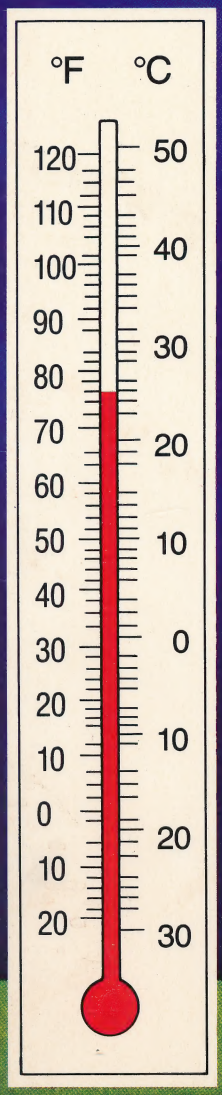
ACCU-WEATHER

FORECASTER™



Apple® Macintosh®
Requirements:
Plus, SE, SE/30, II series.
2 800k floppies or hard drive.
Hayes compatible modem.
System 6.04 or later.
Full Color Support.
Includes one hour of on-line time. Additional time available thru subscriptions starting at $39.95.

2190020-601001

Your Personal On-Line Weather Station

THE SOFTWARE TOOLWORKS

ACCU-WEATHER FORECASTER™

ALL THE WEATHER YOU NEED TO KNOW FOR...

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BUSINESS TRIPS
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GARDENING
SAILING
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FLYING
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Now, you can log on to the world's largest on-line weather service–Accu-Weather®...the weather service used by network TV stations, radio forecasters and major U.S. newspapers. The Accu-Weather Forecaster™ includes a customized account name and password.

ACCU-WEATHER IS...

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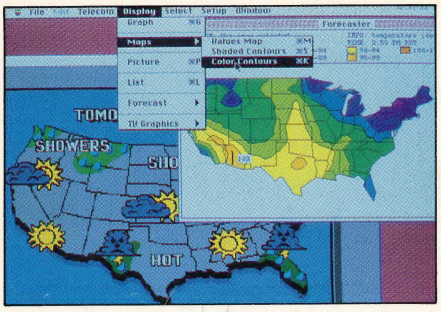
Access all the information the weather pros utilize displayed exactly as they use it or in our "Home Use" mode for easier viewing. Hourly weather conditions from thousands of locations around the world. All official forecasts, warnings, watches, and advisories and live lightning strikes, satellite pictures and radar displays. *Plus* over 25,000 other products, off-line analysis mapping and graphic of data.

FUN

Get a forecast from the pros or create your own! Watch storms as they move across the country toward *you.* Create your own customized Color Contour Maps. Choose the weather stations you would like to view and select temperature, barometric pressure, visibility, or any one of a dozen different data types. You may also zoom in on your maps and zoom out again–ALL-OFF-LINE!

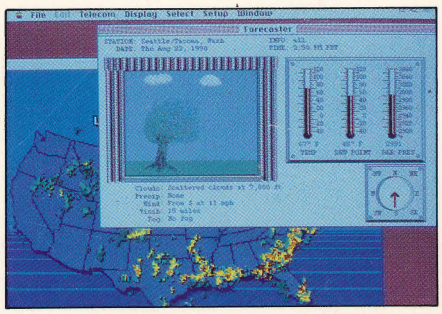


EASY

Fully automated telecommunications and access. Menus let you select the information you want, then sit back and watch the information roll in. Use Graph View to analyze data with ease, as you plot dew point versus time over the last 24 hours and overlay a plot of cloud base on the same graph.

EXCITING

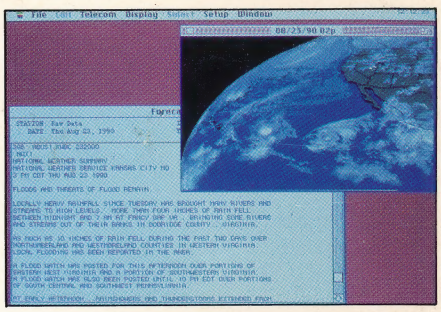
See the location of lightning strikes even before you hear the thunder! Access damage reports from tornadoes, hail, severe thunderstorms exactly as reported by police and other emergency response agencies. Get the inside scoop on National Weather Service internal discussions!



Actual unretouched screen shots

INFORMATIVE

What does it look like out the window? Let the Accu-Weather Forecaster show you with the Picture View. Where are the hottest and coldest places right now? Find out with List View. Sort the weather stations from highest to lowest pressures, from windiest to dead calm, or by any other data type.



FANTASTIC GRAPHICS

Full color graphics in rich detail, sophisticated graphs and charts, and Accu-Weather's proprietary high resolution Advanced Map Plotting System™ (AMPS™ give you unlimited display capabilities).

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You predefine your request; get the data and graphics, then disconnect–all further graphic display and analysis is done with no additional connect time. And Accu-Weather provides discount rates to users of this software.

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Macintosh
Disk 1

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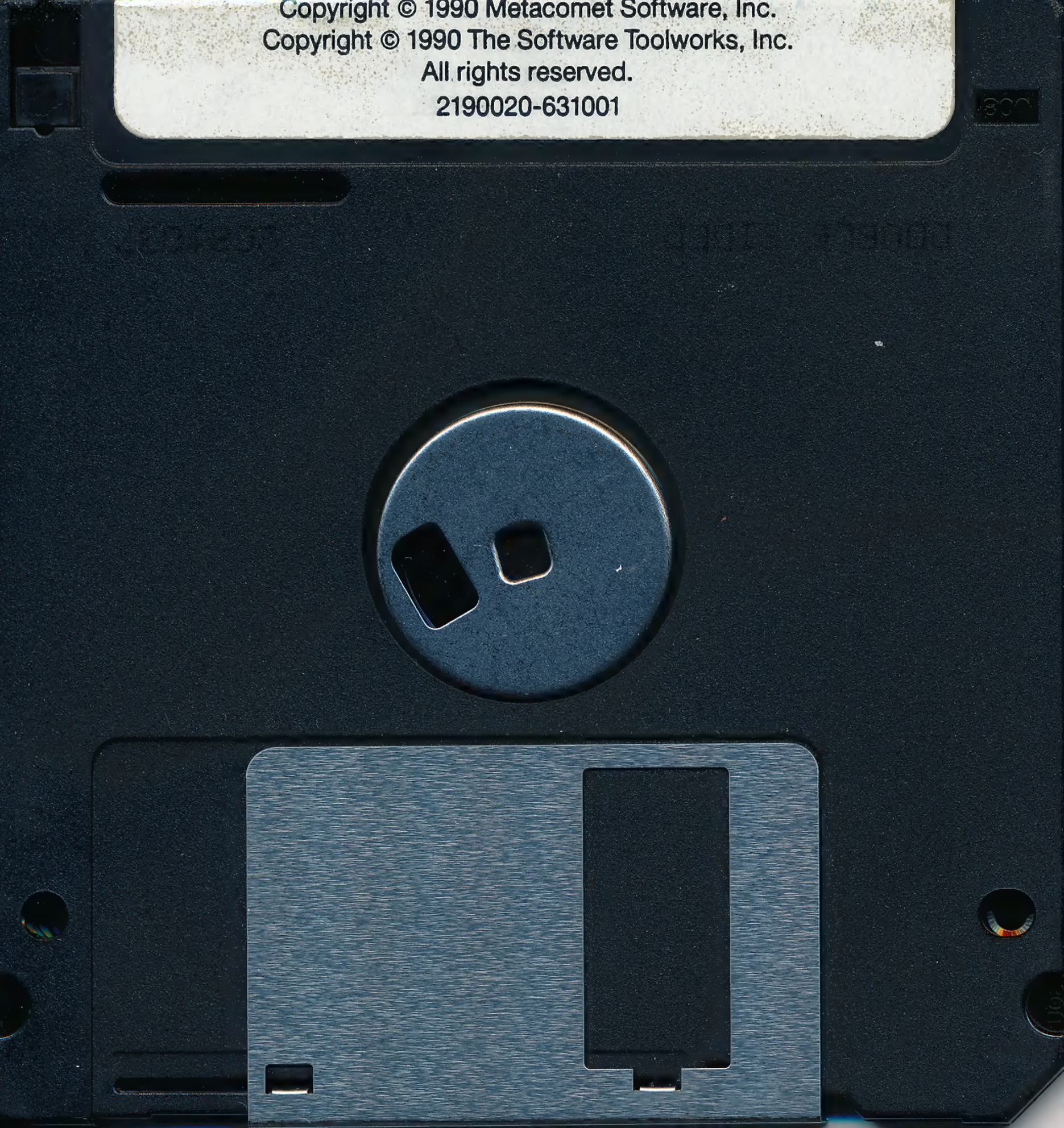
2190020-631001



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Disk 2

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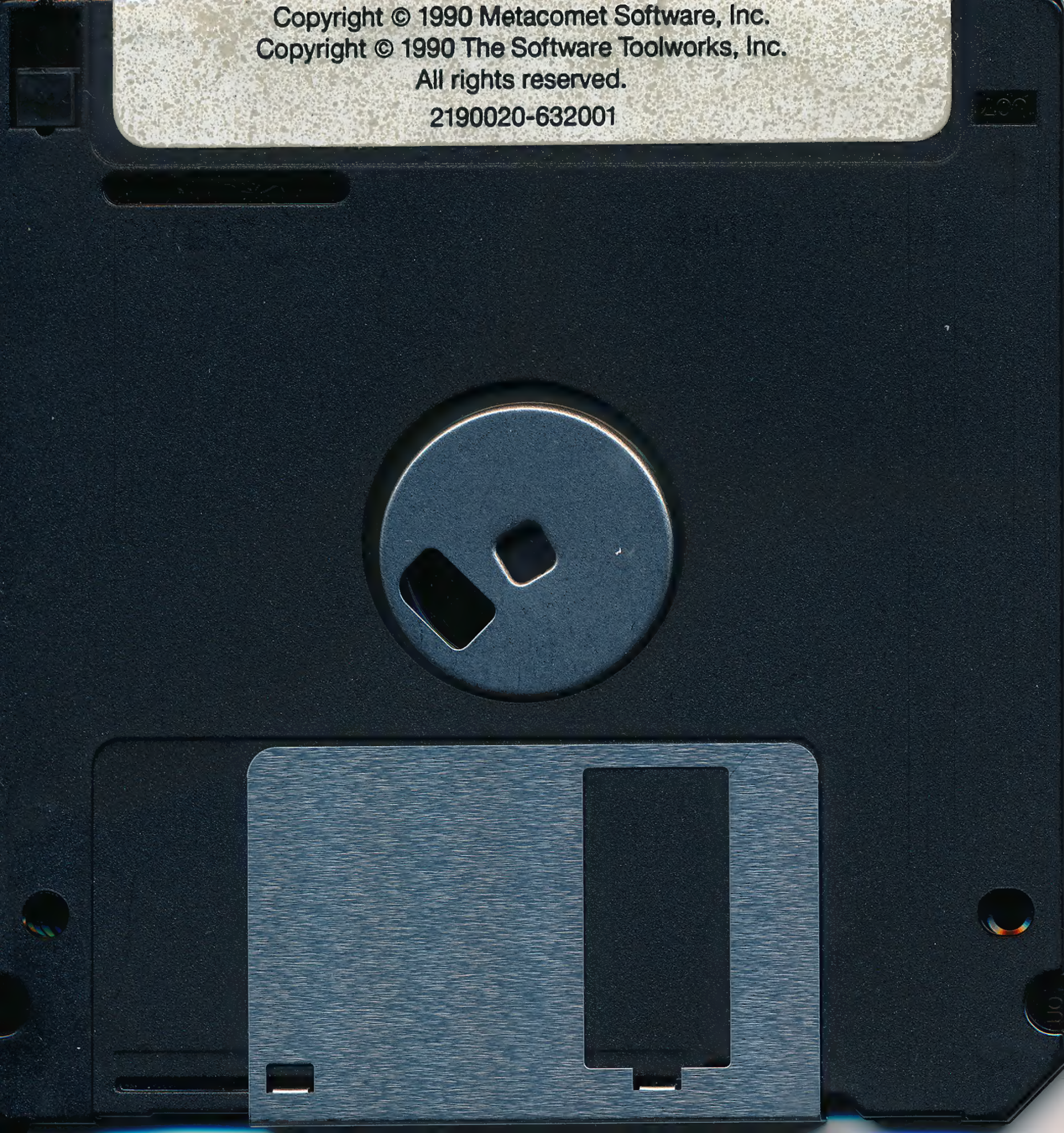

ACCU-WEATHER

FORECASTER™

Your Personal On-Line Weather Station

THE SOFTWARE TOOLWORKS

Accu-Weather
FORECASTER™

USER'S MANUAL

This version of the manual is for use on:
Macintosh computers.

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TABLE OF CONTENTS

GETTING STARTED

Introduction

Samuel Clemens once made this weather prediction:

"Probably nor'east to sou'west winds, varying to the southard and westard and eastard and points between; high and low barometer, sweeping round from place to place; probable areas at rain, snow, hail, and drought, succeeded or preceded by earthquakes with thunder and lightning. "

With the Accu-Weather Forecaster, you can receive — and make — weather forecasts a little more specific than that, although we have to admit that Sam Clemens probably *was* right. Through a direct connection to Accu-Weather®, Inc., the largest private weather forecasting and data service in the U. S., the Accu-Weather Forecaster gives you access to current weather information from any or all of the hundreds of National Weather Service stations across the country.

With the Accu-Weather Forecaster, you can:

- See weather conditions virtually as they happen anywhere in the country
- Automatically create your own weather maps
- Get up-to-the-minute forecasts and reports of weather conditions and changes
- Watch storms, fronts, and weather systems develop and move
- And more!

The Accu-Weather Forecaster delivers far more weather information than you can get from radio, TV, telephone, or newspaper forecasts and reports, and you can have the information when — and from where — you want it.

To get started with the Accu-Weather Forecaster, check the equipment requirements and follow the installation instructions on the next few pages. Once you have the program installed and running, section 2 of this manual (*Using the Accu-Weather Forecaster)* will help you learn the basic operation of the program.

Equipment Requirements

a) **Macintosh Plus, SE, SE30, or Macintosh II series computer with at least:**
- 1 megabyte of memory
- 2 800K floppy disk drives or 1 and a hard disk

b) **modem**
- 300, 1200, or 2400 baud, Hayes compatible

c) **printer** (optional):
- ImageWriter or ImageWriter II
- LaserWriter, LaserWriter Plus, LaserWriter II series or Personal LaserWriter

d) **System and Finder**
- System 6.0.4 (6.0.5 for Macintosh Portable) or later

Apple's latest System Software Package is available from your Apple Dealer.

Installing the Program

To install Accu-Weather to your Macintosh hard drive, make a new folder on your hard drive and drag all of the files from the original **program disk** into that folder. For more information on copying files, see your Macintosh manual.

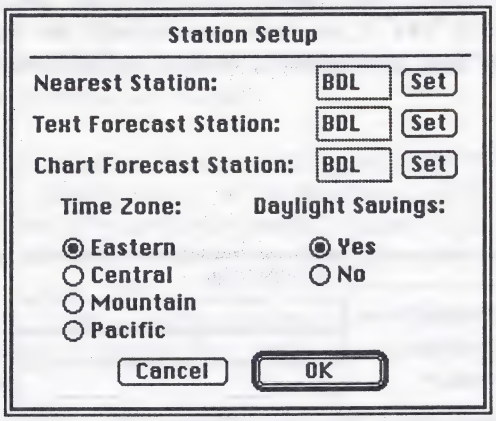
The package includes a second disk that has sample TV graphics images in two folders labeled **"Sample Color Images"** and **"Sample B & W Images"**. Depending on which type of machine you have, open the appropriate folder and drag all of the files from that source folder into the folder on your hard disk that has the program files. (Be sure you drag the individual files, not the file folder itself).

If you do not have a hard drive, you can run the program directly from a copy of the original program floppy disk. However, you will not have much space on your floppy disk for additional data and images. You may want to remove the sample images (file names ending in "TV1" or "TV2") to make additional space for new data.

Setting Up the Program with Your Information

In order for the Accu-Weather Forecaster to operate correctly for your particular situation, you need to enter and save some specific information about your location, your computer, and your telecommunications setup. This process is called **Setup.**

Station Info

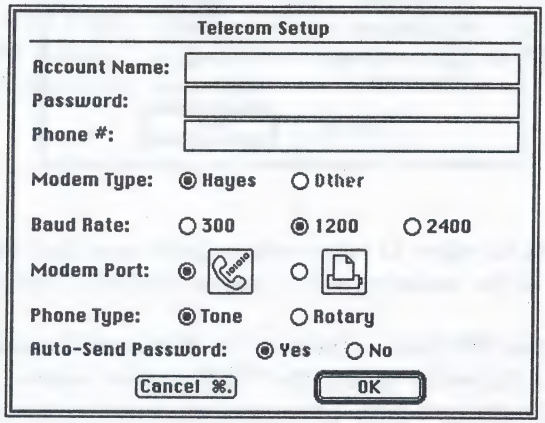


Station Info refers to information about your home location (the above example is for someone who lives in central Connecticut).

1. **Nearest NWS stn** — Refer to the **National Weather Service Stations List** in the Appendix to find the NWS station nearest you, and then enter the 3-letter station code. Some stations operate 24 hours per day, while others report only during the daytime. You may have to choose between a nearby station that only reports during the daytime, and a more distant station that reports 24 hours day.
2. **Text Forecast Station** — Not every station provides text forecasts. Refer to the **National Weather Service Stations List** (in the Appendix) to find the text forecast station nearest you. It may not be the same as the Nearest NWS Station.

3. **Chart Forecast Station** — Not every station provides chart forecasts. Refer to the **National Weather Service Stations List** (in the Appendix) to find the chart forecast station nearest you. It may not be the same as the Nearest NWS Station or the Text Forecast Station.
4. **Time Zone** — Select your time zone by clicking on the appropriate radio button. The time that appears in the Display Identifier is always your own local time.
5. **Daylight Savings Time** — Clicking on the **Yes** button indicates that daylight savings time is used in your area. The program will automatically determine which days use daylight savings time, so just set this to "yes" if you *ever* use daylight savings time, regardless of whether you are currently in the daylight savings time of year.

Telecom Info



Telecom Info refers to the type of telephone and modem you have, and some details about your Accu-Weather account.

1. **Account name** — The account name comes with your copy of Accu-Weather Forecaster. Consult the *Accu-Weather Forecaster Subscription Procedures* insert for more information.
2. **Password** — For security reasons, the actual password will not appear in the dialog box after the first time you type it in; it will be represented by dots: "•••••". Your password will also not appear on the screen when logging on the Accu-Weather's computer.
3. **Phone #** — This refers to **Accu-Weather's telephone number**. This number is provided by Accu-Weather and is listed on the *Accu-Weather Forecaster Subscription Procedures* insert.

   Some phones require extra digits or pauses in the dialing process. These can be included as follows:

   - **Extra digits**: If, for example, you have to dial "9" to get an outside line, simply put a 9 at the beginning of the number when you enter it.
   - **Pause**: If your phone needs a pause in the dialing process, insert a comma at the point where the pause is required.

4. **Modem Type** — Hayes modems (or 100% compatibles) are the only acceptable modems. The Apple Personal Modem is a Hayes-compatible modem.
5. **Baud Rate** — Select 300, 1200 or 2400 depending on the speed of your modem. If you do not know which it is, please refer to your modem's manual.
6. **Modem Port** — The modem can be connected to the "Modem Port" or the "Printer Port." These are on the back of your Mac, and have icons to identify which is which. The modem is normally connected to the modem port.
7. **Phone Type** — Your telephone line is either touch-tone or rotary (pulse). If you do not know which type your line is, listen as you dial. If you hear "clicks", you have a rotary phone. If you hear "beeps", your phone is touch-tone.
8. **Auto-Send Password** — Set this to "Yes" to have the program automatically remember your password and send it to Accu-Weather during the log-on process. If you select "No", the program will ask you for the password before attempting to connect with Accu-Weather. This feature enables you to protect your account from unauthorized access when other people might be using your computer.

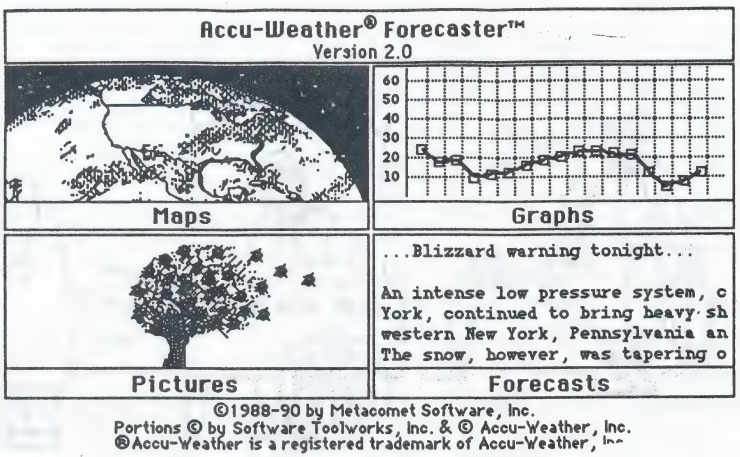
EASY GUIDED TOUR

Easy Guided Tour

Follow these step-by-step instructions to get an introduction to the capabilities of the Accu-Weather Forecaster.

