
frameColor
height
hilite
hilited
icon
iconBackColor
iconFrontColor
ID
left
loc[ation]
name
number
rect[angle]
right
script
sharedHilite
showName
style
textAlign
textColor
textFont
textHeight
textSize
textStyle
top
topLeft
visible
width
```

Card properties

```
cantDelete
cantModify
colorSet
dontSearch
ID
name
number
script
showPict
useColorSet
```

Field properties

autoTab
bottom
bottomRight
dontSearch
frameColor
height
ID
left
loc[ation]
lockText
name
number
rect[angle]
right
script
scroll
sharedText
showLines
style
textAlign
textColor
textFont
textHeight
textSize
textStyle
top
topLeft
visible
wideMargins
width

Global properties

blindTyping
borderColor
cursor
dragSpeed
editBkgnd
language
lastError
lockErrors
lockMessages
lockRecent
lockScreen
numberFormat
powerKeys
printTemplate
textArrows
userLevel
userModify
version

Painting properties

brush
centered
filled
grid
lineSize
multiple
multiSpace
outlined
pattern
polySides
textAlign
textFont
textHeight
textSize
textStyle

Stack properties

```
cantDelete
cantModify
colorSet
freeSize
name
script
size
useColorSet
version
```

Window properties

```
bottom
bottoßmRight
height
left
loc[ation]
rect[angle]
right
top
topLeft
visible
width
```

Constants

Constants are named values that never change. You can't use the name of a constant as a variable name.

Constants	Description
`down`	The value of the key functions for the Command, Option, and Shift keys and for the mouse button when pressed
`empty`	A string containing nothing (the *null* string)—same as `" "`
`false`	The opposite of `true`
`formFeed`	The form feed character, ASCII 12
`lineFeed`	The line feed character, ASCII 10
`pi`	The value of pi to 20 decimal places
`quote`	The double quotation mark character
`return`	The return character, ASCII 13
`space`	The space character, ASCII 32—same as `" "`
`tab`	The horizontal tab character, ASCII 9
`true`	The opposite of `false`
`up`	The value of the key functions for the Command, Option, and Shift keys and for the mouse button when not currently pressed
`zero...ten`	The numbers 0 through 10

Operator precedence

The table below shows the order of precedence of HyperTalk operators. The order of precedence determines which operation HyperCard performs first when evaluating an expression. Operators are evaluated from left to right, except for exponentiation, which is from right to left. Parentheses force evaluation in a certain order; for example, `2*3+5` yields `11`, but `2*(3+5)` yields `16`.

Order	Operators	Type of operator
1	`( )`	Grouping
2	`-`	Minus sign for numbers
	`not`	Logical negation for true or false values
3	`^`	Exponentiation for numbers
4	`* / div mod`	Multiplication and division for numbers
5	`+ -`	Addition and subtraction for numbers
6	`& &&`	Concatenation of text
7	`> < <= >= ≤ ≥`	Comparison for numbers or text

	`is in`
	`contains`
	`is not in`
		Comparison for text

8	`= <> ≠`
	`is`
	`is not`
		Comparison for numbers or text

9	`and`	Logical for true or false values
10	`or`	Logical for true or false values

Script editor keyboard commands

The following table lists keyboard combinations used to edit and format scripts.

Key combination	Effect
⌘-A	Select entire script
⌘-C	Copy selection to Clipboard
⌘-F	Find text (same as Find button)
⌘-G	Find next occurrence of same text
⌘-H	Find current selection
⌘-P	Print selection or (if no selection) entire script (same as Print button)
⌘-V	Paste Clipboard contents at insertion point
⌘-X	Cut selection to Clipboard
⌘-period	Close script without saving changes
Enter	Close script and save changes
Return	Return character—indicates end of HyperTalk statement
Option-Return	Wrap line without return character ("soft" return—symbolized by ¬ in scripts. Don't use a "soft" return inside quotation marks.)
Tab	Format script

Shortcuts for seeing scripts

The following table lists shortcuts for displaying the scripts of HyperCard objects.

Script	Shortcut(s)
Button script	Click button while pressing Option and ⌘ keys
	Double-click button with Button tool while pressing Shift key
Field script	Click field while pressing Option, ⌘, and Shift keys
	Double-click field with Field tool while pressing Shift key
Card script	Press ⌘-Option-C
Background script	Press ⌘-Option-B
Stack script	Press ⌘-Option-S

Synonyms and abbreviations

This table lists synonyms and abbreviations that you can use in scripts.

Term	Synonym or abbreviation
`abbreviated`	`abbr` `abbrev`
`background`	`bg` `bkgnd`
`backgrounds`	`bgs` `bkgnds`
`button`	`btn`
`buttons`	`btns`

(continued)

Term	Synonym or abbreviation
card	cd
cards	cds
character	char
characters	chars
commandKey	cmdKey
field	fld
fields	flds
gray	grey
location	loc
message box	message msg box msg
middle	mid
picture	pict
polygon	poly
previous	prev
rectangle	rect
regular	reg
second (*time unit*)	sec secs seconds
spray can	spray
ticks	tick

algorithm A step-by-step procedure for solving a problem or accomplishing a task. Writing HyperTalk handlers or programs in other languages often begins with figuring out a suitable algorithm for a task.

ASCII Acronym for *American Standard Code for Information Interchange,* pronounced "ASK-ee." A standard that assigns a unique number to each text character and control character. ASCII code is used for representing text inside a computer and for transmitting information between computers and other devices.