Lesson 1 - Demo Data

Once you've started the program, you first see the Software Toolworks, Inc. logo, and then the following screen:



Startup screen

Notice that most of the choices on the menu bar are dimmed; you can't select them (yet). The first choice you must make is indicated by the two buttons near the bottom of the screen: **Use Real Data** and **Use Demo Data.** Position the cursor on **Use Demo Data** and click the mouse button. This tells the Accu-Weather Forecaster what kind of information to use for this session. Once you make your choice, most of the items on the menu bar become available.

About the demo data:

As explained in the Demo Data section of this manual, you have been transported in time to 9:15 p.m., on January 22, 1990. A major snow storm is attacking the Northeast. You will study the weather conditions from the perspective of someone living in central Connecticut.

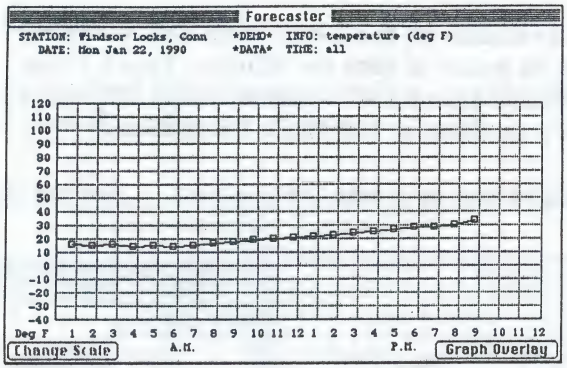
The data available on the Demo Data disk includes:

- past 24 hours of data for Windsor Locks, Conn.
- 8:50 p.m. data for all stations within 250 miles
- 8:50 p.m. data for 100 major US stations

Everything is now as it was then, except. . . *you are there.*

Lesson 2 - Graphs

Pull down the **Display** menu and select **Graph**. A graph will appear on the screen:



Graph of temperature in Windsor Locks, Conn. on January 22, 1990

Display identifier:

What does this graph show? Look for the part of the display that looks like this:

```
STATION: Windsor Locks, Conn     *Demo*   INFO: Temperature (deg F)
DATE: Mon Jan 22, 1990           *DATA*   TIME: all
```

This is the **Display Identifier**. It tells you four things:

1. **Station**: Windsor Locks, Connecticut
2. **Info**: Temperature
3. **Date**: January 22, 1990
4. **Time**: all times

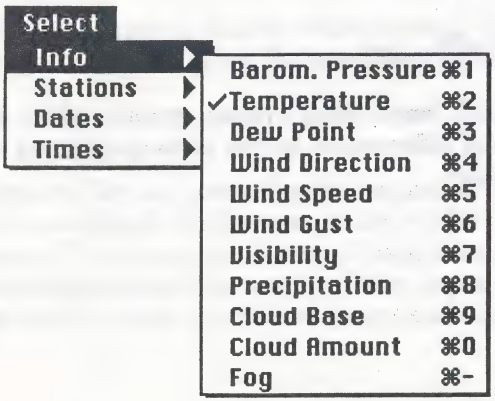
So, this graph shows "Temperature in Windsor Locks, Connecticut, for all times on January 22, 1990." Notice that the temperature rises from a low of 15 degrees to a high of 32. The temperature scale appears on the left edge of the graph. The times appear at the bottom of the graph.

National Weather Service:

Why Windsor Locks, Connecticut? Windsor Locks is a **National Weather Service (NWS)** weather reporting station. There are about 1,000 NWS stations throughout the nation. Every hour they take a standard set of weather observations. The data from these observations is collected by the National Weather Service, and then disseminated (virtually instantaneously) to weather forecasters all over the country. The Accu-Weather Forecaster uses these data for almost all of its displays. For our demo situation, Windsor Locks, Connecticut is the nearest NWS station.

Change info:

Now let's look at a graph of barometric pressure. Pull down the **Select** menu and position the cursor on **Info**. Immediately you see a larger menu:



Now select **Barom. Pressure**. Why barometric pressure? Technically speaking, barometric pressure represents the weight of the air above a

particular location. As you use this program you'll learn a few lessons about weather forecasting, so here is:

Simplified Weather Lesson #1:

"Low pressure corresponds to storm systems, high pressure corresponds to nice clear skies." Looking now at the graph, what is happening to the barometric pressure? It's falling; in fact it's falling dramatically. A storm system is probably approaching.

Precipitation:

Now select **Precipitation** as the type of information. Notice that light snow started at noon, and the snowfall became more intense over the next few hours. A few hints about precipitation information:

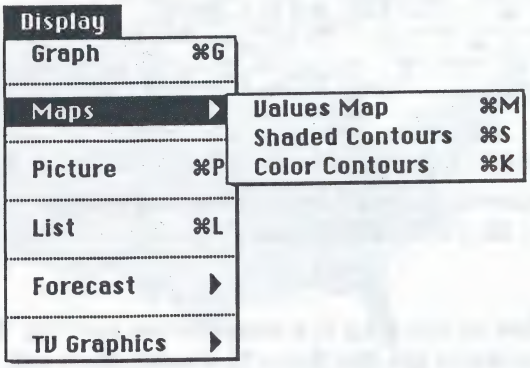
1. N stands for no precipitation; S stands for snow; other precipitation codes are listed at the top of the screen.
2. the heavier the precipitation, the higher the position of the code letter on the graph.

Other Graph Stuff:

Later on you'll learn about overlay graphs, which enable you to see two or three types of information on the same graph, but now let's move to another type of display.

Lesson 3 - Maps

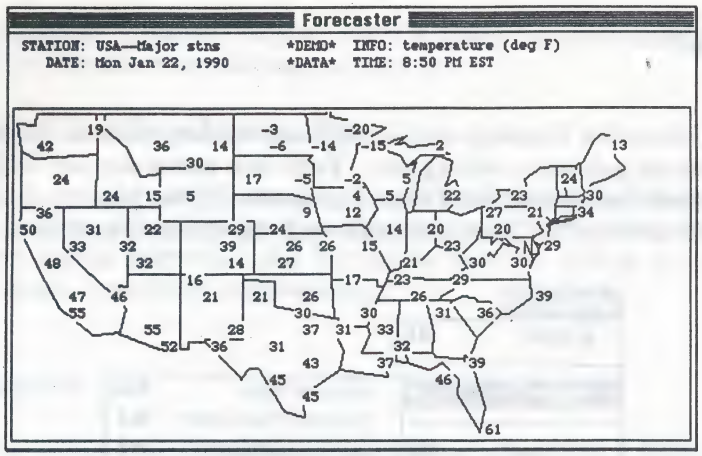
Pull down the **Display** menu and position the cursor on **Maps.** The following submenu will appear. You'll see three choices: **Values Map, Shaded Contours,** and **Color Contours** (if your Macintosh can only display black and white, Color Contours will be dimmed and unavailable).



The first thing you need to do is to select the way information will be displayed on your map, so select **Values Map** from the menu.

Default values:

To make life easy for you, each display begins with a certain type of information as a default. In the case of the surface map display, the default is temperature. This shows you the most recent temperature data for 100 major stations throughout the nation. Other types of information are available by pulling down the **Select** menu and selecting **Info.**

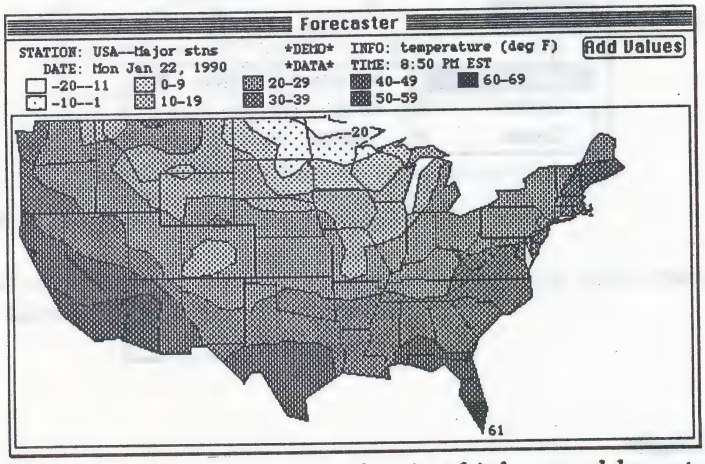


Map of temperature at 100 major stations throughout the US, on January 22, 1990, at 8:50 p.m.

Each number on the map is a temperature reading. Try to find the lowest value (hint: it's in the Northern Midwest). We'd ask you to find the highest value also, but we don't want you to go blind, and there's an easier way to study all those values.

Contours:

You are about to see one of the most powerful features of this program. Simply pull down the **Display** menu, position the cursor on **Maps**, select **Shaded Contours** from the submenu, and watch what happens:



Contour map of temperature, showing highest and lowest values

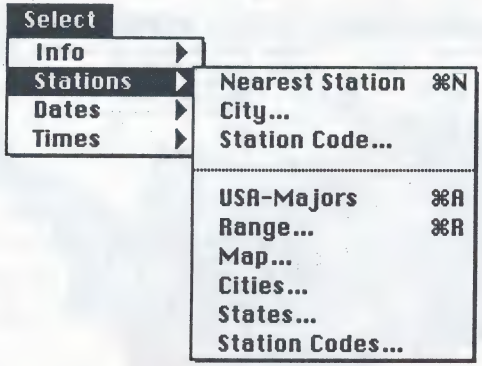
All those numbers are now much easier to understand. Similar values are indicated by the contour lines. The highest value (61°F, in Miami) is the center of the warmest area (probably nice weather there). The low temperature center is in International Falls, Minnesota, where it's -20°F (probably a lot of chills there). Any type of information can be displayed on a contour map, giving you a very visual way to examine weather patterns.

Both Values and Contours:

If you display a Contour Map, you can see the actual values displayed over the contours. Just click the **Add Values** button in the upper right corner of the window. Try mapping some other information. Choose **Info** from the **Select** menu, and then select temperature. The map now shows temperatures around the nation. After you've examined the temperature map, try some other types of information.

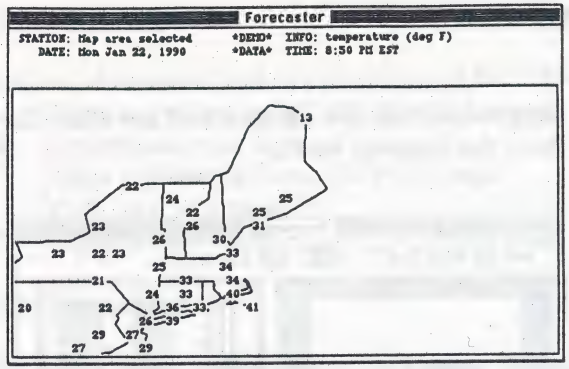
Change Station:

Are you ready to zoom in for a closer look at the Northeast? Pull down the **Select** menu and position the cursor on **Stations**. This enables you to choose a different set of stations to be displayed. You now see:



Select Range:

Range is a very easy station selection procedure to use. "Range" means select all stations within a range of miles from your home base. Enter "250" in the text box, and click **OK**. This means that you want all stations within 250 miles of Windsor Locks, Conn. (your pretend home base). The new map that you see gives you a close-up view of the Northeast.

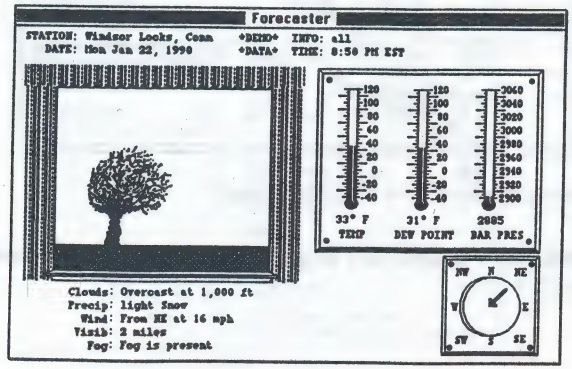


Map of temperatures in the Northeast

Of interest here is the fact that some stations are below freezing and some are above.

Lesson 4 - Pictures

Now it's time to look out the window and see what the weather is like. Select **Picture** from the **Display** menu.



Picture view for Windsor Locks, Conn, on January 22, 1990, at 8:50 p.m.

The Picture format is like a "snapshot" of a single moment in time at a single location. In this case, the Display Identifier tells us that we are in Windsor Locks, Conn., on January 22, 1990 at 8:50 p.m.

"Window View":

The left side of the display is a large rectangle. This is a window (the kind in a house, not a Macintosh window). Looking outside, we see clouds, snow, and a tree bending moderately in the wind.

Wind Direction:

The compass at the lower right shows that the wind is blowing from the northeast. (Notice that the wind blows from the tail to the head of the arrow).

Weather Descriptions:

To the left of the compass are five lines of text. They tell us:

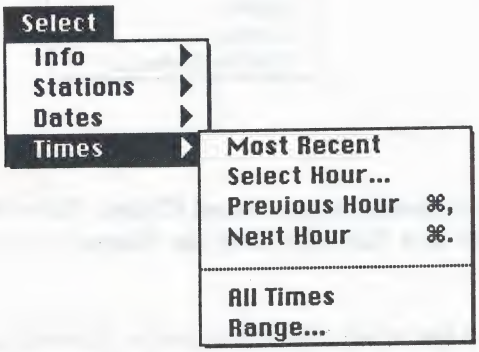
1. Clouds are "overcast" (100% cloud cover)
2. Precipitation is light snow
3. Wind is blowing from NE at 16 mph
4. Visibility is 2 miles
5. Fog is present

Column instruments:

In the upper right corner of the display are three column instruments. The first is a thermometer, indicating that the temperature is 33 degrees. The next instrument gives the dew point (a measure of humidity) as 31 degrees. The third instrument is a barometer, showing the barometric pressure to be 28.85 inches.

Change Times:

Let's see what it was like one hour ago. Pull down the **Select** menu and position the cursor on **Times**. You now see this menu:



Prev Hour:

Select **Previous Hour**. It should be no surprise that the time is now 7:50 p.m. (one hour earlier). Among the minor differences are lower clouds, colder

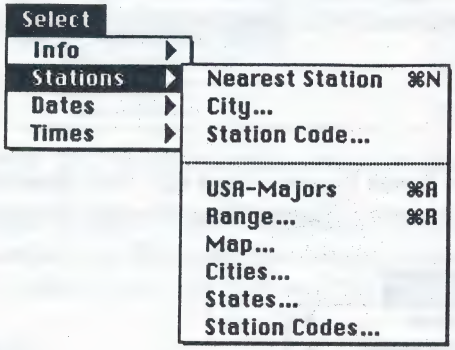
temperature and lower visibility. Try **Previous Hour** a few more times and notice the differences.

Most Recent:

To get back to the most recent time available, simply select **Most Recent**. Notice that you have returned to 8:50 p.m.

Change Stations:

Now let's do some traveling, and find out what the weather is like in a few other locations. Pull down the **Select** menu and position the cursor on **Stations**. You now see this menu:



City name:

First, let's go to Boston, Mass. Select **Cities**. You see a list of all the states (except Alaska and Hawaii). Click on Massachusetts to select it, then click on **OK**.

You now see a list of all NWS stations in Massachusetts. Select Boston and click **OK**. Now the picture shows the weather in Boston, Mass. Notice that the weather is similar to Windsor Locks, Conn. except that the wind is stronger (gusting to 43 mph). Try a few other locations.

Some Stations Aren't Included in the Demo Data:

The demo data includes data from only about 200 stations. If you select a station not included in that list, the program will ask you to select a different station.

Lesson 5 - Forecasts

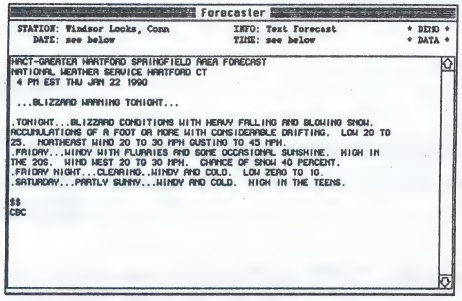
If you review the actual weather information displayed during the previous "lessons", you might be able to make a general forecast of your own for our imagined home in central Connecticut. Because we are still in the grip of the intense low pressure area, we should expect precipitation to continue for a while longer.

Simplified Weather Lesson #2:

Weather generally travels from west to east, taking about 4 days to travel from the west coast to the east coast.

Our national map showed us that precipitation covered a broad area all around us. Therefore, we should expect the snow to continue overnight, probably stop sometime tomorrow, and then be followed by gradually clearing weather. The contour temperature map showed that cold air would be moving in behind the storm, so we would expect cooler temperatures.

Well, let's see what the professionals say. Pull down the **Display** menu and position the cursor on **Forecast** and then select **Station-Text** (Another way to make this selection is to hold down the Command key and press "F").



Forecast for Windsor Locks, Connecticut

As a matter of fact, they forecast a major snowfall (no surprise given all the snow that has fallen during the day and continues to fall all around us). They also forecast gradual clearing and colder temperatures.

This forecast was prepared by the professionals of the National Weather Service. They used the same data that we have been looking at, but they also have access to a few more sophisticated tools, such as upper air data, satellite photos, radar information and much more. And they have professional training in meteorology.

You can make your own forecasts simply by examining the data or you can refer to the professional forecasts that are available (when you learn how to get real data) from hundreds of stations all over the country.

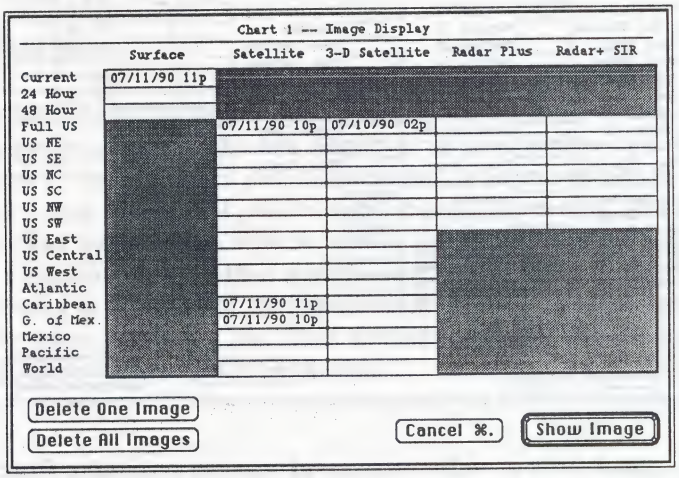
Lesson 6 - TV and AMPS Graphics

TV Graphics and AMPS graphics are the highest resolution graphics available in the Accu-Weather Forecaster. TV Graphics includes a number of types of images, from actual satellite color photographs to manually illustrated maps. AMPS stands for Advanced Map Plotting System, and includes both maps and graphs of surface, upper air, and computer-generated forecasting information. TV Graphics images include many of the same images you see in televised weather forecasts — and many more striking images that you don't get to see otherwise!

Unlike the other displays available in the Accu-Weather Forecaster, TV Graphics and AMPS graphics are not generated by your computer; they're simply downloaded "as-is" from Accu-Data.

TV Graphics

Pull down the **Display** menu and position the cursor on **TV Graphics**, then select **Chart 1 - Surf/Rad/Sat**. The following dialog appears, allowing you to select from available radar and satellite images:

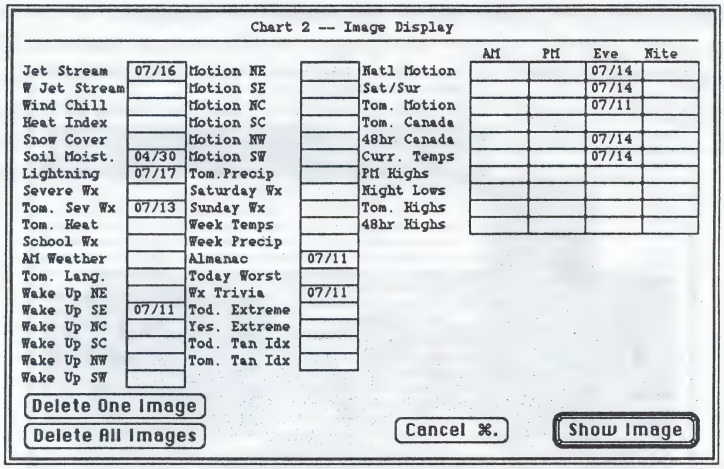


To select any image for display, simply click on it and click the **Show Image** button. The TV Graphics window will appear on your screen, and the image you've selected will appear in that window. If you have a large-screen attached to your computer, the TV Graphics window can be made larger by clicking in the *zoom box* in the upper right corner of the window.

The images listed in Chart 1 include:

1. **Surface maps** (hand-drawn national maps)
2. **Satellite images** (enhanced photos from weather satellites)
3. **3-D satellite images** (satellite photos enhanced to represent the height of cloud formations)
4. **Radar Plus images** (composites of results from numerous weather radar installations across the country - these images show *intensity* of precipitation)
5. **Radar Plus SIR images** (the SIR stands for Snow, Ice, and Rain - these are radar composites showing *type* of precipitation).

Now look at the second set of TV Graphics images by pulling down the **Display** menu, positioning the cursor on **TV Graphics**, and selecting **Chart 2 - Other Images**. The following dialog will appear:



This chart lists a wider variety of images available from Accu-Weather, Inc. While many of these are maps, there are others, including the Almanac and Wx Trivia, that are not. Select an image by clicking on it, then click the **Show Image** button. Note that the new image you've selected fills the existing TV Graphics window on your screen; the image you chose from Chart 1 is replaced. You can only have one TV Graphics image on the screen at a time.

AMPS Graphics

AMPS graphics differ from the images in Chart 1 and Chart 2 in several ways. The first difference you'll notice, if you pull down the **Display** menu, position the cursor on **TV Graphics**, and select **AMPS Graphics**, is that you select these through a list rather than a chart. This is because the Accu-Weather system offers such an immense variety of AMPS graphics that we couldn't fit them all into any number of charts. In fact, as you'll find later on when you've set up your Accu-Weather account and logged on, you can design your own AMPS graphics! Therefore, *the list you see when you select*

AMPS Graphics from the menu is a list of the images on your disk, not the images available from Accu-Weather. Choose an image from the list by clicking on it and clicking the **Open** button. The AMPS image will appear in its own window on the screen - not the TV Graphics window. You can select the window you want to be active by using the **Window** menu, or by clicking on some part of the window you want to make active.

Named Images

The last choice under **TV Graphics** on the **Display** menu, **Load Named Image**, works just like the AMPS Graphics choice. You'll see a list of TV Graphics images that you downloaded interactively through an Explore Accu-Data session (if you haven't downloaded any images from Accu-Weather yet, the list will be blank; the program disk doesn't include any TV Graphics images that aren't listed on the two charts). This choice is provided to enable you to download and display additional types of images from Accu-Weather, Inc. This process is explained in detail in the "Explore Accu-Data" section of the manual.

Lesson 7 - You're On Your Own Now

If We Had Time:

We could expand your guided tour to include several more aspects of the program such as:

1. List format
2. Other ways to select stations
3. Using Archive files
4. And more!

However, you have at least been introduced to the basic capabilities of the program. From here, you should be able to explore on your own without too much difficulty.

Getting Real data:

Obviously, the most exciting part of this program will come when you use real data instead of the demo data. Please refer to the "Getting Real data" section of the manual to find out how to:

1. Activate your subscription with Accu-Weather
2. Connect your modem
3. Set up the program with your account name & password
4. Select the data to request
5. Automatically get the data

Once you get started, the process of getting the data is very easy. And then you will have the most current weather information available from all over the nation.

DATA IN THE ACCU-WEATHER FORECASTER

Data in the Accu-Weather Forecaster

One of the most important things the Accu-Weather Forecaster does for you is to present weather data in a variety of ways. All of the other displays in the program are alternative ways to look at essentially the same information. TV Graphics and AMPS Graphics are exceptions; they're not created by the Accu-Weather Forecaster from the raw downloaded data; rather, they're downloaded as full-screen images to be displayed on your Macintosh.

This chapter presents the three types of data available in the program: demo data, real data, and archive data. Also covered in this chapter are the various ways to choose the data you want to see, as well as an explanation of how you can look at a particular sort of data: National Weather Service forecasts.

Demo, Real, and Archive Data

Demo Data are provided with the Accu-Weather Forecaster to give you a chance to explore the program immediately, before you set up your account with Accu-Weather, Inc.

We recommend that you explore the basic operation of the Accu-Weather Forecaster using this demo data. To use the Demo Data, simply select **Demo Data** by clicking the button on the **Startup Screen** (or select **Demo Data** from the **File Menu**).

The demo data represent the evening of January 22, 1990, when a major storm was covering the Northeast with a good deal of snow. For the purpose of the demo, pretend that you live in central Connecticut, that it is 9:15 p.m., and that you have just received the very latest weather information, as follows:.

- **Windsor Locks, Conn.** — hourly reports for the past 24 hours and the most recent forecast
- **All weather stations within 250 miles of Windsor Locks, Conn.** — most recent hourly report

- **100 major National Weather Service stations** — most recent hourly report
- National Weather Service's most recent **"US Summary"** report

Whenever you use the demo data, the program will automatically consider Windsor Locks, Connecticut to be your "Nearest Weather Station".

Real Data are the "live" weather data you get from Accu-Weather, Inc., when you set up your account and use the Accu-Weather Forecaster to define your request for information and download that information.

To use Real Data, simply select **Real Data** by clicking the button on the **Startup Screen** (or select **Real Data** from the **File Menu**). Real data includes as many kinds of weather observations as you want from as many National Weather Service stations as you choose. There are over 900 officially-reporting weather stations in the country, 12 different types of information available in each report, and up to 24 hourly reports per day from each station — or a potential total of over a quarter of million pieces of weather information per day! In other words, you can have a *lot* of real weather data on your computer. To get real data, you have to download it from Accu-Weather, Inc. (refer to the Telecommunications chapter). Once real data are stored on your data disk, the Forecaster can show some or all of it to you in lots of different ways, as we explain below in the Selecting Data section.

Archive Data are real data you've downloaded from Accu-Weather, Inc., and have stored for future reference. You store real data in an "archive file" by selecting **Save to Archive...** from the **File** menu. You can use archive data at any time by selecting **Open Archive...** from the **File** menu. Once you open an archive file, its contents become your active data, and you can choose to see it in various ways as explained below in "Selecting Data."

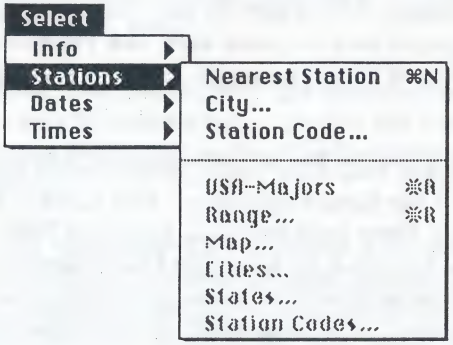
Selecting Data

Choose from four items to specify what information you would like to see displayed from the data you *already have* on your data disk: **Info, Stations, Dates,** and **Times.** These are the choices under the **Select** menu. For example, you might have a map of temperature displayed, and want to see wind speed instead. The **Info** choice under the **Select** menu lets you do this. Other choices under the **Select** menu let you select data from a different location, such as Boston or San Francisco, a different date, or a different time of day.

Selecting Stations

"**Stations**" refer to the National Weather Service stations that take hourly observations. A full list of all NWS stations is in the Appendix.

If the current type of display (such as a graph) allows for selection of only one station, you will see the following choices under the **Select-Stations** menu:



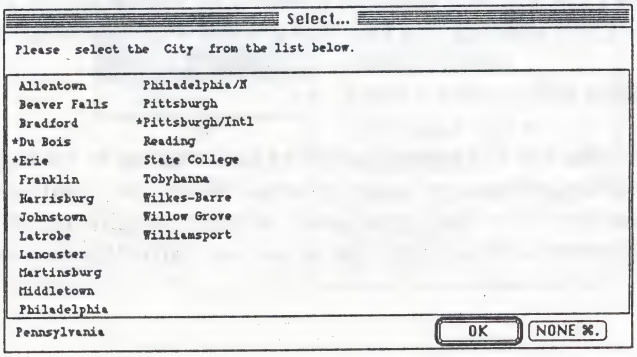
When the type of display (such as a map) allows you to select more than one station, all the choices in the **Select-Stations** menu will be available to you.

For any of the selection procedures described below, *you are limited to a maximum of 100 stations.* Whenever you select more than 100 stations, the program will *automatically* reduce the size of the list by eliminating any

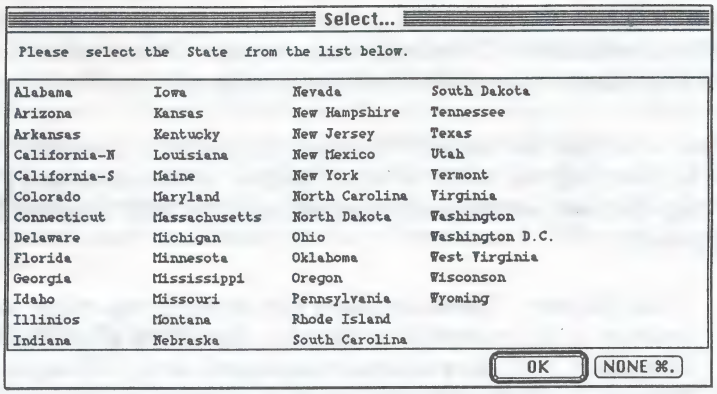
station which is not a "Major Station." The National Weather Service station list in the Appendix includes a map indicating the locations of the 100 major stations. To see this map on your screen, select **Demo Data** from the **File** menu, then hold down the Command and Shift keys and press "/".

If you don't get the correct "Nearest Station," it's probably because you didn't set up the program to know which station is closest to you. Please refer to the **Setup-Station** section of the Manual, and the **NWS Station List** in the Appendix.

- **USA Majors** — Because there are so many reporting stations in this country, it is impossible to display data from all of them at once. Therefore, this item selects *a standard set of 100 major stations.*
- **Range** — selects *all stations within any desired number of miles from your home base.* You may enter any distance up to 500 miles.
- **Map** — selects *all stations within a particular rectangular region of a map.* You define the region by drawing a rectangle on a map of the United States.
- **Cities** — *selects cities by name.* First you choose the state(s) from the state menu (as above). Then the program displays a list of all reporting cities within each state, from which you make your city selection(s). An asterisk next to a city name (e.g., "*Erie") indicates that station is one of the 100 major reporting stations. Here is a sample city list:



- **States** — selects *all stations within a state or states* that you choose from the list. Here is what the state list looks like:

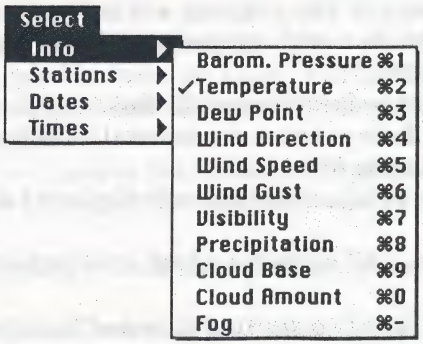


Note: because of the large number of stations in **California**, that state is broken into two sections: **"Cal-N"** and **"Cal-S"**; northern California and southern California, respectively. Also, **Alaska** and **Hawaii** are not included because their geographical locations are not covered by this program.

- **Station Code** — If you know the National Weather Service's three letter station code (for example, Windsor Locks, Conn is BDL), you can *select stations by entering the station code(s)* directly. As you enter the code(s), the program will confirm whether or not each is a valid station code, and will identify the full city and state name (refer to ***NWS Stations***).

Selecting Info

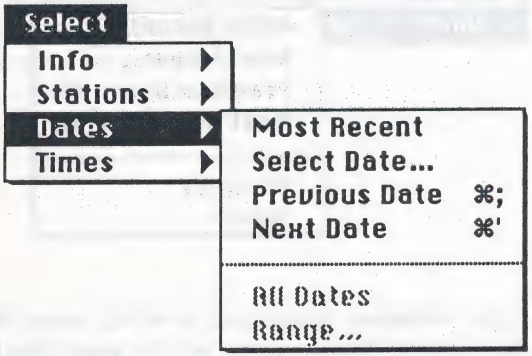
"Info" refers to the type of weather information to be displayed (such as barometric pressure or temperature). When you want to change the type of information to be displayed (such as with Graphs and Maps), pull down the **Select** menu and position the cursor on **Info.** The following menu appears:



These types of weather information are explained in more detail in the Reference section of the manual.

Selecting Date

Selecting one date: If the current type of display allows for selection of only one date, you will see the following choices under the **Select-Dates** menu:

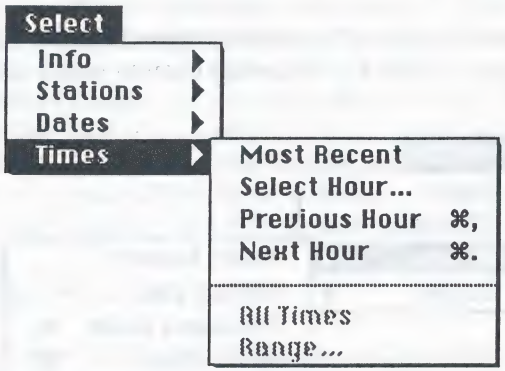


When the type of display allows you to select more than one date, all the choices in the **Select-Dates** menu will be available to you.

- **Most recent** — The program will *automatically find the most recent date(s).* This is a real convenience if you don't know what dates are on the data disk.
- **Select date** — Select *a specific date* (month, date and year).
- **Previous date** — takes the currently displayed date and changes it to *the date previous to it.*
- **Next date** — takes the currently displayed date and changes it to *the date after it.*
- **All dates** — *All dates* for which information is available will be included.
- **Range** — Specify *a starting date and a stopping date* (month, date and year).

Selecting Times

Selecting one time: If the current type of display allows for selection of only one time, you will see the following choices under the **Select-Times** menu:



When the type of display allows you to select more than one time, all the choices in the **Select-Times** menu will be available to you.

- **Most recent** — The program will *automatically find the most recent time(s).* This is a real convenience if you don't know what times are on the data disk.

- **Select hour** — select *one specific hour*. You enter the hour only, using a 24 hour clock; enter 1 p.m. as 13. (The selected time will be displayed as 50 minutes past the hour, so 1 p.m. will be displayed as 1:50 p.m.)
- **Previous hour** — takes the currently displayed time and changes it to *the hour previous to it*.
- **Next hour** — changes the currently displayed time to *one hour later*.
- **All times** — *All times* for which information is available will be included.
- **Range** — Specify *a starting time and a stopping time*.

Special Notes About Time:

1. In all cases, *the time displayed is your own* ***local time***, even if you are displaying data from a different part of the country. Although the data are stored on disk in Greenwich Mean Time (which is the National Weather Service's standard time format), it's automatically converted to your local time when displayed.
2. If **Daylight Savings Time** is used in your part of the country, *the program will automatically convert to Daylight Savings Time* during the appropriate time of the year.
3. In order for the above time conversions to take place correctly, *you need to use the Setup menu* to indicate your local time zone and whether or not you use Daylight Savings Time. You only have to do this once, when you first set up your program.

TEXT DISPLAYS

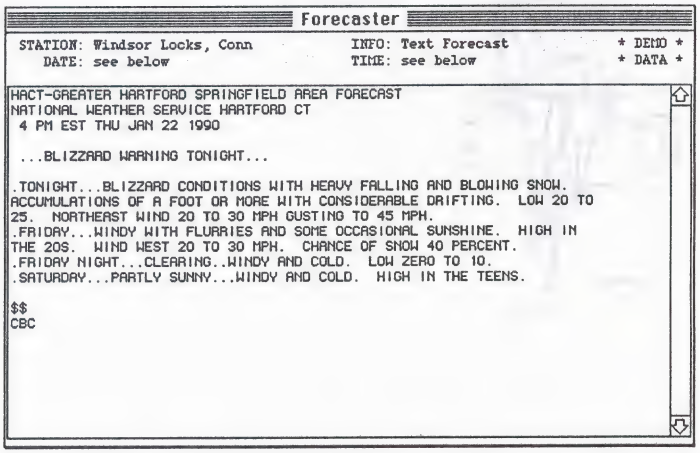
Forecasts

A variety of forecasts are provided by the National Weather Service. As detailed in the following pages, the Accu-Weather Forecaster gives you access to three types of reports:

1) **Text Forecasts**
2) **Chart Forecasts**
3) **US Summary**

The first two reports are available for approximately 250 stations throughout the country. The specific stations are listed in the **NWS Stations List** in the Appendix.

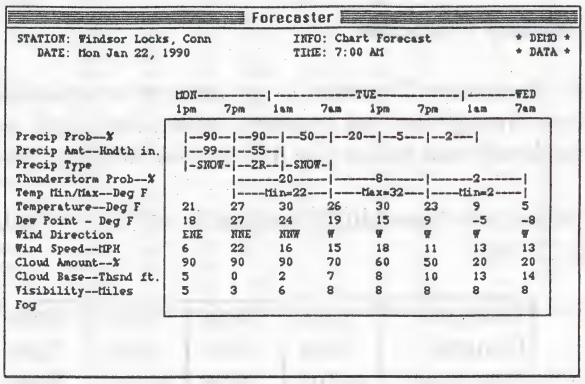
Text Forecast



The **Text Forecast** is a brief forecast for the region near the forecast station. It is prepared by the local office of the National Weather Service and is issued approximately four times each day.

If you want to see a forecast for a different station, choose **Station Codes** from the **Select-Station** menu, and a list of all stations for which you currently have this type of forecast information will be presented in a dialog box. You can choose another station from this list by double-clicking or by highlighting it and using the **Select** button in the dialog box.

Chart Forecast



The **chart forecast** is based on a computer model of weather conditions, as prepared by a National Weather Service computer. Meteorologists refer to this as the "MOS forecast" (Model Output Statistics). It contains a variety of forecast information for the following two days, broken down into 6 hour blocks. It is released twice each day, according to the following schedule (add 1 hour for Daylight Savings):

Eastern	8am	8pm
Central	7am	7pm
Mountain	6am	6pm
Pacific	5am	5pm
GMT	1pm	1am

At the top of each chart forecast are the dates and times; on the left are the categories of information. Most data, such as cloud cover and wind speed, are forecast for the specific time listed at the top of each column. Other data

(such as probability of precipitation) are forecast for a range of times as indicated by the dashed lines.

To see a forecast for a different station, choose **Station Codes** from the **Select-Station** menu, and a list of all stations for which you currently have this type of forecast information will be presented in a dialog box. You can choose another station from this list by double-clicking or by highlighting it and using the **Select** button in the dialog box.

U.S. Summary Forecast

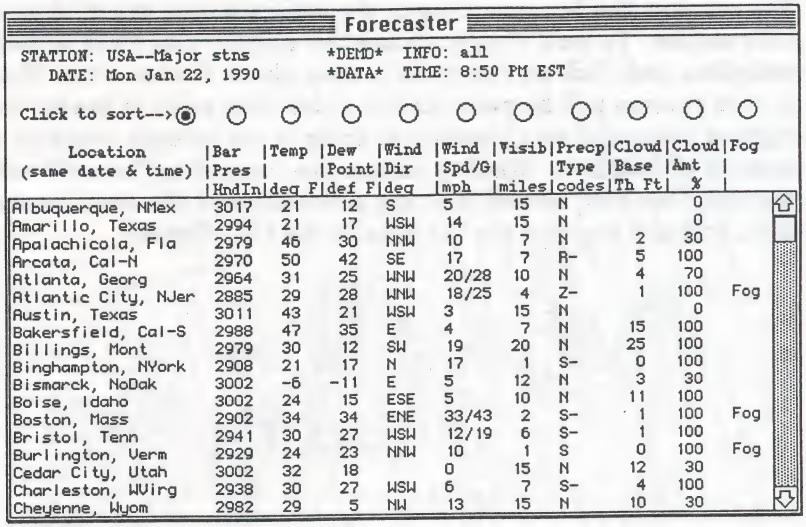
The U.S. Summary Forecast is an extensive description of current conditions throughout the country. It is a thorough and reliable overview that is updated four times per day by the National Weather Service.

The approximate reporting schedule is as follows (add 1 hour for Daylight Savings Time):

Eastern	2am	8am	2pm	8pm
Central	1am	7am	1pm	7pm
Mountain	mdnt	6am	noon	6pm
Pacific	11pm	5am	11am	5pm
GMT	7am	1pm	7pm	1am

The U.S. Summary is a couple of pages in length, and includes the following:

1. The **date and time** of the forecast, in the first line of text
2. A discussion of **current conditions**, with emphasis on important weather events
3. A description of the **current weather map**, including locations of lows, highs, and fronts.
4. A **descriptive weather map** forecast giving predicted locations of lows, highs, and fronts.
5. A discussion of the **forecast weather conditions** for various regions of the country.