background A type of HyperCard **object;** a template shared by a number of cards. Each card with the same background has the same background picture, background fields, and background buttons in its **background layer.** Like other HyperCard objects, every background has a **script.** You can place handlers in a background script that you want to be accessible to all the cards with that background.

background button A button that is common to all cards sharing a background. Compare with **card button.**

background field A field that is common to all cards sharing a background; its size, position, and default text format remain constant on all cards associated with that background, but its text can change from card to card. Compare with **card field.**

background layer The layer behind the **card layer,** containing all the elements of the **background.** You see the elements of both layers when you look at a **card,** as if the card layer were a transparent layer in front of the background layer. The **background button** or **background field** created most recently is the topmost object in the background layer (that is, closest within the background layer to the front of the screen). The **background picture** is behind (farther from the front of the screen) the objects in the background layer.

background picture A picture that is common to all cards sharing a background. You see the background picture by choosing Background from the Edit menu. Compare with **card picture.**

button A type of HyperCard **object;** a rectangular "hot spot" on a **card** or **background** that responds when you click it according to the instructions in its **script.** For example, clicking a right arrow button with the Browse tool can take you to the next card.

card A type of HyperCard **object;** a rectangular area that can hold buttons, fields, and graphics. All cards in a stack are the same size. Each card is a composite of two layers—a foreground layer, called the **card layer,** and a **background layer.** You see the elements of both layers when you look at a card, as if the card layer were a transparent layer in front of the background layer. Each layer can contain its own buttons, fields, and graphics.

card button A button in the **card layer** of a single card. Compare with **background button.**

card field A field in the **card layer** of a specific card; its size, position, text attributes, and contents are limited to the card on which the field is created. Compare with **background field.**

card layer The layer in front of the **background layer.** You see the elements of both layers when you look at a **card,** as if the card layer were a transparent layer in front of the background layer. The **card button** or **card field** created most recently is the topmost object in the card layer (that is, closest within the card layer to the front of the screen). The **card picture** is behind (farther from the front of the screen) the objects in the card layer and in front of all the elements in the background layer.

card picture A picture in the **card layer** of a single card. Compare with **background picture.**

chunk A piece of a character string represented as a **chunk expression.** Chunks can be specified as any combination of characters, words, items, or lines in a container or other **source of value.**

chunk expression A HyperTalk description of a unique **chunk** of the contents of any container or other **source of value.**

command A response to a particular message; a built-in message handler residing in HyperCard. Compare with **function** and **keyword.** See also **external command.**

command-key (⌘-key) equivalent The combination of the ⌘ key and another key on the keyboard that you can press instead of choosing a command from a menu.

comments Descriptive lines of text in a script or program that are intended not as instructions for the computer but as explanations for people to read. Comments are set off from instructions by symbols called **delimiters,** which vary from language to language. In HyperTalk, a double hyphen (--) indicates the beginning of a comment.

constant A named **value** that never changes. For example, the constant `empty` stands for the null string, a value that can also be represented by the literal expression `" "`. HyperCard contains a number of constants, such as `true`, `false`, `up`, `down`, and `pi`. Compare with **variable.**

container A place where you can store a **value** (text or a number). Examples are **fields,** the **Message box,** the **selection,** and **variables.**

control structure A block of HyperTalk statements defined with **keywords** that enable a script to control the order or conditions under which specific statements execute.

current (adj.) The card, background, or stack you're looking at now. For example, the current card is the one you see in the active window on your screen.

debug To locate and correct an error or the cause of a problem or malfunction in a computer program, such as a HyperTalk script.

delimiter A character or characters used to mark the beginning or end of a sequence of characters; that is, to define limits. For example, in HyperTalk double quotation marks act as delimiters for **literals,** and **comments** are set off with two hyphens at the beginning of the comment and a return character at the end.