Forecaster

STATION: USA--Major stns *DEMO* INFO: all
DATE: Mon Jan 22, 1990 *DATA* TIME: 8:50 PM EST

Click to sort--> ◉ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Location (same date & time)	Bar Pres InHg	Temp deg F	Dew Point def F	Wind Dir deg	Wind Spd/G mph	Visib miles	Precp Type codes	Cloud Base Th Ft	Cloud Amt %	Fog
Albuquerque, NMex	3017	21	12	S	5	15	N		0	
Amarillo, Texas	2994	21	17	WSW	14	15	N		0	
Apalachicola, Fla	2979	46	30	NNW	10	7	N	2	30	
Arcata, Cal-N	2970	50	42	SE	17	7	R-	5	100	
Atlanta, Georg	2964	31	25	WNW	20/28	10	N	4	70	
Atlantic City, NJer	2885	29	28	WNW	18/25	4	Z-	1	100	Fog
Austin, Texas	3011	43	21	WSW	3	15	N		0	
Bakersfield, Cal-S	2988	47	35	E	4	7	N	15	100	
Billings, Mont	2979	30	12	SW	19	20	N	25	100	
Binghampton, NYork	2908	21	17	N	17	1	S-	0	100	
Bismarck, NoDak	3002	-6	-11	E	5	12	N	3	30	
Boise, Idaho	3002	24	15	ESE	5	10	N	11	100	
Boston, Mass	2902	34	34	ENE	33/43	2	S-	1	100	Fog
Bristol, Tenn	2941	30	27	WSW	12/19	6	S-	1	100	
Burlington, Verm	2929	24	23	NNW	10	1	S	0	100	Fog
Cedar City, Utah	3002	32	18		0	15	N	12	30	
Charleston, WVirg	2938	30	27	WSW	6	7	S-	4	100	
Cheyenne, Wyom	2982	29	5	NW	13	15	N	10	30	

The **List** display is simply a listing of the actual weather data. In the example above, all available weather information is presented for one single hour for all stations in Connecticut. The **station names** are specified in the column on the left. The **types of information** and the **units of measure** are indicated at the top of each column.

Vary One Selection Criterion at a Time

You can look at a list in several ways:

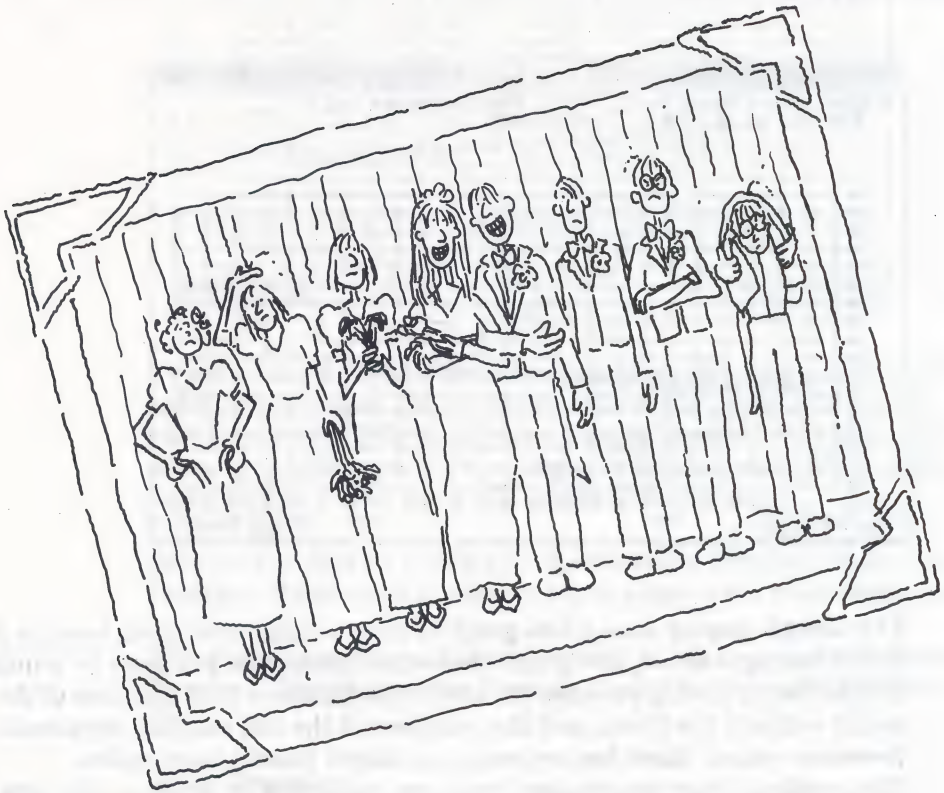
1. Several stations for a single date and time
2. Several times for a single station and date
3. Several dates for a single station and time

The program takes care of the details when you change the criterion you use to select information.

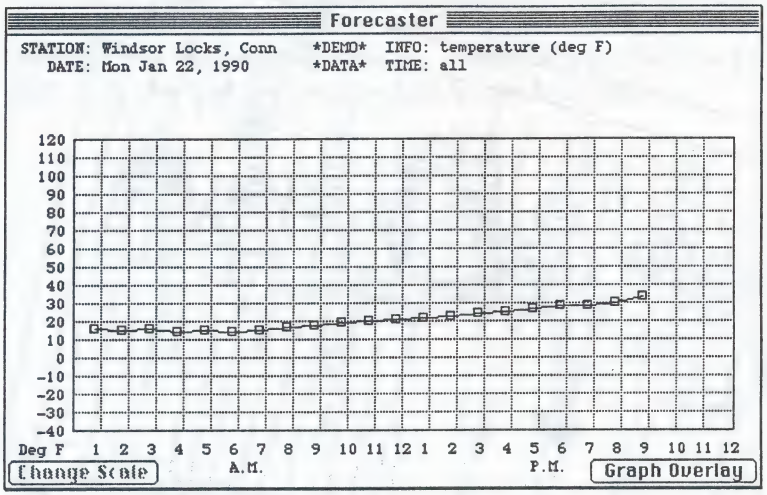
Sorting

You can sort the list according to the values in any one of the columns of information. To sort, simply choose the column you want to use as a sorting criterion, and click on the radio button above that column. The information in that column will be presented in order from least or lowest to most or highest values, or in alphabetical order if the column contains letters instead of numbers. Missing values are treated as "lowest" values in sorting. Note that sorting does not affect the way the data are stored on your disk, only the way you see the data in the **List** display.

GRAPHIC DISPLAYS

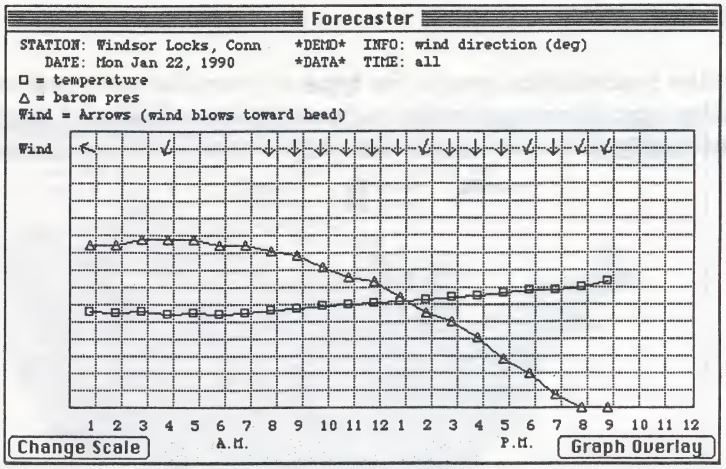


Graph Display



The **Graph** display uses a line graph to show change over time, hour by hour. In the example above, the graph shows the barometric pressure in Windsor Locks, Conn., during January 22, 1990. The numbers at the bottom of the graph indicate the times, and the numbers at the left indicate barometric pressure values. Each box represents a single hourly observation. Observations from consecutive hours are connected by a line — the line is broken when an observation is not available for a particular hour.

Overlay Graphs enable you to compare up to three different types of information for a given station on a given date. You start with a graph of one type of information, then by clicking on the **Overlay Graph** button in the lower right corner, you can choose other information to display on the same graph.



In the example above, notice that squares, triangles and stars are used to indicate the values for the three different types of information. However, only one type of information at a time is labeled in the scale on the left side of the graph. If you want to change the labeled scale, click on the **Change Scale** button in the lower left corner of the window.

Remove overlays by clicking on the **Overlay Graph** button, then choosing **Remove Overlay** in the dialog box to remove the most recent overlay.

When you have the maximum number of scales present on the graph, **Remove Overlay** will be the only available choice in the "Select Info" dialog box.

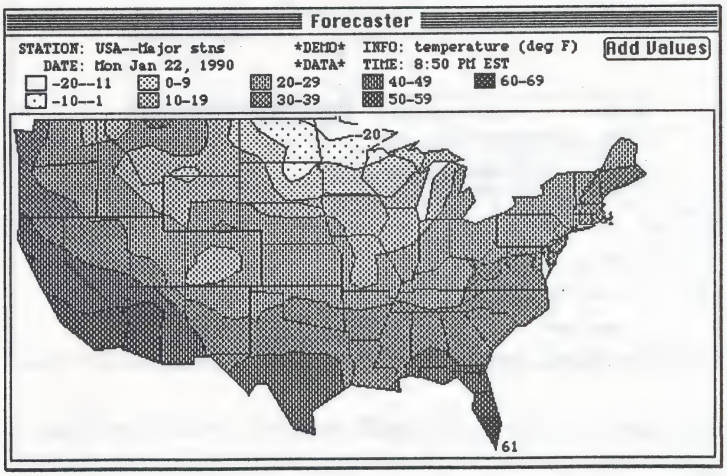
Wind direction

On the top row of the graph, wind direction is shown as a series of arrows. The arrows are oriented to show the wind blowing from the tail to the head of the arrows (north is "up" as in a map).

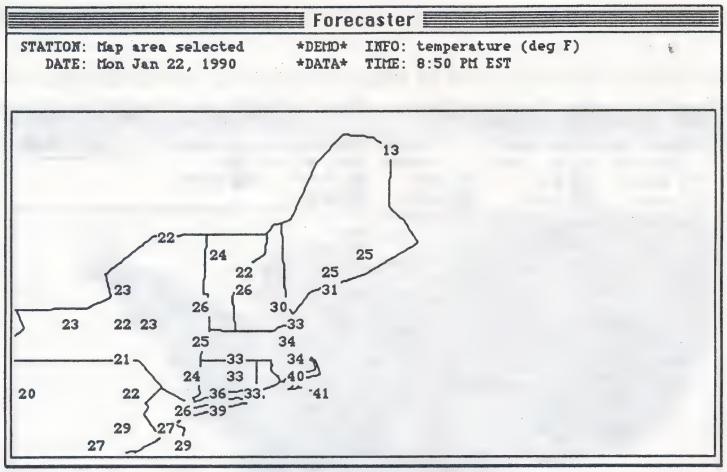
Precipitation

In the precipitation graph, the **type** of precipitation is indicated by letter codes (e.g., S = snow) (*refer to **Precipitation Codes** in the Reference section*). **Intensity** is shown by position (higher position means greater intensity).

Maps



Maps are the most powerful and informative displays provided by the AccuWeather Forecaster. Maps can be drawn for the entire US or *any selected region.* The map display includes options for displaying the data as specific values or as contour regions (as explained below).


Forecaster
STATION: Map area selected
DATE: Mon Jan 22, 1990
DEMO INFO: temperature (deg F)
DATA TIME: 8:50 PM EST
13
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25
31
23
26
26
30
23
22 23
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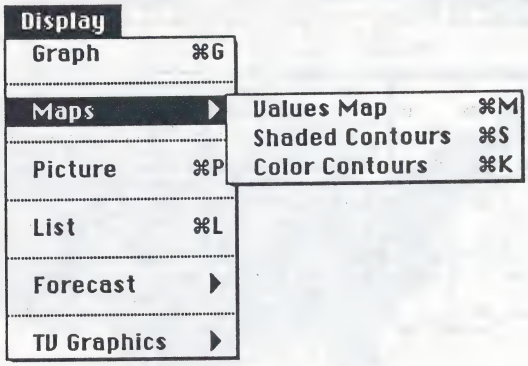
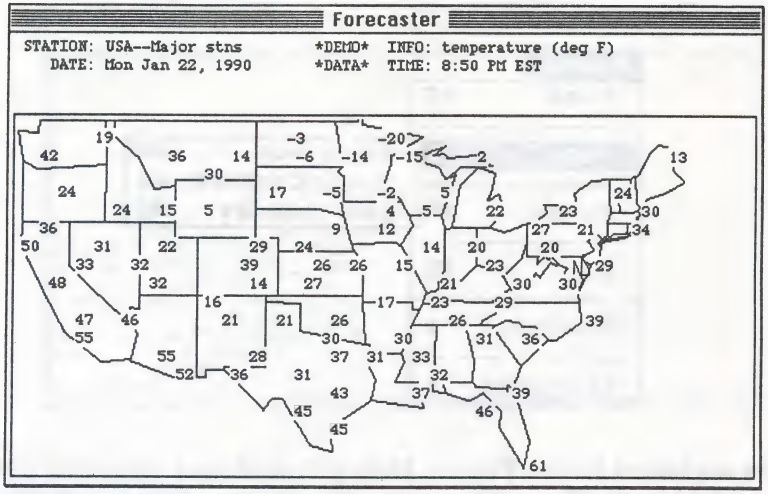
To display a map, pull down the **Display** menu and position the cursor on **Maps.** The following submenu will appear:



As explained below, **Values Map** will produce a map with numeric values overlaid on it. The values represent whatever type of information you choose (from the **Select** menu). Contour maps interpret the information and calculate contour lines illustrating trends and areas with similar values. If you have a Macintosh capable of displaying color, you can choose either shaded contours (areas are filled with monochrome patterns) or color contours (areas are filled with colors). If your Macintosh can display only black and white, you are limited to the shaded contours selection.

The various options on the **Select** menu work with Maps to enable you to produce maps of any region of the country showing any type of weather information.

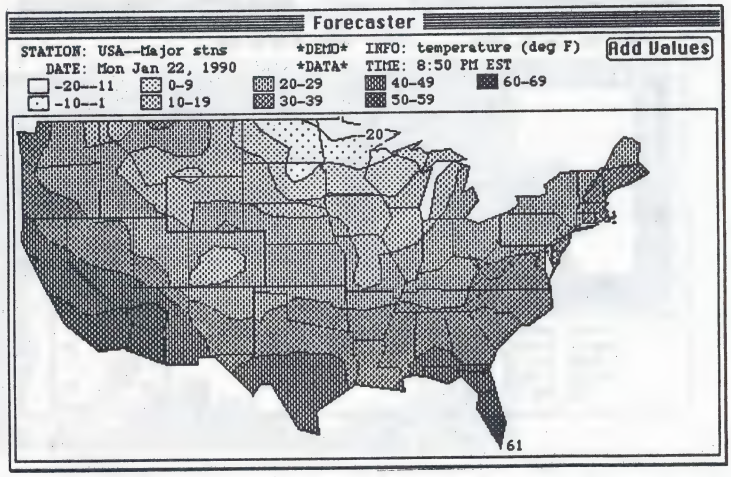
Maps Showing Values



This is the standard way to display data on a map. The actual values are displayed directly on the map, at the exact locations of the reporting stations. (If two stations are extremely close together, only one value will be displayed). All data are displayed as numeric values except:

- **Wind direction** — shown as **arrows**, with the wind blowing from tail of the arrow to the head
- **Precipitation** — shown as the **standard precipitation codes**, as follows:
  - **T** = Thunderstorm
  - **H** = Hail
  - **Z** = Freezing rain/sleet
  - **S** = Snow
  - **R** = Rain

Contour Maps

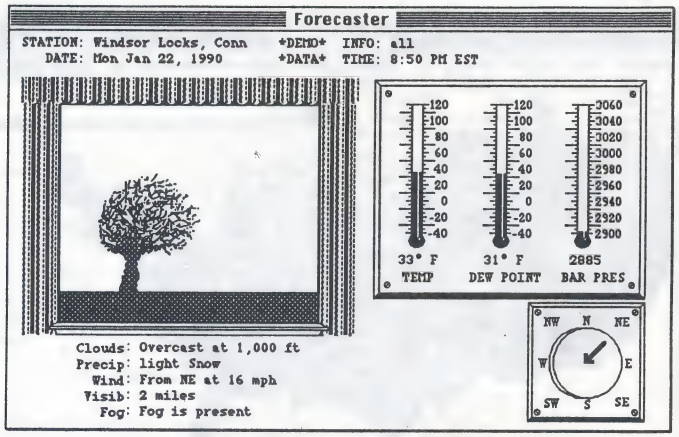


Contour maps use shading or color bands to indicate common ranges of values. Contour maps provide a powerful tool to visually represent and interpret weather data. They really bring the numbers to life!

The ranges used for the contour levels are based on the total range of values, divided into equal segments. On each contour map, the minimum and maximum values are shown in their proper geographic locations, and the scale of values is displayed above the map. Maps with **shaded contours** use a range of patterns from light to dark as the scale, while maps with **color contours** use a series of colors. While color contours provide more visually exciting images, they are only available on color Macintosh systems, and will not print as well as shaded contours.

Contour maps should be considered as *"best approximations"* because the calculations assume that values change smoothly from one point to the next, which may not always be the case. Therefore you should use some caution in interpreting them. Once you've displayed a contour map, click the **Add Values** button in the upper right corner to see the actual values added to the map. The values are overlaid upon the contours, so some of the detail in the contours may be lost when values are added.

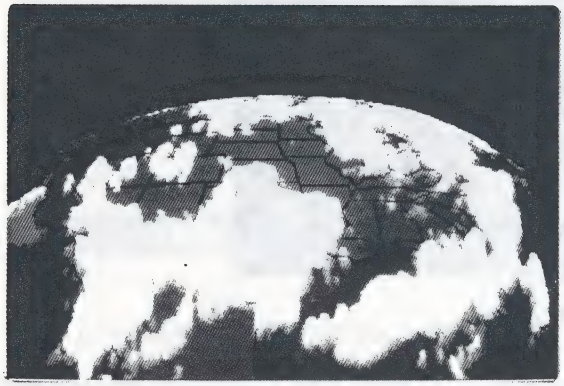
Picture Display



Pictures display all the information available for a single hour at a single station. The picture shown above, for example, presents all the weather information reported by Windsor Locks, Conn. at 8:50 p.m. on January 22, 1990.

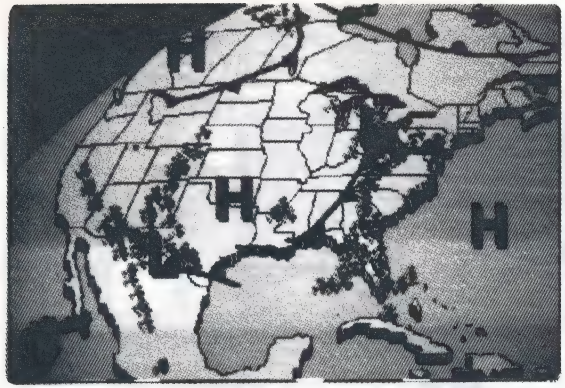
1. **"Window View"** (upper left) shows cloud cover and precipitation as if you were looking out a window: clouds are shown in varying amounts; any reported precipitation is shown as rain, snow or freezing rain, or hail; lightning and fog are also drawn in when appropriate. The amount of wind is illustrated by the bending of the tree in the window.
2. **Instruments** (upper right) depict the temperature, dew point, and barometric pressure. Note that the scales on the instruments differ.
3. The **compass** (lower right) indicates the direction that the wind is blowing (the wind blows from the tail to the head of the arrow — this is the opposite of a wind vane).
4. The **text area** (lower left) spells out the degree of cloud cover, the level of the lowest clouds, the type of precipitation, the wind direction and speed, the visibility, and the presence of fog.

TV Graphics



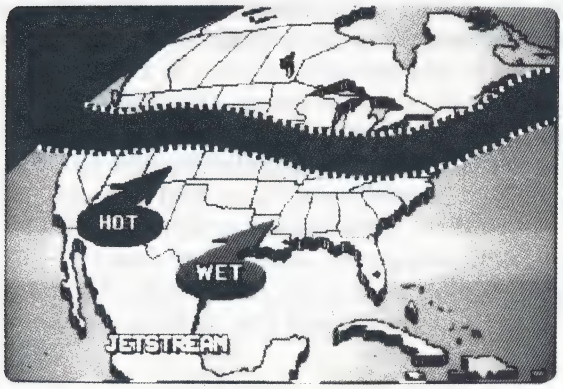
TV Graphic satellite image

TV Graphics are high-resolution color images that are downloaded from Accu-Weather, Inc. as complete images. They include manually generated maps of surface conditions and forecasts, graphic displays of weather trivia and historical weather events, satellite photographs with various types of enhancements, composite radar images, and more. Many of these images are the same ones you see every night on televised weather reports — only now, *you* can have them first!



TV Graphic surface map

TV Graphics files, because of their high resolution and the fact that they are stored on your disk as images, rather than data, occupy a significant amount of space on your disk, and take more time to download from AccuWeather than do hourly reports or other information. This may become a concern as you amass a large collection of images. Refer below to "Deleting TV Graphics" for information on erasing old images.

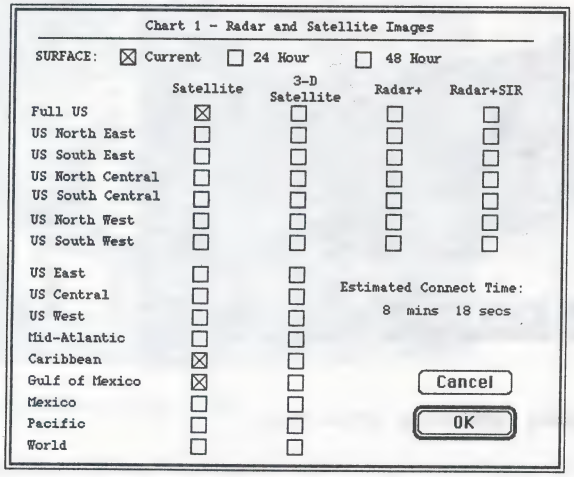


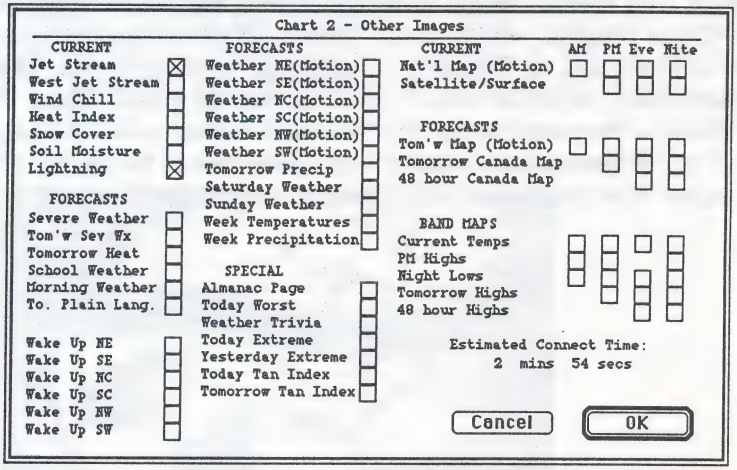
TV Graphic jet stream map

TV Graphic lightning strike map

TV Graphics are available through two lists, "Chart 1 - Surf/Rad/Sat", which lists surface maps, satellite photos, and radar composites, and "Chart 2 - Other Images", which lists a variety of other types of images, from upper air information to forecasts, a seasonal tanning index, almanac information, weather trivia, and a variety of maps. These charts are used in **Define Request** (under the **Telecom** menu) to select images to download, and in **TV Graphics** (under the **Display** menu) to display downloaded images. The charts are slightly different in each case:

Define Request

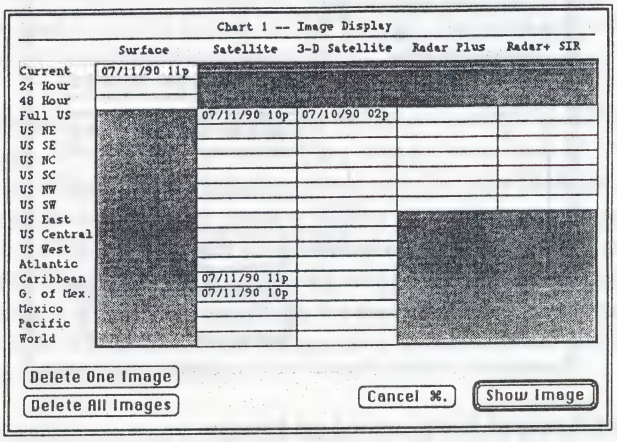


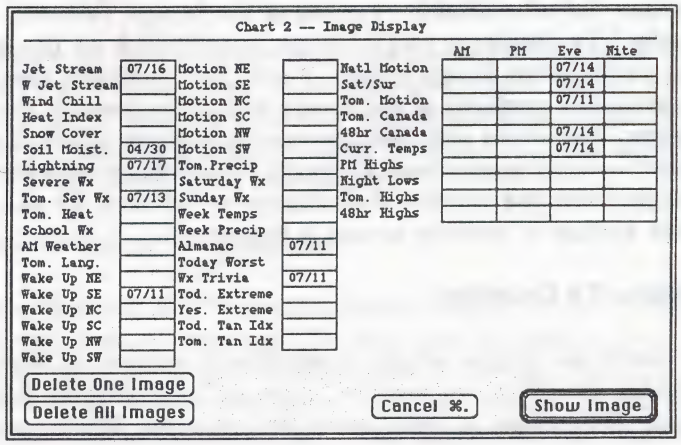


In **Define Request**, the TV Graphics charts (shown above) enable you to check the images you want to download. In **Display**, the TV Graphics charts (on following page) display information about the images available on your disk, and enable you to select an image to display.

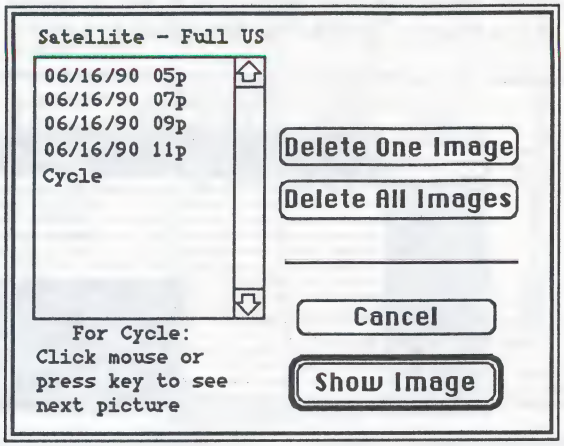
Displaying TV Graphics

In the Display TV Graphics charts, the date (and time, where appropriate) of the latest version of each available image is shown. It's possible to have several versions of a particular image — for example, you might have satellite maps of the US for several consecutive hours. If more than one version of an image is available, you'll see a "plus" sign following the date or time of the image: "01/22+" or "01/22/90 11p+".





To select an image for display, simply click on the cell in the chart containing the date of the most recent version. The **Show Image** button will become active, enabling you to display the image. When you select an image for display that has more than one version available, however, the following dialog appears when you click the Show Image button:



Cycling Several Versions of an Image

The name of the image appears at the top of the dialog. Under the name is a scrolling list of available versions of the image, followed by the word "**Cycle**." To display a single image, simply click on the one you choose and then on the Show Image button. If you click on **Cycle**, then on Show Image, the available versions of the image will cycle through the TV Graphics window. Each time you click the mouse or press a key, the next image will appear — until you've seen them all. This feature enables you to see changes from one version of an image to the next, for example, when a storm system is moving across a region.

Deleting TV Graphics

TV Graphics images occupy a significant amount of disk space. You will probably find that you need to "clean up" periodically, deleting some or all of your old images to make room for new ones. While you can do this from

the Finder, the names assigned to the TV Graphics files by the Accu-Weather Forecaster are somewhat cryptic, so it can be difficult to be sure that you're deleting the right images (the system for naming TV Graphics files is explained in the Reference section). There is an easier way to delete old image files from within the program.

The simplest way to delete old images is to let the program do so automatically when downloading new images. Simply click the "Erase Old Data" button in the Define Request dialog to enable this feature (this is explained in more detail in the Define Request section of the Telecommunications chapter).

TV Graphic images can also be deleted through the Chart 1 and Chart 2 dialogs. Whenever you select an image from one of the charts, rather than click the **Show Image** button, you can click the **Delete One Image** button instead to delete that image. When you select an image with multiple versions (that is, when the date of the image is followed by "+") and click **Delete One Image,** you see an additional dialog enabling you to pick a single version or all versions for deletion. Finally, the **Delete All Images** button will delete all the image files listed in that chart — but *not* the images listed on the other chart.

To protect images from any possible deletion by the Accu-Weather Forecaster, simply move them to a different folder — the program will *only* delete images in its own folder.

Images for which you provide the filename, including those listed under AMPS and those listed under Named Images, are not affected by the methods of deletion available within the Accu-Weather Forecaster. Since you provide the names for these images, they'll be easy to identify and (if you wish) delete from the Finder.

Availability of TV Graphics

Note that not all TV Graphics are available all year; there are a number of images that are seasonal. For example, the Radar Plus SIR (Snow, Ice, Rain) maps are available November 1 through April 30 — there isn't much snow or ice around the rest of the time! Similarly, the Tanning Index is only available between May 1 and September 30. The manual you'll receive

from Accu-Weather when you open your account will provide more details on the availability of seasonal images.

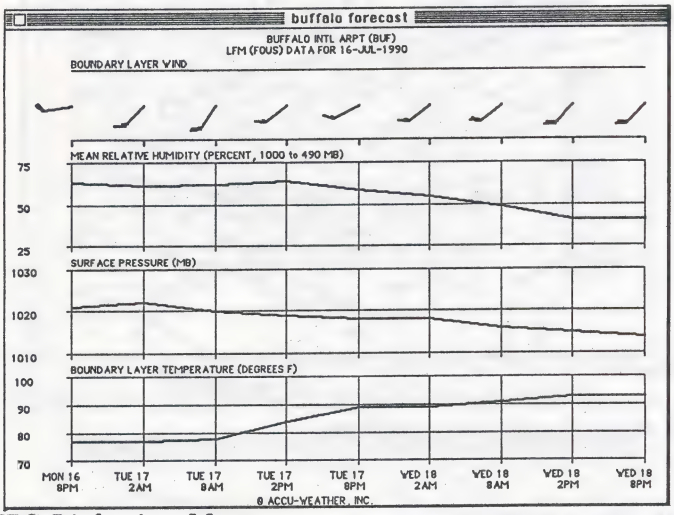
Printing TV Graphics

Like any screen in the Accu-Weather Forecaster, it is possible to print the TV Graphics window on an ImageWriter or LaserWriter printer. Simply make sure the TV Graphics window is active (use the Window menu or click on a portion of the TV Graphics window to make it active), select **Print** from the **File** menu, and wait for it to print. Note that all of the detail you see on the screen may not be rendered on paper, particularly if you have a color monitor.

Saving TV Graphics Screens on Disk

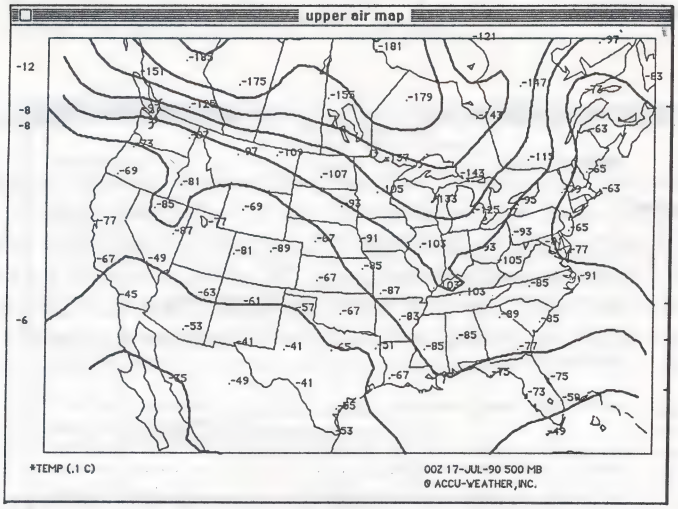
It is possible to save any TV Graphics screen on disk. If your Macintosh can only display black and white, the disk file will be in MacPaint format. If your Macintosh can display color, the disk file will be in PICT format (a standard Macintosh format for graphic images). This is useful if you want to manipulate a TV Graphics image in a painting or drawing program, or if you want to use an image in a word processor or page layout program. Simply make sure the TV Graphics window is active (use the Window menu or click on a portion of the TV Graphics window to make it active) and select **Save Screen** from the **File** menu. The program will ask you to supply a name for the file, and will save it where you specify through the save file dialog box. Note that the results you see when importing the file into a graphics program will vary according to the capabilities of the graphics program; sometimes you may lose some color or detail. However, if you have a Macintosh capable of displaying color, and a color graphics program, the image will be displayed in full color.

AMPS Graphics



AMPS Lightning Map

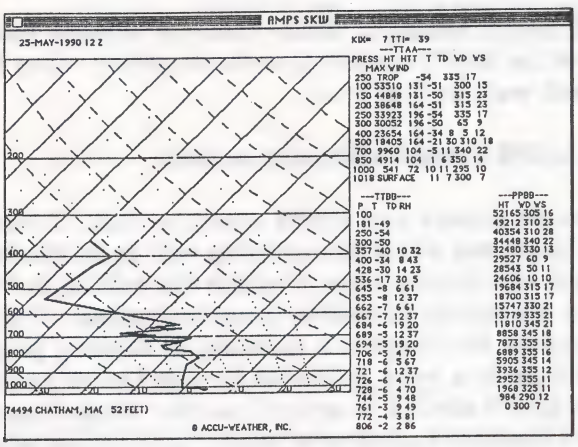
Another type of high-resolution graphic available from Accu-Weather, Inc. is called AMPS (for Advanced Map Plotting System). AMPS graphics differ from TV graphics in that they are generated by Accu-Weather's computers rather than produced by an artist or a camera. In effect, the AMPS system on the Accu-Weather computer is doing much the same thing as the Accu-Weather Forecaster does on your computer when you generate graphs and maps. Through the AMPS system, though, you have access to additional types of information the Accu-Weather Forecaster's mapping and graphing systems don't offer — and many AMPS displays are exactly what professional meteorologists find particularly useful. The AMPS system is capable of showing you upper air maps and sounding diagrams, charts, maps of specific regions of the US, maps of various parts of the world, including Australia, Europe, and Alaska, and much more!



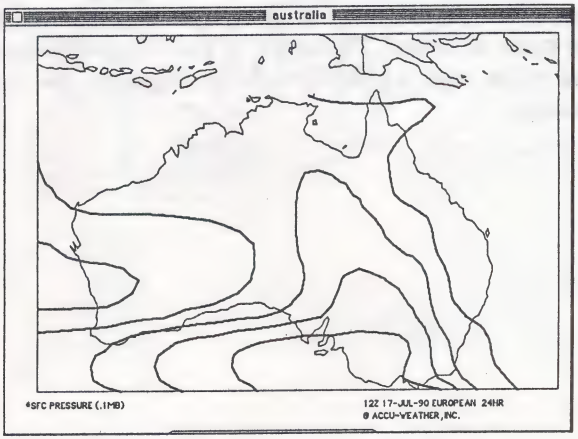
AMPS map of upper air conditions

Downloading AMPS Images

When you specify an AMPS image to download, you are instructing the Accu-Weather computer to *create an image according to your specifications*; no two AMPS images are (necessarily) alike! You have a wide range of choices of information, maps, scales, and methods of presentation. Because of this nearly infinite flexibility, there is no way to predefine a list of images for you, as the program does with TV Graphics. AMPS images must be downloaded interactively, by selecting **Explore Accu-Data** from the **Telecom** menu. This is explained in more detail in the "Explore Accu-Data" section of the manual. That section, along with the documentation you receive from Accu-Weather, Inc. when you open your account, will guide you through the process of choosing and downloading AMPS images. For now, though, here are some more samples to whet your appetite!



AMPS upper air sounding chart showing the relationship between temperature and humidity as altitude increases.



AMPS can produce maps beyond the U.S. — Australia, for example

Printing AMPS Graphics

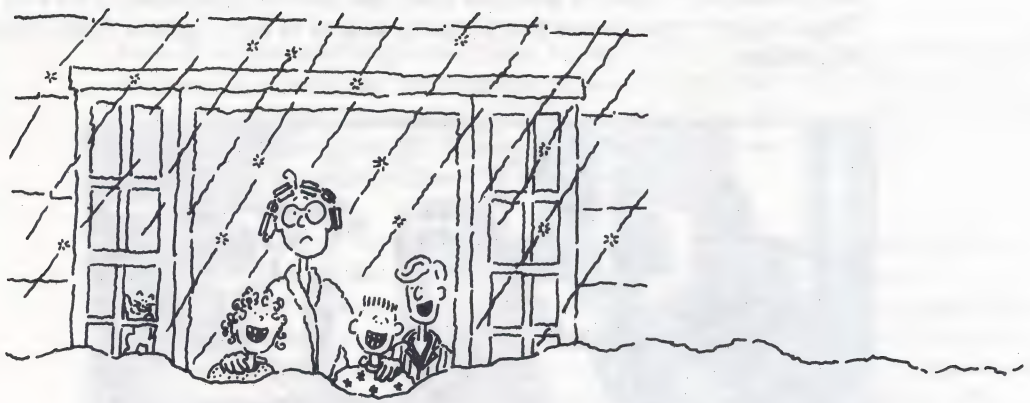
Like any screen in the Accu-Weather Forecaster, it is possible to print the AMPS window on an ImageWriter or LaserWriter printer. Simply make

sure the AMPS window is active (use the Window menu or click on a portion of the AMPS window to make it active), select **Print** from the **File** menu, and wait for it to print.

Saving AMPS Graphics Screens on Disk

It is possible to save any AMPS screen on disk. If your Macintosh can only display black and white, the disk file will be in MacPaint format. If your Macintosh can display color, the disk file will be in PICT format (a standard Macintosh format for graphic images). This is useful if you want to manipulate the image in a painting or drawing program, or if you want to use an image in a word processor or page layout program. Simply make sure the AMPS window is active (use the Window menu or click on a portion of the AMPS window to make it active) and select **Save Screen** from the **File** menu. The program will ask you to supply a name for the file, and will save it where you specify through the save file dialog box. Note that the results you see when importing the file into a graphics program may vary according to the capabilities of the graphics program; sometimes you may lose some color or detail. However, if you have a Macintosh capable of displaying color, and a color graphics program, the image will be displayed in full color.

TELECOMMUNICATIONS



Telecommunications

Background

The telecommunications component is the real source of power for the Accu-Weather Forecaster. First, some background:

Every hour, hundreds of weather reporting stations throughout the country, such as the one pictured below, perform a standard set of weather observations. The observations, referred to as "hourlies", are done every hour between 50 and 59 minutes after the hour (e.g. between 1:50 and 1:59). These hourly reports are the primary source of data for the Accu-Weather Forecaster.

This is a sample hourly report, in its original coded form:

BDL SA 1850 3 OVC 7S- 993/22/17/0109/948

The hourly reports use an internationally standardized code in order to communicate a great deal of information in such a compact form (the codes are explained in the Reference section).

These reports are immediately forwarded to the National Weather Service's centralized computer database. The National Weather Service in turn provides the information (for a fee) to Accu-Weather and other private and public weather agencies.

Accu-Weather has developed a sophisticated computerized weather database of its own. Their database, which they call **Accu-Data**, incorporates the National Weather Service data, along with a variety of other weather data. Accu-Weather uses these data for their own forecasts, which they provide to numerous television and radio stations and newspapers, and to various private clients.

Accu-Weather has implemented a system which allows the general public to access the weather information in Accu-Data. For this privilege users are charged a modest "connect-time" fee, based on the amount of time they are connected. Before you can access Accu-Data, you need to initiate a subscription account with Accu-Weather.

The Accu-Weather Forecaster gets its data through a direct connection to Accu-Data. One of the important features of this program is that it automates the process of accessing the weather information. As explained later, you predefine your request (*refer to **Define Request***), and then the program automatically logs on to Accu-Data, requests the data, receives the data, saves it on disk, logs off and disconnects (*refer to **Get Data***). The actual displaying of the data takes place after you have logged off from Accu-Data.

Downloading data usually requires only 2 to 5 minutes, depending on the amount of information that you request.

Alternatively, if you want to explore some of the many additional capabilities of Accu-Data on your own, you can use another capability of this program. It can dial up and log on to Accu-Data, and then leave you in control. This direct interactive use of Accu-Data is explained in the **Explore Accu-Data** section of this manual. You will be amazed at the vast amount of weather information available in Accu-Data.

Getting Started

Before you can begin to use telecommunications, you need to:

1. Activate your account with Accu-Weather
2. Connect a modem to your Macintosh
3. Set up the Accu-Weather Forecaster for your particular equipment and subscription.

Activating Your Accu-Weather Account

Accompanying this program is an Accu-Weather subscription instruction sheet including an account name and password for you to use. As detailed in the package, you only need to establish payment arrangements with Accu-Weather to activate your account and receive additional material, including a manual with additional details about the information available in their database. Refer to the material on your subscription instruction sheet for more information about logging on to Accu-Data for the first time.

If you have any questions regarding Accu-Data, contact:

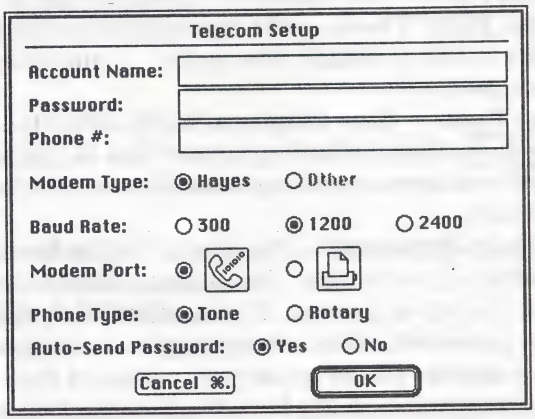
Accu-Weather, Inc.
619 W. College Ave.
State College, PA 16801
(814) 237-0309

Installing the Modem

Connecting a modem to your Macintosh probably involves nothing more than plugging the modem cable into the modem port, and the phone line into the modem. However, the details may vary, so refer to the manual you received with your modem.

Setting Up for Telecommunications

Once you have referred to your Accu-Weather Subscription Procedure (and once your modem is installed), you are ready to set up the Accu-Weather Forecaster for your particular subscription and equipment. Start by selecting **"Telecom"** from the Setup menu.



When you have made the Setup/Telecommunications selection from the menu, the above dialog box appears. Just make sure the settings correspond to your password, phone type, modem speed, and so on.