empty Used to describe scripts that contain no handlers. Every HyperCard object has a script, even if the script is empty. See also **null**.

expression A HyperTalk description of how to get a **value;** a **source of value** or complex expression built from sources of value and **operators.**

external command (Also known as XCMD.) A **command** written in a computer language other than HyperTalk but made available to HyperCard to extend its built-in command set. External commands can be attached to a specific stack or to HyperCard itself. See also **external function.**

external function (Also known as XFCN.) A **function** written in a computer language other than HyperTalk but made available to HyperCard to extend its built-in function set. External functions can be attached to a specific stack or to HyperCard itself. See also **external command.**

field A type of HyperCard **object;** a **container** in which you type field text (as opposed to Paint text). HyperCard has two kinds of fields—**card fields** and **background fields.**

function A named value that HyperCard calculates each time it is used. The way in which the value is calculated is defined internally for HyperTalk's built-in functions, and you can define your own functions with **function handlers.** Sometimes a script must supply a function with starting values or **parameters.** Compare with **command** and **keyword.**

function call The use of a function name in a HyperTalk statement or in the Message box, invoking either a **function handler** or a built-in **function.**

function handler A **handler** that executes in response to a **function call** matching its name.

global properties The properties that determine aspects of the overall HyperCard environment. For example, `userLevel` is a global property that determines the current **user level** setting.

global variable A **variable** that is valid for all handlers in which it is declared. You declare a global variable by preceding its name with the keyword `global`. Compare with **local variable.**

handler A block of HyperTalk statements in the script of an object that executes in response to a **message** or a **function call.** The first line in a handler must begin with the word `on`, and the last line must begin with the word `end`. Both `on` and `end` must be followed by the name of the message or function. HyperTalk has **message handlers** and **function handlers.**

hierarchy See **object hierarchy.**

Home cards The first five cards in the standard Home stack, designed to hold buttons that take you to stacks, applications, and documents. Choose Home from the Go menu (or press ⌘-H) to get to the card in the standard Home stack that you've seen most recently. You can also type `go home` in the Message box or include it as a statement in a handler.

HyperTalk The built-in script language for HyperCard users.

identifier A character string of any length, beginning with an alphabetic character, containing any alphanumeric character and, optionally, the underscore character. Identifiers are used for variable and handler names.

integer A number with no decimal part. For example, –6, 0, and 125 are all integers; 2.54 is not an integer.

keyword Any one of the 13 words that have a special meaning in HyperTalk statements. Examples of keywords are `end`, `if`, `on`, `repeat`, and `send`.

link A short script, usually in a button but potentially in any HyperCard **object,** that allows you to move immediately to a specific card in a stack, to an application, or to a document. For example, clicking a button that contains a link to your Addresses stack takes you immediately to the first card of that stack.

literal A string of characters intended to be taken literally. In HyperTalk, you use quotation marks (`" "`) as **delimiters** to set off a string of characters as a literal, such as the name of an object or a group of words you want to be treated as a text string.

local variable A **variable** that is valid only within the handler in which it is used (local variables need not be declared). Compare with **global variable.**

loop A section of a **handler** that is repeated until a limit or condition is met, such as in a `repeat` structure.

message A string of characters sent to an object from a script or the Message box, or that HyperCard sends in response to an event. Messages that come from the system—from events such as mouse clicks, keyboard actions, or menu commands—are called **system messages.** Examples of HyperTalk messages are `mouseUp`, `go`, and `push card`. See also **handler** and **object hierarchy.**

Message box A **container** that you use to send messages to objects or to evaluate **expressions**.

message handler A **handler** that executes in response to a **message** matching its name.

message-passing order The order in which a **message** is passed between objects. For example, a message that goes first to a button, such as `mouseUp`, would go next to the card, then to the background, then to the stack, and finally to HyperCard itself, unless intercepted and acted upon by a **handler.** See also **object hierarchy.**

metasymbol See **syntax.**