1. **Account name** — This is on the *Accu-Weather Subscription Procedures* insert.
2. **Password** — This is also on the *Subscription Procedures* insert. For security reasons, the actual password will not appear in the dialog box after the first time you type it in; it will be represented by dots: "•••••". Your password will also not appear on the screen when logging on the Accu-Weather's computer.
3. **Phone #** — This refers to **Accu-Weather's telephone number**, which is provided on the *Subscription Procedures* insert.
   Some phones require extra digits or pauses in the dialing process. These can be included as follows:
   - **Extra digits**: If, for example, you have to dial "9" to get an outside line, simply put a 9 at the beginning of the number when you enter it.

- **Pause**: If your phone needs a pause in the dialing process, insert a comma at the point where the pause is required.

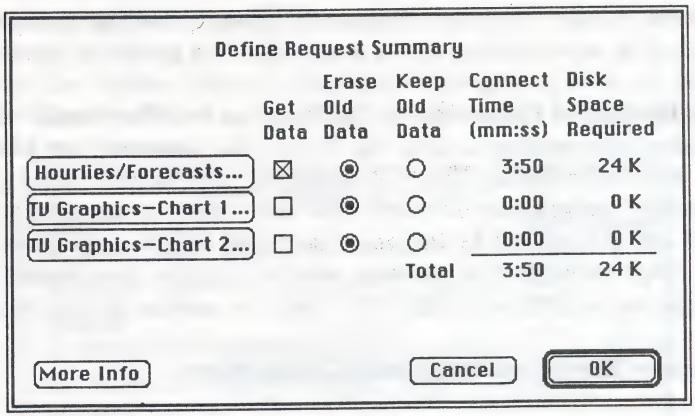
4. **Modem Type** — Hayes modems (or 100% compatibles) are the only acceptable modems. The Apple Personal Modem is Hayes-compatible.
5. **Baud Rate** — Select 300, 1200 or 2400 depending on the speed of your modem. If you do not know which it is, refer to your modem's manual.
6. **Modem Port** — The modem can be connected to the "Modem Port" or the "Printer Port." These are on the back of your Mac, and have icons to identify which is which. The modem is normally connected to the modem port.
7. **Phone Type** — Your telephone line is either touch-tone or rotary (pulse). If you do not know which type your line is, listen as you dial. If you hear "clicks", you have a rotary phone. If you hear "beeps", your phone is touch-tone.
8. **Auto-Send Password** — Set this to "Yes" to have the program automatically remember your password and send it to Accu-Weather during the log-on process. If you select "No", the program will ask you for the password before attempting to connect with Accu-Weather. This feature enables you to protect your account from unauthorized access when other people might be using your computer.

Define Request

Before you actually get the data from Accu-Weather, you predefine the information that you want to request using the **Define Request Summary** shown below.

This request chart is one of the most important parts of this program because it enables you to define your request in a visual and intuitive fashion — you don't need to know anything about the specific data request formats required by Accu-Weather.

Furthermore, your request will be saved by the program, enabling you to enter your specifications just once if you usually request the same type of information. In fact, after defining your request the first time, you can skip the entire Define Request process if you just want to use your standard request.



The Define Request dialog box has three large buttons on the left:

Hourlies/Forecasts...
TV Graphics - Chart 1...
TV Graphics - Chart 2...

Each of these buttons brings up another dialog enabling you to select specific data or images to request.

Get Data

The **Get Data** buttons enable you to "turn on" your request for the types of data or images listed in each heading. If there is an "X" in the box to the right of the **Hourlies/Forecasts...** button, for example, the program will download the data you specified in the Hourlies/Forecasts dialog box.

Keep or Erase Old Data

Erase Old Data and **Keep Old Data** are settings you can choose for each category of data or images. For Hourlies and Forecast data, the **Erase Old Data** setting will wipe out all information you've downloaded previously, and replace it with information from your new download. For TV Graphics, Erase Old Data will erase *only those images that you're downloading again*. If, for example, you previously downloaded a Full US Satellite Map, but you didn't request one the next time, that map will not be

affected by the download. In general, **Erase Old Data** should be your default setting to save on disk space and make the program operate more quickly.

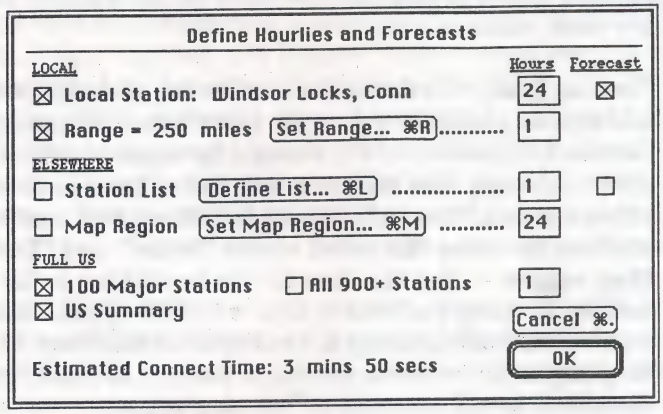
The **Keep Old Data** setting, for Hourlies and Forecasts, will append new Hourly information to the old. *Forecasts, however, are always replaced by the new information.* For TV Graphics, this setting simply means that no existing images are deleted. *This can make a significant difference in the disk space required by the download*, but will also give you the capability of "cycling" through the various versions you've downloaded of a single image, as explained in the TV Graphics section of the manual.

Connect Time and Disk Space Calculations

The **Connect Time** and **Disk Space Required** columns are calculations performed for you by the program to give you an advance notice of the requirements of the download. As you'll see as you experiment with defining requests, TV Graphics have a much larger effect than hourlies and forecasts on both the time and space required by a request.

Requesting Hourlies and Forecasts

From the Define Request Summary dialog box, click on the **Hourlies/Forecasts...** button. The following dialog box will appear:



The dialog box has three headings: **Local, Elsewhere,** and **Full US.** The text boxes in the **Hours** column allow you to set the range of time for which you want information, and the check boxes under **Forecast** let you choose whether or not to receive forecast data. The buttons in the middle of the box, **Set Range..., Define List...** and **Set Map Region...** offer ways of selecting information you want in the "Local" and "Elsewhere" categories. Let's take a closer look at each element of the Define Hourlies and Forecasts dialog:

Local refers to reports from your own nearest NWS station, and the area around it:

- **Windsor Locks, Conn** — This is the nearest NWS station in our example. You should have already predefined your own nearest NWS station through the Setup activities *(refer to*: ***Setup***). In the example, we are requesting hourly reports for the past 24 hours. To obtain forecasts from your local station, click in the first check box under "Forecast."
- **Range** — refers to all the stations surrounding your nearest NWS station, within a range of miles that you specify. In the example, we have selected all stations within 250 miles. To change the range

distance, simply click the **Set Range...** button and enter a number of miles. For information from stations within your defined range, click in the check box to the left of "Range =."

Elsewhere refers to stations elsewhere in the country. There are two ways to specify such stations:

- **Station List** — To define the station list, click the **Define List** button, and add stations according to their three-letter abbreviations (see the NWS Station List section of the manual for a list of stations and their abbreviations). The program will not allow you to enter invalid abbreviations. You can request hourly reports and/or forecasts for these stations by using the boxes under "Hours" and "Forecast."
- **Map region** — Set the Map Region by clicking in the **Set Map Region...** button. A dialog box with a U.S. map will appear. Set the region you want by simply drawing a rectangle on the map. The currently defined map region is shown on the map. You can request hourly reports, but not forecasts, for all stations in the map region.

Full US refers to reports encompassing the full continental United States. The three options under this heading are:

- **100 Major Stations** — There are approximately 900 weather reporting stations in the US. One hundred of these are "major stations". These are indicated by an asterisk next to the station name when you select stations to display in the Map, Picture, List, or Forecast functions of the Accu-Weather Forecaster. The NWS Station List in the manual also indicates which stations are major stations. You can request hourly reports from all 100 major stations in the US. You can specify the number of hours for which you want this information.
- **US Summary** — This refers to a detailed description of current weather conditions provided 4 times a day by the National Weather Service.

Not all stations give forecasts. The stations that do are indicated in the NWS Stations List in the Appendix. If, for example, you want a forecast for Denver, Colorado, simply look up Denver in the NWS Station List and find out which station in or near Denver gives a forecast (in this case it is DEN). Then click on **Define List** and enter the station code or city name. (You can put as many stations as you want in the Station List). Don't forget to click on

the check box to the left of "Station List" (so your request will include the list) and on the second check box under "Forecast" (so your request will include forecast information).

The "**Estimated Connect Time**" at the bottom of the dialog box indicates an estimate of the total amount of connect-time that the Hourlies/Forecasts portion of your request will require. This is important information because the fee charged by Accu-Weather is based on the length of time of your connection. While a normal request (at 1200 baud) might take three or four minutes, requesting eight hourlies for all 900 US stations would take almost a full hour. The program will not allow you to make a request that would take longer than 1 hour to download. Actual connect time may vary according to the time of day — some times are busier than others.

When you finish defining your request, click on the **OK** button. This will **save your selection criteria as the new default selection list.** This means that *this list will be used as the standard selection every time that you request new data from Accu-Weather* (until you change the list). This is a real convenience, since you probably will want to use the same criteria each time that you get new data.

Initiate Account

Once you have entered all the Setup information, you need to initiate your account with Accu-Weather. This is done through an easy on-line procedure *the first time you use* ***Get Data*** to call Accu-Weather. Their computer will automatically recognize that yours is a new account, and take you through the steps to initiate your account, such as ask you for your name, address and MasterCard or Visa number. When this is done, the program will automatically proceed with a normal download. This procedure is only done once. Further details of initiating your account are in the *Accu-Weather Account Procedures* insert.

Get Data

When you select **Get Data**, the Accu-Weather Forecaster will *automatically* get the data. The first steps are the only steps that require a response from you. The program will automatically:

1. **dial** Accu-Weather's telephone #
2. **log-on** with your account name and password
3. **request** all the data that you specified in "Define Request"
4. **save** the new data on disk
5. **log-off** from Accu-Data
6. **convert** the data from National Weather Service coded format to the format used by the Accu-Weather Forecaster

If you want to end the call at any point during the above sequence, simply click the **Disconnect** button.

Entering Your Password

The **Telecom** dialog box, accessed through the **Setup** menu, allows you to set **Auto-Enter Password** to "Yes" or "No". If you click the "Yes" button, the program will remember your password and send it to Accu-Weather automatically when you get new data. This is convenient, but it means that *anyone using your computer can use your Accu-Weather account.* If you need to restrict use of your account, set Auto-Enter Password to "No." The program will then ask for your password each time you get data. When you enter the password, dots (•) will appear instead of the actual characters that you type.

Explore Accu-Data

Accu-Data (Accu-Weather's database) has an incredible amount of weather information. Although the Accu-Weather Forecaster uses three of the most important types of data (hourly reports, forecasts, and TV Graphics), there are *many* other types of weather information available, including:

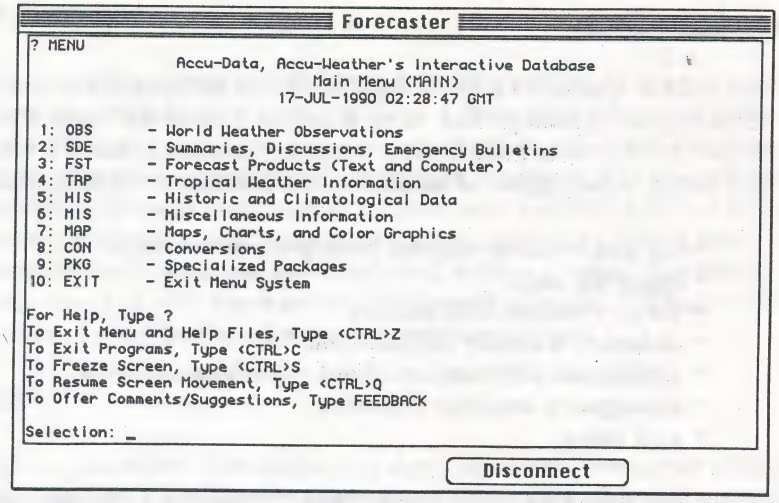
- current weather reports from around the world
- upper air data
- farm weather information
- aviation weather information
- additional information about reporting stations
- emergency weather bulletins
- and more!

When you select **Explore Accu-Data™** from the **Telecom** menu, the Accu-Weather Forecaster will automatically dial-up and log-on to Accu-Data, and then leave you in control. Instead of doing the standard data requests, the program will let you make your own data requests interactively in a direct connection to Accu-Data.

All the images and data that you request through "Explore Accu-Weather" are *displayed on the screen, saved on disk* and may be *printed on your printer*. (This information is not available, however, for use in the Graph, Map, List, or Picture displays of the Accu-Weather Forecaster). You can also download AMPS and TV Graphics images. In fact, *Explore Accu-Data is the only way to download AMPS images* with the Accu-Weather Forecaster.

Some AMPS images are **continuous** — for example, you can watch lightning strikes occurring in real time all across the country. These images will stay on your screen (and you'll stay connected with Accu-Data) until you *do something*; either click the mouse or press any key.

Accu-Data is designed for easy use, with access based on choices that you make from a series of menus. Here is a sample Accu-Data menu:



When you initiate your subscription with Accu-Weather, they will send you the **Accu-Data User's Manual**, which describes the full set of weather information that is available through Accu-Data, along with all the details of how to access it.

Storing and Retrieving an Explore Accu-Data Session

The information from your most recent "Explore Accu-Data" session is stored in a file called EXPLORAD. TXT. It is a standard ASCII text file, and may alternatively be displayed using a standard word-processing program. Images you select during an Explore Accu-Data session are saved under names you specify when you select the image from Accu-Data. AMPS images can be displayed using the **AMPS Graphics** selection from the **Display - TV Graphics** menu. TV Graphics images can be displayed using the **Load Named Image** selection from the **Display-TV Graphics** menu.

ARCHIVES

Archives

What are Archive Files?

Archive files are for when you want to save weather information for long-term storage or later use. The only difference between an archive file and your current weather data files is that the program won't automatically use the archive information when you select "Real Data." Instead, you have to use the Open Archive command from the File menu. Archive files are data files, and don't contain AMPS or TV Graphics images.

You might find archive files useful in a number of situations. For example, you might want to save information about a major storm or weather system as it passes through your area.

Open Archive, **Save to Archive**, and **Erase Archive** are available in the File menu:

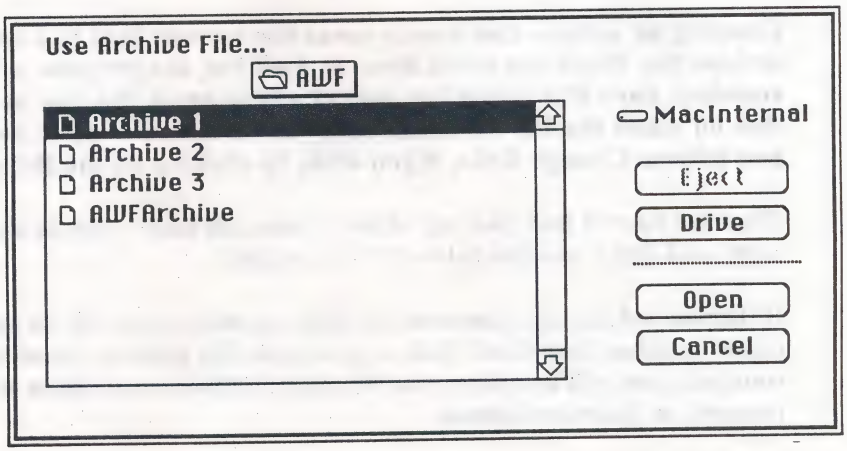
Open Archive

Pull down the **File** menu and select **Open Archive** when you want to *get data from an archive file*. The subsequent steps depend on which type of disk drive setup you have:

If you have a single **floppy disk drive**, wait for the File dialog to appear, click on the **Eject** button, and insert your data disk in the drive. The name of that disk and its list of files will appear in the dialog, and you can select the file you want. The system will tell you when to reinsert the program disk. If you have two floppy disk drives, your archive disk can go in one drive while your Accu-Weather Forecaster system disk is in the other drive.

If your archive data are stored on the **hard disk** itself, just select the proper folder and file in the Open Archive dialog box.

In either case (hard disk or floppy), the program will search for all archive files on the selected disk. It will list those files in the Open Archive dialog box Here is an example:



Each of the items listed is a separate archive file. Use the standard selection procedures to select one of the archive files. If you decide not to use one of these archive files, simply click on the **Cancel** button.

The archive file that you select will then become the active data set, and *all subsequent displays will use data from the selected archive file.*

The fact that you are using archive data will be indicated in the **Display Identifier** with an "**Archive**" label.

Save to Archive

"Save to Archive" lets you create new archive files containing the weather information you're currently using.

Creating an archive disk simply saves the current data to a separate archive file. When you select **Save to Archive**, the program will present the standard Save File dialog box asking you to name the new archive file. The disk on which the file will be saved is indicated at the top of the list of files and folders. Change disks, if you wish, by clicking on the **Drive** button.

Files are named just like any other Macintosh files — up to 63 characters long, and don't use the colon (":") character!

If there is not enough space on the disk you select, you will be prompted to insert another initialized disk or to cancel the archive. Once the saving is complete, you will be able to use this data in the normal **Open Archive** process, as described above.

NOTE: *Forecasts can **not** be archived;* hourly reports are the only data that are saved to archive files.

Erase Archive

Select **Erase Archive** from the **File** menu when you no longer need a particular archive file, and you want to *permanently* erase it from the archive disk.

You will first be asked to select the archive file (using the same procedure described in ***Open Archive***). You will then be asked to confirm:

> "Are you sure you want to permanently erase *Filename*?"

If you click **OK**, the selected archive file will be erased from the disk. If you click **Cancel**, this activity will be cancelled without erasing the file.

Problems & Solutions

You aren't likely to have any problems with the Accu-Weather Forecaster, but just in case, here are some possible "fixes":

The menu bar and menus don't correspond to the manual.

You are probably using older versions of the System and Finder. Get System Software Package 6.0.4 or higher from your Apple dealer and install it.

The modem won't connect with Accu-Weather, Inc.

Check the following:

1. Is the modem plugged into the port you indicated in the **Setup-Telecom** dialog box?
2. Did you select touch-tone dialing when your phone line can only accept pulse dialing?
3. Did you specify the correct number for Accu-Weather, Inc. in **Setup-Telecom**?
4. Did you specify the correct baud rate for your modem in **Setup-Telecom**? For example, if you select 2400 baud and you have a 1200 baud modem, it won't work until you select 1200 baud.

Printing Problems

1. Did you use the Chooser (under the "" menu) to select your printer?
2. If your Macintosh can display color, your AMPS and TV Graphics may print more clearly if you go to the Control Panel (under the "" menu) and use the Monitors control to switch your system to black and white only, then print.
3. And (please excuse us for even mentioning this. . .) is your printer turned on?

The program doesn't accurately pick the "most recent date" or "most recent time."

The date and time on your Macintosh may be set incorrectly. If you correct the time or date and the problem recurs, you may need a new battery.

During an "Explore Accu-Data" session, you get "stuck" on one image.

You have most likely encountered a continuous display (one that will simply stay on your screen until you cancel it). For example, the USA Lightning Strikes display will keep showing you lightning strikes as they happen until you cancel it. To cancel a continuous image, simply click the mouse or press any key.

Weather Information

The types of weather information available through the Accu-Weather Forecaster are as follows:

- **Barometric pressure** — the "weight" of the air, which is an important means of monitoring weather changes. Low pressure generally means precipitation, high pressure generally means clear skies. The unit of measurement is "inches of mercury"; the Accu-Weather Forecaster leaves out the decimal point (2950 means 29. 50)
- **Temperature** — outdoor temperature in degrees Fahrenheit
- **Dew point** — the temperature at which dew would form, which is an indication of the level of humidity — the higher the dewpoint the greater the humidity. An important consideration is the number of degrees separating the dew point value from the actual temperature. The unit of measurement is degrees Fahrenheit.
- **Wind direction** — the direction which the wind is blowing <u>from</u> (the source of the wind). Depending on the type of display, the unit of measure is:
    1. degrees (0 to 360)
    2. letters (e. g. NE for northeast)
    3. arrows (with the wind blowing from the tail to the head).
- **Wind speed** — the speed of the wind in miles per hour
- **Wind gust** — the highest speed of brief gusts that are significantly stronger than average, reported in miles per hour
- **Visibility** — the ground level visibility in miles
- **Precipitation** — type of precipitation, using a simplified set of categories. (Amount of precipitation is indicated with a + [heavy] or - [light])
    Rain (R)
    Snow (S)
    Freezing Rain/Sleet (Z)
    Hail (H)
    Thunderstorm (T)
    Tornado (Tornado)
- **Cloud base** — the lowest level of cloud cover (excluding thin clouds). The unit of measurement is thousands of feet.

- **Cloud amount** — the total amount of cloud cover (incorporating all layers into one figure, and excluding thin clouds). The unit of measurement is percentage.
- **Fog** — the presence or absence of fog or haze

Precipitation Codes

Hourly weather reports indicate precipitation and obstructions to vision using a standard set of about 25 symbols. The Accu-Weather Forecaster groups these into the following general categories (Fog is displayed separately from precipitation):

Rain (R):

R	Rain
R W	Rain showers
L	Drizzle

Freezing Rain/Sleet (Z):

ZR	Freezing rain
ZL	Freezing drizzle
IP	Ice pellets
IPW	Ice pellet showers
IC	Ice crystals

Fog (F):

F	Fog
GF	Ground fog
IF	Ice fog
H	Haze

Snow (S):

S	Snow
SG	Snow Grains
S W	Snow Showers
SP	Snow pellets
BS	Blowing snow

Hail (H):

A	Hail

Thunderstorm (T):

T	Thunderstorm

Tornado:

TORNADO Tornado
FUNNEL Funnel cld
SPOUT Water spout

Obstructions to vision

K	Smoke
D	Dust
BD	Blowing dust
BS	Blowing sand

Intensity (for all the above):

+	Heavy
-	Light

Interpreting Raw NWS Hourly Reports

The weather information used in the Accu-Weather Forecaster comes from the National Weather Service hourly reports. Although this program automatically interprets the raw data for use in the displays, you may want to examine the raw data yourself. You can display the most recently acquired hourly reports by selecting "Examine Raw Data" from the "Telecommunications" menu.

To aid you in the interpretation of the raw data, here is an example:

```
BDL SA 1850 3 OVC 7S- 993/22/17/0109/948
```

Here's what that coded report means:

BDL	= Windsor Locks, Conn.
SA	= Standard hourly report
1850	= 18:50 GMT or 2:50 p.m. EST
3 OVC	= Overcast clouds at 300 feet
7	= 7 mile visibility
S-	= light snow
993	= barometer reading is 999. 3 mb (29. 65 in)
22	= temperature is 22 degrees F.
17	= dewpoint is 17 degrees F.
0109	= wind is from 10° (N) at 9 knots (10 mph)
948	= altimeter reading (not used in program))

Coding Scheme:

- **Station code** — a three letter station code
- **Type of report**
  SA=Standard hourly report
  SP=Special report indicating a significant change
  RS=Special report that is also an hourly report
- **Time** — in GMT, standard reports are done between 50 and 59 minutes after the hour
- **Cloud height** — in hundreds of feet. Method of measurement is sometimes added (M=measured by instrument, E=estimated by pilot or balloon, W or I=indefinite). V means variable
- **Cloud amount** — tenths of cloud cover (repeated for each layer of clouds), as follows ("–" means thin):
  CLR = clear (0)
  SCT = scattered (1-5)
  BKN = broken (6-9)
  OVC = overcast (10)
- **Visibility** — ground level visibility in miles
- **Weather** — coded indication of current weather and/or obstructions to vision (refer to Precipitation Codes below)
- **Barometric pressure** — sea level pressure in millibars, omitting the 9 or 10 and without the decimal point (255=1025. 5 mb)
- **Temperature** — in Fahrenheit
- **Dew point** — in Fahrenheit
- **Wind direction & velocity** — first two digits are direction in tens of degrees (e.g. 32=320°); second two digits are speed in knots
- **Altimeter setting** — a barometric pressure/altitude reading used by pilots
- **Remarks** — specialized remarks usually related to aviation and a description of the current weather

Files Created and Used by the Program

The Accu-Weather Forecaster uses and creates a number of files. These files must be stored in the same folder as the Accu-Weather Forecaster Program. These are the standard files required by the program, not including TV Graphics images:

Demo Data Files	
SampObs	hourly observations
SampObs.Key	a key to observation data
SampObs.Txt	hourly observations in raw text form
SampFC.Txt	forecast data

Real Data Files	
AllObs	current hourly observations
AllObs.Key	key to current hourly observations
ExploreAD.Txt	raw text from most recent Explore Accu-Data session
FCast.Txt	current forecast information
Newtel.Txt	latest downloaded raw data

TV Graphics image files downloaded automatically by the Accu-Weather Forecaster are assigned filenames according to image type, date, and time. This information is encoded into ASCII characters, resulting in filenames with seven letters such as "AAAHBBN". Appended to these letters is an extension, either ".TV1" or ".TV2", indicating the association of the image with TV Graphics Chart 1 or Chart 2.

AMPS and TV Graphics image files downloaded during an **Explore Accu-Data session** are assigned filenames by the user. Any legal Macintosh filename can be used (maximum length is 63 characters including folder names; the colon character is not allowed).

Command Keys in the Accu-Weather Forecaster

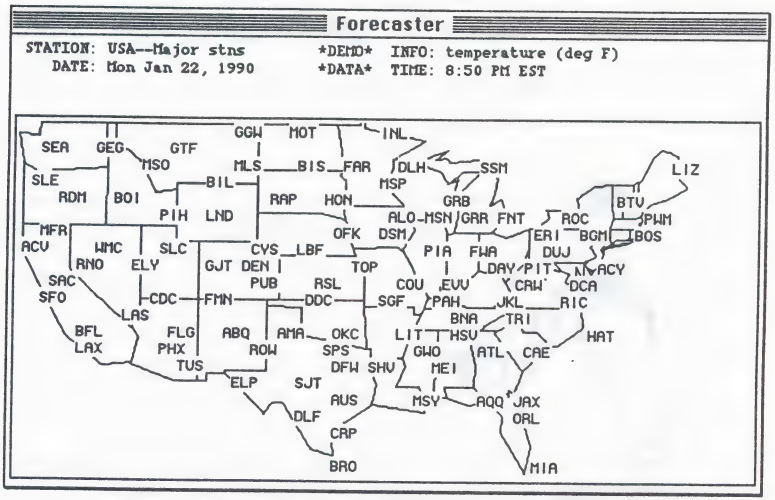
The following command key combinations are available in the program. To use any of them, press the Command key and the key indicated:

Command Key	Menu	Effect
Q	File	Quit
D	Telecom	Define Request
G	Display	Graph Display
M	Display	Values Map
S	Display	Shaded Contour Map
K	Display	Color Contour Map
P	Display	Picture Display
L	Display	List Display
F	Display	Station Text Forecast
T	Display	TV Graphics Chart 1
Y	Display	TV Graphics Chart 2
W	Display	AMPS Images
1	Select	Barometric Pressure
2	Select	Temperature
3	Select	Dew Point
4	Select	Wind Direction
5	Select	Wind Speed
6	Select	Wind Gust
7	Select	Visibility
8	Select	Precipitation
9	Select	Cloud Base
0	Select	Cloud Amount
-	Select	Fog
N	Select	Nearest Station
A	Select	USA Major Stations
R	Select	Range
;	Select	Previous Date
'	Select	Next Date
,	Select	Previous Hour
.	Select	Next Hour

APPENDIX

NATIONAL WEATHER SERVICE STATIONS

Map of Major NWS Stations



Whenever you select "USA Majors", the stations shown above are used. To see this map on your screen, select **Demo Data** from the **File** menu, hold down the Command and Shift keys, and press the "/" key.

Also, whenever you select more than 100 stations, your station selection list is automatically reduced to eliminate stations that are not "major" stations.

Key to Column Labels

Code = National Weather Service station code
City = City name
Maj = "Y" means one of the 100 "USA Major stations"
24 = "Y" means reports 24 hours
Cht = "Y" means produces "Chart" forecasts
Txt = "Y" means produces "Text" forecasts
Lat = Latitude of station
Long = Longitude of station

Alabama

Code	City	Maj	24	Cht	Txt	Lat	Long
BHM	Birmingham			Y	Y	33°34	86°45
CKL	Centreville		Y			32°48	87°18
DHN	Dothan		Y			31°18	85°30
HSV	Huntsville	Y	Y	Y	Y	34°42	86°48
MOB	Mobile/Bates		Y	Y	Y	30°42	88°18
BFM	Mobile/Brkly					30°42	88°00
MGM	Montgomery		Y	Y	Y	32°18	86°24
MSL	Muscle Shoals		Y			34°48	87°36
OZR	Ozark		Y			31°18	85°42
TOI	Troy					31°54	86°00
TCL	Tuscaloosa					33°12	87°36

Arizona

Code	City	Maj	2 4	Cht	Txt	Lat	Long
CHD	Chandler					33°18	111°42
DUG	Douglas		Y			31°30	109°36
FLG	Flagstaff	Y		Y	Y	35°06	111°42
FHU	Ft Huachuca					31°36	110°18
GBN	Gila Bend					32°54	112°42
LUF	Glendale		Y			33°30	112°24
GCN	Gr Canyon Pk					36°00	112°12
IGM	Kingman					35°18	114°00
PGA	Page					36°36	111°18
0E4	Payson					34°12	111°12
PHX	Phoenix	Y	Y	Y	Y	33°24	112°00
PRC	Prescott		Y			34°42	112°24
E74	Saffort					32°06	110°54
TUS	Tuscon	Y	Y	Y	Y	32°06	110°54
DMA	Tuscon/Davis		Y			32°12	110°54
INW	Winslow			Y	Y	35°00	110°42
YUM	Yuma			Y	Y	32°42	114°36

Arkansas

Code	City	Maj	2 4	Cht	Txt	Lat	Long
BYH	Blytheville		Y			36°00	89°54
ELD	El Dorado			Y		33°12	92°48
FYV	Fayetteville		Y			36°00	94°06
FSM	Ft Smith			Y	Y	35°18	94°24
HRO	Harrison					36°18	93°12
HOT	Hot Springs					34°30	93°06
LRF	Jacksonville		Y			34°54	92°12
JBR	Jonesboro		Y	Y		35°48	90°42
LIT	Little Rock	Y	Y	Y	Y	34°42	92°12
PBF	Pine Bluff					34°12	91°54
TXK	Texarkana			Y		33°30	94°00

California (North)

Code	City	Maj	24	Cht	Txt	Lat	Long
NGZ	Alameda		Y			37°48	122°18
S11	Alturas					41°18	120°30
ACV	Arcata	Y	Y	Y		41°00	124°06
BIH	Bishop			Y		37°24	118°24
BNY	Burney					40°48	121°42
CIC	Chico					39°54	121°54
CCR	Concord					38°00	122°30
CEC	Crescent City					41°48	124°12
NRC	Crows Landing					37°24	121°06
BLU	Emigrant Gap					39°18	120°42
EKA	Eureka	Text Forecast Only				40°47	124°09
SUU	Fairfield		Y			38°18	121°54
HWD	Hayward					37°36	122°12
LVK	Livermore					37°42	121°48
MMH	Mamoth Lakes					37°24	119°00
BAB	Marysville/Beal		Y			39°06	121°24
MYV	Marysville/Yuba					39°06	121°36
MER	Merced		Y			37°24	120°36
MOD	Modesto					37°42	120°54
SIY	Montague					41°48	122°30
MHS	Mt Shasta				Y	41°18	122°18
APC	Napa					38°12	122°12
OAK	Oakland			Y		37°48	122°12
RBL	Red Bluff			Y		40°12	122°18
RDD	Redding		Y		Y	40°30	122°18
SAC	Sacramento/Exec	Y	Y	Y	Y	38°30	121°30
SMF	Sacramento/Met					38°42	121°36
MHR	Sacramento/Mthr		Y			38°36	121°18
MCC	Sacramento/Mcln		Y			38°42	121°24
SQL	San Carlos					37°30	122°18
SFO	San Francisco	Y	Y	Y	Y	37°36	122°24
SJC	San Jose					37°24	121°54
STS	Sta Rosa					38°30	122°48
O87	Shelter Cove					40°00	124°00
TVL	South Lk Tahoe					38°54	120°00

SCK	Stockton			Y	Y	37°54	121°18
SVE	Susanville					40°18	120°30
TRK	Truckee-Tahoe					39°18	120°12
UKI	Ukiad					39°06	123°12

California (South)

Code	City	Maj	24	Cht	Txt	Lat	Long
AVX	Avalon					33°24	118°24
BFL	Bakersfield	Y	Y	Y	Y	35°25	119°03
DAG	Barstow			Y		34°54	116°48
BUO	Beaumont					34°00	117°00
BYS	Bicycle Lake					35°18	116°42
BLH	Blythe					33°36	114°42
BUR	Burbank					34°12	118°24
CZZ	Campo					32°42	116°30
CRQ	Carlsbad					33°06	117°12
NID	China Lake					35°42	117°42
CNO	Chino					34°00	117°36
EDW	Edwards AFB					34°54	117°54
NJK	El Centro					32°48	115°42
EMT	El Monte					34°00	118°00
HGT	Ft Hunter					36°00	121°18
FAT	Fresno		Y		Y	36°48	119°42
FUL	Fullerton					33°48	118°12
NRS	Imperial Bch					32°30	117°12
IPL	Imperial					32°48	115°36
POC	La Verne					34°06	117°48
WJF	Lancaster					34°42	118°12
NLC	Lemoore		Y			36°18	119°54
VBG	Lompoc					34°42	120°36
LGB	Long Bch			Y		33°48	118°12
SLI	Los Alamitos					34°00	118°18
LAX	Los Angeles	Y	Y	Y	Y	33°54	119°24
OAR	Monterrey/F Ord		Y			36°42	121°48
MRY	Monterrey/Pensl					36°36	121°48
MWS	Mt Wilson					34°06	118°06

EED	Needles					34°48	114°36
NFG	Oceanside		Y			33°18	117°18
ONT	Ontario					34°06	117°36
OXR	Oxnard					34°12	119°12
PSP	Palm Spring					33°54	116°30
PMD	Palmdale					34°36	118°00
NTD	Pt Hueneme		Y			34°06	119°06
RAL	Riverside					33°54	117°24
RIV	Riverside/March		Y			33°54	117°18
SNS	Salinas					36°42	121°36
SBD	San Bernardino		Y			34°06	117°12
NUC	San Clemente					33°00	118°30
SAN	San Diego/Intl		Y	Y	Y	32°42	117°12
SDM	San Diego/Brown					32°36	116°54
SEE	San Diego/Glsp					32°48	116°54
NKX	San Diego/Mrmar		Y			32°54	117°12
MYF	San Diego/Mntgm					32°48	117°06
NZY	San Diego/N Is		Y			32°42	117°12
SBP	San Luis Obispo					35°12	120°36
NSI	San Nicholas					33°18	119°30
87Q	San Simeon					35°42	121°18
SDB	Sandberg					34°48	118°42
NZJ	Sta Ana		Y			33°42	117°42
SNA	Sta Ana/Wayne					33°42	117°54
SBA	Sta Barbara			Y		34°24	119°48
SMX	Sta Maria			Y	Y	34°54	120°30
SMO	Sta Monica					34°06	118°30
TRM	Thermal					33°36	116°12
TOA	Torrance					33°48	118°18
NTK	Tustin		Y			33°42	117°48
NXP	Twentynine Plms					34°18	116°12
VNY	Van Nuys					34°12	118°30
VCV	Victorville		Y			34°36	117°24
VIS	Visalia					36°12	119°24

Colorado

Code	City	Maj	24	Cht	Txt	Lat	Long
AKO	Akron					40°12	103°12
ALS	Alamosa			Y	Y	37°30	105°54
ASE	Aspen					39°12	106°54
AFF	Colo Spg/AF Acd					39°00	104°48
COS	Colo Spg		Y	Y	Y	38°48	104°42
CEZ	Cortez					37°18	108°36
CAG	Craig-Moffet					40°30	107°30
BKF	Denver/Bkly		Y			39°42	104°48
APA	Denver/Cent					39°30	104°54
BJC	Denver/Jeffco					39°54	105°06
DEN	Denver/Stpltn	Y	Y	Y	Y	39°48	104°54
DRO	Durango					37°12	107°48
EGE	Eagle					39°42	106°54
FCS	Ft Carson					38°42	104°48
FCL	Ft Collins					40°36	105°06
GJT	Gr Junction	Y	Y	Y	Y	39°06	108°30
2V9	Gussison					38°30	106°54
GUC	Gunnison Arpt					38°30	106°54
HDN	Hayden					40°30	107°18
4LJ	Lamar					38°06	102°42
LXV	Leadville					39°12	106°18
LIC	Limon		Y			39°12	103°42
6V8	Montrose					38°30	107°54
MTJ	Montrose Arpt					38°30	107°54
PUB	Pueblo	Y	Y	Y	Y	38°18	104°30
1V1	Rifle					39°30	107°54
0V2	Salida					38°30	106°00
SBS	Steamboat Spgs					40°30	106°42
TAD	Trinidad		Y			37°18	104°18

Connecticut

Code	City	Maj	24	Cht	Txt	Lat	Long
BDR	Bridgeport			Y	Y	41°10	73°08
DXR	Danbury					41°22	73°29
GON	Groton					41°20	72°03
HFD	Hartford					41°44	72°39
HVN	New Haven					41°16	72°53
BDL	Windsor Locks		Y	Y	Y	41°56	72°41

Delaware

Code	City	Maj	24	Cht	Txt	Lat	Long
DOV	Dover		Y			39°06	75°30
ILG	Wilmington		Y	Y	Y	39°42	75°36

Florida

Code	City	Maj	24	Cht	Txt	Lat	Long
AQQ	Apalachicola	Y	Y	Y	Y	29°42	85°00
90J	Astor					29°48	81°18
AGR	Avon Pk		Y			27°36	81°18
BOW	Barton					27°54	81°42
COF	Cocoa					28°12	80°36
CEW	Crestview		Y			30°48	86°30
CTY	Cross City					29°36	83°06
DAB	Daytona Bch		Y	Y	Y	29°12	81°06
FMY	Ft Myers		Y	Y	Y	26°36	81°54
RSW	Ft Myers/SW Fla					26°36	81°54
FXE	Ft Lauderdl/Ex					26°06	80°06
FLL	Ft Lauderdl/Int					26°06	80°12
GNV	Gainesville		Y			29°42	82°18
HST	Homestead		Y			25°30	80°24
NIP	Jacksonville		Y			30°12	81°42
JAX	Jacksonvl/Intl	Y	Y	Y	Y	30°30	81°42
NZC	Jacksonvl/Cec					30°12	81°54

Florida (cont.)

CRG	Jacksonvl/Crg					30°18	81°30
NQX	Key West					24°36	81°42
EYW	Key West Intl		Y	Y	Y	24°36	81°48
LAL	Lakewood			Y		28°00	81°54
HRT	Mary Esther		Y			30°18	86°42
NRB	Mayport					30°24	81°24
MLB	Melbourne					28°06	80°36
MIA	Miami	Y	Y	Y	Y	25°48	80°18
OPF	Miami/Opa Lcka					25°42	80°06
TMB	Miami/Tamiami					25°42	80°24
NSE	Milton/Whiting					30°42	87°00
APF	Naples					26°06	81°30
X68	NASA Shuttle					28°36	80°42
ORL	Orlando/Exec	Y	Y	Y		28°30	81°18
MCO	Orlando		Y			28°24	81°18
PFN	Panama City					30°12	85°42
PAM	Panama City/Ty					30°06	85°36
NPA	Pensacola/Arpt		Y	Y		30°24	87°18
PNS	Pensacola/Reg		Y	Y	Y	30°30	87°12
SFB	Sanford					28°48	81°18
SRQ	Sarasota					27°24	82°36
PIE	St Petersburg					27°54	82°42
TLH	Tallahassee		Y	Y	Y	30°24	84°24
TPA	Tampa		Y	Y		28°00	82°30
TBW	Tampa	Text Forecast Only				28°00	82°30
MCF	Tampa/MacDill		Y			27°54	82°30
TIX	Titusville					28°30	80°48
EGI	Valparaiso/Dk					29°42	85°24
VPS	Valparaiso/Egl		Y			30°30	86°30
VRB	Vero Bch		Y			27°42	80°24
PBI	W Palm Bch			Y	Y	26°42	80°06

Georgia

Code	City	Maj	24	Cht	Txt	Lat	Long
ABY	Albany		Y			31°30	84°12
AMG	Alma					31°30	82°30
AHN	Athens		Y	Y	Y	33°57	83°19
ATL	Atlanta	Y	Y	Y	Y	33°42	84°24
FTY	Atlanta/Fltn					33°48	84°24
PDK	Atlanta/Pchtree					33°48	84°18
AGS	Augusta/Bush		Y	Y	Y	33°24	82°00
BQK	Brunswick					31°18	81°30
SSI	Brunswick/McKn		Y			31°12	81°24
CSG	Columbus		Y	Y	Y	32°30	84°54
LSF	Ft Benning		Y			32°18	85°00
LHW	Winesville					31°54	81°36
WRB	Macon/Robins		Y			32°36	83°36
MCN	Macon/Wilson		Y	Y	Y	32°42	83°42
MGE	Marietta					33°54	84°30
MGR	Moultrie					31°18	82°24
RMG	Rome					34°18	85°12
SAV	Savannah		Y	Y	Y	32°06	81°12
SVN	Savannah/Hntr		Y			32°00	81°12
VLD	Valdosta		Y			30°48	83°18
VAD	Valdosta/Moody		Y			31°00	83°12
AYS	Way Cross					31°18	82°18

Idaho

Code	City	Maj	24	Cht	Txt	Lat	Long
BOI	Boise	Y	Y	Y	Y	43°34	116°13
BYI	Burley		Y			42°30	113°48
U15	Challis					46°24	117°00
COE	Coeur D'Alene					47°48	116°48
P69	Elk City					45°48	115°24
S80	Grangeville					45°54	116°06
SUN	Hailey					43°30	114°18
IDA	Idaho Falls		Y			43°30	112°06

Idaho (cont.)