null Having no value at all, not even zero. The HyperTalk constant `empty` is defined as a string containing nothing—that is, a null string. A string containing 0 would not be empty.

number A character string consisting of any combination of the numerals 0 through 9, optionally including one period (.) representing a decimal value. A number can be preceded by a hyphen or a minus sign to represent a negative value.

object An element of the HyperCard environment that has a **script** associated with it and that can send and receive messages. There are five kinds of HyperCard objects: buttons, fields, cards, backgrounds, and stacks.

object descriptor A HyperTalk description that specifies a unique object. An object descriptor is formed by combining the name of the type of object with a specific name, number, or ID number. For example, `background button 3` is an object descriptor.

object hierarchy The hierarchy of objects according to their **message-passing order.** For example, for a message such as `mouseUp`, the button that first receives the message is higher in the object hierarchy than the background, the stack, or HyperCard itself.

object properties The properties that determine how HyperCard objects look and act. For example, the `autohilite` property of a button determines whether the button will highlight when clicked.

operator A character or group of characters that causes a particular calculation or comparison to occur. In HyperTalk, operators operate on **values.** For example, the plus sign (+) is an arithmetic operator that adds numerical values.

painting properties The properties that control aspects of HyperCard's painting environment, which is invoked when you choose a Paint tool. For example, the `brush` property determines the shape of the Brush tool.

palette A small window that displays icons or patterns you can select by clicking. You can see two of HyperCard's palettes, the Tools palette and the Patterns palette, simply by "tearing off" their respective menus. To see the Go palette, type `show go window` in the Message box. See also **tear-off menu.**

parameters Values passed to a handler by a **message** or **function call.** Any expressions after the first word in a message are evaluated to yield the parameters; the parameters to a function call are enclosed in parentheses or, if there is only one, it can follow `of`.

parameter variables Local variables in a handler that receive the values of parameters passed with the message or function call initiating the handler's execution.

picture Any graphic or part of a graphic, created with a Paint tool or imported from an external file, that is part of a card or background.

pixel Short for "picture element"; the smallest dot you can draw on the screen. The position of the pointer is often represented by two numbers separated by commas. These numbers are horizontal and vertical distances of the pointer from the left and top edges of the card window, measured in pixels. The upper-left corner of the screen has the coordinates `0,0`.

point In printing, the unit of measurement of the height of a text character; one point is about ½ of an inch. When you select a font, you can also select a point size, such as 10-point, 12-point, and so on. Also, a location on the screen described by two integers, separated by a comma, that represent horizontal and vertical offsets measured in pixels from the upper-left corner of the card window or (in the case of the card window itself) of the screen.

properties The defining characteristics of any HyperCard object and of HyperCard's environment. For example, setting the user level to Scripting changes the `userLevel` property of HyperCard to the value `5`. Properties are often selected as options in dialog boxes or on palettes, or they can be set from handlers. See also **global properties, object properties, painting properties,** and **window properties.**

Recent A special dialog box that holds pictorial representations of the last 18 unique cards viewed. Choose Recent from the Go menu to get the dialog box. Also, as in `recent card`, a HyperTalk adjective describing the card you were viewing immediately prior to the current card.

recursion The continuing repetition of an operation or group of operations. Recursion occurs when a handler calls itself.

resource fork The part of a file that contains resources such as icons and sounds.

script A collection of **handlers** written in HyperTalk and associated with a particular **object.** You use the **script editor** to add to and revise an object's script. Every object has a script, even though some scripts are empty; that is, they contain nothing.

script editor A large window in which you can type and edit a **script.** The title bar of the script editor describes the object to which the script belongs. You can use the Edit menu, the Script menu, and keyboard commands to edit text in the script editor. See also **handler, object,** and **script.**

scripting The act of writing **scripts,** or programs in HyperTalk. Also refers to the **user level** that allows you to look at and change objects' scripts.

search path When you open a file from within HyperCard, HyperCard attempts to locate the stack, document, or application you want by searching the folders listed on the **Search Paths card** in the Home stack. Each line on the Search Paths card indicates the location of a folder, including the disk name (and folder and subfolder names, if any). This information is called a search path. Items in a search path are separated by colons, like this: `:my disk:HyperCard folder:my stacks:`

Search Paths card A card in the Home stack used to store information about the location of stacks, documents, and applications that you open while HyperCard is running. See also **search path.**

selection A **container** that holds the currently selected area of text. Note that text found by the `find` command is not selected.

shared text Field text that appears on every card in a background. Shared text can only be edited from the **background layer.**

source of value HyperCard's most basic expressions; the language elements from which values can be derived: **constants, containers, functions, literals,** and **properties.**

stack A type of HyperCard **object** that consists of a collection of **cards;** a HyperCard document.

statement A line of HyperTalk code inside a **handler** or typed into the **Message box.** A handler can contain many statements. Statements within handlers are first sent as **messages** to the **object** containing the handler and then to succeeding objects in the **object hierarchy.** Statements typed into the Message box are sent to the current card.

string A sequence of characters. You can compare and combine strings in different ways by using **operators.** In HyperTalk, for example, `23 + 23` will result in `46`; but `23 & 23` will result in `2323`.

subprocedure A part of a larger procedure. You can write scripts that perform complex tasks by dividing the task into parts and writing **message handlers** to perform each subprocedure.

syntax A description of the way in which language elements fit together to form meaningful phrases. A syntax statement for a command shows the command in its most generalized form, including placeholders (sometimes called metasymbols) for elements you must fill in, as well as optional elements.

system message A **message** sent by HyperCard to an object in response to an event such as a mouse click, keyboard action, or menu command. Examples of HyperCard system messages are `mouseUp`, `doMenu`, and `newCard`.

target The object that first receives a message.

tear-off menu A menu that you can remove from the menu bar by dragging the pointer beyond the menu's edge. HyperCard has three menus that can be torn off: the Tools menu, the Patterns menu, and the Go menu. When torn off, these menus are referred to as **palettes.**

text property A quality or attribute of a character's appearance. Text properties include style, font, and size.

tick Approximately one-sixtieth (1/60) of a second. The `wait` command assumes a value in ticks unless you specify seconds by adding `secs` or `seconds`.

user level A **property** of HyperCard, ranging from 1 to 5, that determines which of HyperCard's capabilities are available. You can select the user level on the **User Preferences card** in the Home stack. Each user level makes all the options from the lower levels available, and gives you additional capabilities. The five user levels are: Browsing, Typing, Painting, Authoring, and Scripting.

User Preferences card The last card in the Home stack, where you can set your **user level** and select or deselect the Blind Typing, Power Keys, and Arrow Keys in Text options.

value A piece of information on which HyperCard operates. All HyperCard values can be treated as strings of characters—they are not formally separated into types. For example, a numeral could be interpreted as a number or as text, depending on what you do with it in a HyperTalk handler.

variable A named **container** that can hold a **value** consisting of a character string of any length. You can create a variable to hold some value (either numbers or text) simply by using its name with the `put` command and putting the value into it. HyperCard has **local variables** and **global variables.** Compare with **constant.**

window properties The properties that determine how windows such as the Message box and the Tool and Pattern palettes are displayed. For example, the `visible` property of a window determines whether that window is displayed on the screen.

C

T

U

V

W, X, Y, Z

HyperTalk®

Script editor keyboard commands

The following table lists keyboard combinations used to edit and format scripts.

Key combination	Effect
⌘-A	Select entire script
⌘-C	Copy selection to Clipboard
⌘-F	Find text (same as Find button)
⌘-G	Find next occurrence of same text
⌘-H	Find current selection
⌘-P	Print selection or (if no selection) entire script (same as Print button)
⌘-V	Paste Clipboard contents at insertion point
⌘-X	Cut selection to Clipboard
⌘-period	Close script without saving changes
Enter	Close script and save changes
Return	Return character—indicates end of HyperTalk statement
Option-Return	Wrap line without return character ("soft" return—symbolized by ¬ in scripts. Don't use a "soft" return inside quotation marks.)
Tab	Format script

Commands

This section lists the syntax of all HyperTalk commands. For more information about other HyperTalk commands, see the HyperTalk Help stack or the *HyperCard IIGS Script Language Guide.*

```
add number to [chunk of] container

answer question
answer question with reply
answer question with reply1 or reply2
answer question with reply1 or reply2 or reply3
answer file text [of type fileType]

arrowKey direction

ask question [with defaultAnswer]
ask password question [with defaultAnswer]
ask file text [with fileName]

beep [number]

choose toolName tool
choose tool number

click at point
click at point with key1
click at point with key1, key2
click at point with key1, key2, key3

close file fileName

close printing

controlKey keyNumber

convert [chunk of] container to format [and format]

create stack stackName [with background]

delete chunk of container
delete [stack] stackName

dial number
dial number with modem [modemCommands]

divide [chunk of] container by number
```

```
doMenu menuItem [without dialog]

drag from point to point
drag from point to point with key1
drag from point to point with key1, key2
drag from point to point with key1, key2, key3

edit script of object

enterKey

export paint to file filename

find text
find text [in backgroundField]
find chars text [in backgroundField]
find word text [in backgroundField]
find whole text [in backgroundField]
find string text [in backgroundField]

functionKey keyNumber

get expression

go [to] stack
go [to] background [of stack]
go [to] card [of background] [of stack]

help

hide button
hide field

hide card picture
hide picture of card
hide background picture
hide picture of background

hide menuBar
hide message box
hide tool window
hide pattern window
hide go window
hide card window

import paint from file filename
```

```
lock [the] printTemplate

lock screen

multiply [chunk of] container by number

open [fileName with] applicationName

open file fileName

open printing [with dialog]

play sound [tempo] [notes]
play stop

pop card
pop card into [chunk of] container
pop card after [chunk of] container
pop card before [chunk of] container

print field
print fileName with applicationName

print card
print number cards
print card
print all cards

push card

put expression
put expression into [chunk of] container
put expression after [chunk of] container
put expression before [chunk of] container

read from file fileName at start for numberOfChars
read from file fileName for numberOfChars
read from file fileName until character
read from file fileName until end
read from file fileName until eof

reset paint

returnKey
```

```
save this stack as fileName
save this stack as pathName
save [stack] stackName as fileName
save [stack] stackName as pathName

select button
select field

select text of container
select before text of container
select after text of container

select chunk of container
select before chunk of container
select after chunk of container
select empty
```

Note: *container* is a field or the Message box.

```
set [the] property [of object] to expression

show button [at point]
show field [at point]

show card picture
show picture of card
show background picture
show picture of background

show menuBar
show message box
show tool window [at point]
show pattern window [at point]
show go window [at point]
show card window

show number cards
show all cards

sort [sortDirection] [sortStyle] by expression

subtract number from [chunk of] container

tabKey
```

```
type text
type text with key1
type text with key1, key2
type text with key1, key2, key3

unlock [the] printTemplate

unlock screen
unlock screen with visualEffect
```

Note: *visualEffect* is any form of the `visual` command.

```
visual [effect] effectName [speed] [to image]

wait [for] number [seconds]
wait until condition
wait while condition

write text to file fileName [at start]
```