LWS	Lewiston			Y	Y	46°24	117°00
MLD	Malad City					42°12	112°18
MUO	Mountain Home		Y			43°00	115°54
S06	Mullan					47°30	115°48
PIH	Pocatello	Y	Y	Y	Y	42°54	112°36
27U	Salmon					45°00	113°30
U78	Soda Spgs					42°42	111°30
TWF	Twin Falls					42°30	114°30

Illinois

Code	City	Maj	24	Cht	Txt	Lat	Long
ALN	Alton					38°48	90°00
ARR	Aurora					41°48	88°30
BLV	Belleville		Y			38°30	89°48
BMI	Bloomington					40°30	88°54
CMI	Champagne					40°00	88°18
CHI	Chicago	Text Forecast Only				42°00	87°54
DPA	Chicago/DuP					41°54	88°18
CGX	Chicago/Meigs					41°54	87°30
MDW	Chicago/Midway			Y		41°48	87°48
ORD	Chicago/O'Hare		Y	Y		42°00	87°54
DNV	Danville					40°12	87°36
DEC	Decatur		Y			39°48	88°54
CPS	East St Louis					38°30	90°12
GBG	Galesburg					40°54	90°24
NBU	Glenview		Y			42°06	87°48
PIA	Peoria	Y	Y	Y	Y	40°42	89°42
RFD	Rockford		Y	Y	Y	42°12	89°06
MWA	Marion			Y		37°48	89°00
MMO	Marseilles					41°18	88°36
MLI	Moline		Y	Y	Y	41°30	90°30
MVN	Mt Vernon					38°18	88°48
UIN	Quincy		Y			39°54	91°18
SPI	Springfield		Y	Y	Y	39°48	89°42

Indiana

Code	City	Maj	2 4	Cht	Txt	Lat	Long
BMG	Bloomington					39°06	86°36
EKM	Elkhart					41°42	86°00
EVV	Evansville	Y	Y	Y	Y	38°06	87°30
FWA	Ft Wayne	Y	Y	Y	Y	41°00	85°12
GYY	Gary					41°36	87°24
IND	Indianapolis		Y	Y	Y	39°42	86°18
LAF	Layayette		Y			40°30	87°00
MIE	Muncie					40°12	85°24
GUS	Peru		Y			40°42	86°12
SBN	So Bend		Y	Y	Y	41°42	86°18
HUF	Terre Haute		Y			39°30	87°18

Iowa

Code	City	Maj	2 4	Cht	Txt	Lat	Long
BRL	Burlington		Y	Y		40°48	91°06
CID	Cedar Rapids		Y			41°54	91°42
DSM	Des Moines	Y	Y	Y	Y	41°30	93°42
DBQ	Dubuque			Y	Y	42°24	90°42
FOD	Ft Dodge					42°30	94°12
3OI	Lamoni					40°36	93°54
MCW	Mason City		Y	Y		43°12	93°18
OTM	Ottumwa		Y			41°06	92°30
SUX	Sioux City		Y	Y	Y	42°24	96°24
3SE	Spencer					43°12	95°12
ALO	Waterloo	Y	Y	Y	Y	42°36	92°24

Kansas

Code	City	Maj	2 4	Cht	Txt	Lat	Long
CNU	Chanute					37°42	95°30
CNK	Concordia		Y	Y	Y	39°36	97°42
DDC	Dodge City	Y	Y	Y	Y	37°48	100°00
1K5	Elkhart					37°00	101°54
EMP	Emporia					38°18	96°12
FRI	Ft Riley		Y			39°00	96°48
GCK	Garden City					37°54	100°42
GLD	Goodland		Y	Y	Y	39°24	101°42
HYS	Hays					38°54	99°18
HLC	Hill City					39°24	99°48
HUT	Hutchinson					38°00	97°30
MHK	Manhattan					39°12	96°42
P28	Medicine Lodge					37°18	98°30
OJC	Olathe/Exec					38°48	94°54
IXD	Olathe/John					38°48	94°54
RSL	Russell	Y	Y	Y		38°54	98°48
SLN	Salina		Y			38°48	97°42
TOP	Topeka/Billard		Y	Y	Y	39°06	95°36
FOE	Topeka/Forbes					39°00	95°42
IAB	Wichita/MCC		Y			37°36	97°18
ICT	Wichita		Y	Y	Y	37°42	97°24

Kentucky

Code	City	Maj	2 4	Cht	Txt	Lat	Long
BWG	Bowling Green		Y			37°00	86°24
FTK	Ft Knox		Y			37°54	86°00
HOP	Hopkinsville		Y			36°42	87°30
JKL	Jackson	Y	Y			37°12	83°06
LEX	Lexington		Y	Y	Y	38°00	84°36
LOZ	London					37°06	84°06
LOU	Louisville/Bwmn					38°12	85°42
SDF	Louisville/Stnd		Y	Y	Y	38°12	85°42
OWB	Owensboro					37°48	87°12

Kentucky (cont.)

PAH	Paducah	Y	Y		Y	37°06	88°48
5I3	Pikeville					37°30	82°30

Louisiana

Code	City	Maj	2 4	Cht	Txt	Lat	Long
ARA	Acadiana		Y			30°00	91°48
AEX	Alexandria/Eng		Y			31°18	92°36
ESF	Alexandria/Esl			Y		31°24	92°18
7R3	Amelia					29°42	91°00
BTR	Baton Rouge		Y	Y	Y	30°30	91°06
BVE	Bootheville			Y		29°18	89°24
7R5	Cameron					29°48	93°18
POE	Ft Polk		Y			31°00	93°12
7R2	Gulf Leevill					29°12	90°12
HUM	Houmaterre					29°30	90°42
7R4	Intracoastl Cty					29°42	92°12
LFT	Lafayette		Y			30°12	92°00
LCH	Lake Charles		Y	Y	Y	30°06	93°12
MLU	Monroe					32°30	92°06
NBG	New Orleans		Y			29°54	90°00
MSY	New Orleans/Int	Y	Y	Y		30°00	90°18
NEW	New Orleans/LkF		Y		Y	30°00	90°00
PTN	Patterson					29°48	91°24
DTN	Shrevept/Dwntn					32°30	93°48
SHV	Shreveport	Y	Y	Y	Y	32°30	93°48
BAD	Shrevept/Brksdl		Y			32°30	93°42
7R8	So Marsh Isl					29°30	91°48
7R1	Venice					29°18	89°24

Maine

Code	City	Maj	2 4	Cht	Txt	Lat	Long
AUG	Augusta		Y			44°19	69°48
BGR	Bangor		Y	Y		44°48	68°49
BHB	Bar Harbor					44°23	68°13
NHZ	Brunswick		Y			43°53	69°56
CAR	Caribou			Y	Y	46°52	68°01
3B1	Greenville					45°28	69°35
HUL	Houlton		Y			46°08	67°47
LIZ	Limestone	Y	Y			46°57	67°53
MLT	Millincoket					45°39	68°43
PWM	Portland	Y	Y	Y	Y	43°39	70°19
PQI	Presque Isle					46°41	68°01
RKD	Rockland					44°06	69°06

Maryland

Code	City	Maj	2 4	Cht	Txt	Lat	Long
APG	Aberdeen					39°30	76°12
MTN	Baltimore/Mrtn					39°30	76°18
BWI	Baltimore/Wash		Y	Y	Y	39°12	76°42
ADW	Camp Springs		Y			38°54	76°54
FME	Ft Meade					39°06	76°48
HGR	Hagarstown					39°42	76°42
NHK	Patuxent River		Y			38°17	76°24
SBY	Salisbury		Y			38°18	76°30

Massachusetts

Code	City	Maj	2 4	Cht	Txt	Lat	Long
BED	Bedford					42°28	71°17
BVY	Beverly					42°35	70°55
BOS	Boston	Y	Y	Y	Y	42°22	71°02
CEF	Chicopee Falls					42°10	72°36
FMH	Falmouth		Y			41°42	70°30

Massachusetts (cont.)

AYE	Ft Devans					42°30	71°36
HYA	Hyannis					41°40	70°17
LWM	Lawrence					42°42	71°09
MVY	Martha's VYard					41°24	70°37
ACK	Nantucket			Y		41°15	70°04
EWB	New Bedford					41°41	70°58
OWD	Norwood					42°11	71°11
PSF	Pittsfield					42°27	73°15
PYM	Plymouth					41°58	70°14
NZW	So Weymouth		Y			42°09	70°56
BAF	Westfield					42°10	72°43
ORH	Worcester				Y	42°16	71°52

Michigan

Code	City	Maj	24	Cht	Txt	Lat	Long
APN	Alpena		Y	Y	Y	45°06	83°36
ARB	Ann Arbor					42°12	83°48
BTL	Battle Creek					42°12	85°12
BEH	Benton Harbor					42°06	86°24
P59	Copper Harbour					47°25	87°37
DET	Detroit					42°12	83°18
DTW	Detroit/Metro		Y	Y	Y	42°12	83°18
YIP	Detroit/WilRun		Y			42°12	83°30
ESC	Escanaba					45°48	87°00
FNT	Flint	Y	Y	Y	Y	43°00	83°42
GRR	Grand Rapids	Y	Y	Y	Y	42°54	85°30
SAW	Gwinn/Sawyer		Y			46°18	87°24
CMX	Hancock					47°12	88°30
P58	Harbour Beach					43°48	82°30
HTL	Houghton Lk			Y	Y	44°24	84°42
IMT	Iron Mt					45°48	88°06
IWD	Ironwood					46°30	90°06
JXN	Jackson					42°18	84°30
AZO	Kalamazoo					42°12	85°36

Michigan (cont.)

LAN	Lansing		Y	Y	Y	42°48	84°36
MQT	Marquette		Y	Y	Y	46°36	87°24
MNM	Menominee					45°06	87°36
MTC	Mt Clemens		Y			42°36	82°48
MKG	Muskegon			Y	Y	43°12	86°12
OSC	Oscoda		Y			44°30	83°24
PLN	Pellston		Y			45°36	84°48
PTK	Pontiac					42°42	83°24
MBS	Saginaw		Y			43°30	84°06
SSM	Sault St Marie	Y	Y	Y	Y	46°18	84°30
P75	Seul Choix					45°06	83°36
TVC	Traverse City		Y	Y		44°42	85°36

Minnesota

Code	City	Maj	24	Cht	Txt	Lat	Long
AXN	Alexandria		Y			45°54	95°24
BRD	Brainerd					46°24	94°06
HIB	Chisolm		Y			47°24	92°54
DTL	Detroit Lakes					46°48	96°12
DLH	Duluth	Y	Y	Y	Y	46°48	92°12
EL0	Ely					47°48	91°54
FRM	Fairmont					43°42	94°24
FFM	Fergus Falls					46°12	96°36
GPZ	Grand Rapids					47°24	93°36
INL	Int'l Falls	Y	Y	Y	Y	48°36	93°24
MML	Marshall					44°30	95°42
MSP	Minneapolis/Int	Y	Y	Y	Y	44°54	93°12
MIC	Minneapolis/Chr					44°54	93°12
FCM	Minneapolis/FIC					44°54	93°12
PKD	Park Rapids					46°54	95°06
P39	Pequot Lake					46°36	94°18
RWF	Redwood Falls		Y			44°36	95°06
RST	Rochester		Y	Y	Y	43°54	92°30
STC	St Cloud			Y	Y	45°36	94°06

Minnesota (cont.)

STP	St Paul					44°54	93°06
TVF	Thief Rvr Falls					48°06	96°12
D45	Warroad					48°54	95°24
OTG	Worthington					43°42	95°36

Mississippi

Code	City	Maj	24	Cht	Txt	Lat	Long
BIX	Biloxi		Y			30°24	88°54
CBM	Columbus		Y			33°42	88°24
GTR	Golden Triangle					33°30	88°36
GWO	Greenwood	Y	Y	Y		33°30	90°06
GPT	Gulfport					30°24	89°06
JAN	Jackson		Y	Y	Y	32°18	90°06
PIB	Laurel					31°30	84°18
MCB	McComb		Y	Y		31°12	90°30
NMM	Meridian		Y			32°30	88°36
MEI	Meridian/Key	Y	Y	Y	Y	32°12	88°48
HEZ	Natchez					31°24	91°06
TUP	Tupelo		Y			34°18	88°48

Missouri

Code	City	Maj	24	Cht	Txt	Lat	Long
CGI	Cape Girardeau		Y			37°12	89°36
COU	Columbia	Y	Y	Y	Y	38°48	92°12
TBN	Ft Leonard					37°48	92°12
JEF	Jefferson City					38°36	92°12
JLN	Joplin		Y			37°12	94°30
MCI	Kansas City		Y	Y	Y	39°18	94°42
MKC	Kansas Cty/Dntn		Y			39°06	94°36
GVW	Kansas Cty/R-G					38°48	94°36
IRK	Kirksville					40°06	92°36
SZL	Know Noster					38°42	93°36

Missouri (cont.)

P02	Poplar Bluff					36°42	90°24
VIH	Rolla					38°06	91°42
P35	Spickard					40°12	93°42
SGF	Springfield	Y	Y	Y	Y	37°12	93°24
STJ	St Joseph			Y	Y	39°48	94°54
STL	St Louis			Y	Y	38°48	90°24
SUS	St Louis/Spirit		Y			38°36	90°36

Montana

Code	City	Maj	24	Cht	Txt	Lat	Long
BIL	Billings	Y	Y	Y	Y	45°48	108°30
BZN	Bozeman		Y			45°48	111°12
4BQ	Broadus					45°24	105°24
BTM	Butte		Y			45°54	112°30
CTB	Cutbank					48°36	112°24
DLN	Dillon					45°18	112°36
3DU	Drummond					46°42	113°12
GGW	Glasgow	Y	Y	Y	Y	48°12	106°12
GDV	Glendive					47°06	104°48
GTF	Great Falls	Y	Y	Y	Y	47°30	111°12
GFA	Great Fls/Mlms		Y			47°30	111°12
3HT	Harlowton					45°48	108°30
HVR	Havre			Y	Y	48°36	109°48
HLN	Helena		Y	Y	Y	46°36	112°00
JDN	Jordan					47°18	106°54
FCA	Kalispell		Y	Y	Y	48°18	114°18
LWT	Lewistown					47°06	109°30
LVM	Livingston					45°42	110°24
MLS	Miles City	Y	Y			46°30	105°54
MSO	Missoula	Y	Y	Y	Y	46°54	114°06
MQM	Monida					44°36	112°18
SDY	Sidney					47°24	104°06
3TH	Thomson Falls					47°48	115°18
WYS	W Yellowstone					44°36	111°06
OLF	Wolf Point					48°06	105°36

Nebraska

Code	City	Maj	24	Cht	Txt	Lat	Long
ANW	Ainsworth					42°36	99°54
AIA	Alliance					42°06	102°48
BIE	Beautrice					40°18	96°48
FNB	Brenner Field					40°00	95°36
BBW	Broken Bow					41°24	99°42
CDR	Chadron					42°48	103°06
OLU	Columbus					41°24	97°24
CZD	Cozad					40°54	100°00
GRI	Grand Isl		Y	Y	Y	41°00	98°18
HSI	Hastings					40°36	98°24
IML	Imperial					40°36	101°42
EAR	Kearney					40°42	99°00
LNK	Lincoln		Y	Y	Y	40°54	96°48
MCK	McCook					40°12	100°36
MHN	Mullen					42°06	101°06
OFK	Norfolk	Y	Y	Y	Y	42°00	97°24
LBF	No Platte	Y	Y	Y	Y	41°06	100°42
ONL	O'Neill					42°30	98°42
OMA	Omaha/Eppley		Y	Y	Y	41°18	95°54
OFF	Omaha/Offutt		Y			41°06	95°54
ODX	Ord					41°42	98°54
BFF	Scottsbluff		Y	Y	Y	41°54	103°36
SNY	Sidney					41°06	103°00
VTN	Valentine			Y		42°54	100°36

Nevada

Code	City	Maj	24	Cht	Txt	Lat	Long
U31	Austin					39°30	117°06
BAM	Battle Mt					40°36	116°54
P38	Caliente					37°36	114°30
EKO	Elko			Y	Y	40°48	115°48

Nevada (cont.)

ELY	Ely	Y	Y	Y	Y	39°18	114°54
NFL	Fallon					39°24	118°42
HTH	Hawthorne					38°30	118°42
L63	Indian Springs					36°36	115°36
LAS	Las Vegas/McCrn	Y	Y	Y	Y	36°06	115°12
LSV	Las Vegas/Nell		Y			36°18	115°00
DRA	Mercury		Y			36°36	116°00
OWY	Owyhee					42°00	116°06
RNO	Reno	Y	Y	Y	Y	39°30	119°12
TPH	Tonopah			Y		38°06	117°06
WMC	Winnemucca	Y	Y	Y	Y	40°54	117°48

New Hampshire

Code	City	Maj	24	Cht	Txt	Lat	Long
CON	Concord		Y	Y	Y	43°12	71°30
EEN	Keene					42°54	72°16
LEB	Lebanon		Y			43°38	72°19
MHT	Manchester					42°56	71°26
MWN	Mt Washington					44°16	71°18
PSM	Portsmouth		Y			43°05	70°49

New Jersey

Code	City	Maj	24	Cht	Txt	Lat	Long
ACY	Atlantic City	Y	Y	Y	Y	39°27	74°34
CDW	Caldwell					40°48	74°18
EWR	Newark		Y	Y	Y	40°42	74°10
MIV	Millville		Y			39°22	75°04
MMU	Morristown					40°48	74°25
NEL	Lakehurst					40°02	74°19
TEB	Teterboro		Y			40°51	74°03
TTN	Trenton					40°17	74°49
WRI	Wrightstown		Y			40°00	74°36

New Mexico

Code	City	Maj	24	Cht	Txt	Lat	Long
HMN	Alamogordo		Y			32°48	106°06
ABQ	Albuquerque	Y	Y	Y	Y	35°06	106°36
E33	Chama					36°54	106°54
CAO	Clayton			Y		36°30	103°12
CVS	Clovis		Y			34°24	103°18
DMN	Deming			Y		32°18	107°42
FMN	Farmington	Y	Y	Y		36°48	108°12
GUP	Gallup		Y			35°30	108°48
HOB	Hobbs					32°42	103°12
LVS	Las Vegas					35°42	105°12
LAM	Los Alamos					35°54	106°18
ROW	Roswell	Y	Y	Y		33°18	104°30
SAF	Santa Fe					35°36	106°06
SVC	Siver City					32°42	108°12
TCS	Truth/Conseqns			Y		33°12	107°18
TCC	Tucumcari			Y		35°12	103°36
E28	White Sands					33°00	106°24

New York

Code	City	Maj	24	Cht	Txt	Lat	Long
ALB	Albany		Y	Y		42°45	73°48
BGM	Binghampton	Y	Y	Y	Y	42°13	75°59
BUF	Buffalo		Y	Y	Y	42°56	78°44
ELM	Elmira		Y			42°10	76°54
FRG	Farmingdale					40°44	73°26
GFL	Glens Falls		Y			43°21	73°37
ISP	Islip		Y	Y		40°47	73°06
ITH	Ithaca					42°29	76°28
JHW	Jamestown					42°09	79°15
MSS	Massena		Y	Y		44°56	74°51
MSV	Monticello					41°42	74°48

New York (cont.)

NYC	New York	Text Forecast Only				40°39	73°47
JFK	New York/JFK		Y	Y		40°39	73°47
LGA	New York/Lag		Y	Y		40°46	73°54
SWF	Newburgh					41°30	74°06
IAG	Niagara Falls		Y			43°06	78°57
OGS	Ogdensburg					44°42	75°29
PBG	Plattsburgh		Y			44°39	73°28
POU	Poughkeepsie		Y			41°38	73°53
ROC	Rochester	Y	Y	Y	Y	43°07	77°40
RME	Rome		Y			43°13	75°27
SLK	Saranac Lake					44°23	74°12
SYR	Syracuse		Y	Y	Y	43°06	76°07
UCA	Utica		Y			43°09	75°23
ART	Watertown		Y			44°00	76°01
FOK	Westhampton Bch					40°54	72°36
HPN	White Plains		Y			41°04	73°43

North Carolina

Code	City	Maj	24	Cht	Txt	Lat	Long
AVL	Asheville		Y	Y	Y	35°24	82°30
CLT	Charlotte		Y	Y	Y	35°12	80°54
NKT	Cherry Pt		Y			34°48	76°54
ECG	Elizabeth City					36°18	76°12
FAY	Fayetteville					35°00	78°54
FBG	Fayettevl/Ft Br					35°06	78°54
POB	Fayettevl/Pope		Y			35°12	79°00
GSB	Goldsboro		Y			35°18	78°00
GSO	Greensboro		Y	Y	Y	36°06	80°00
HAT	Hatteras		Y	Y		35°18	75°36
HKY	Hickory		Y			35°48	81°24
HFF	Hoffman					35°00	79°30
HSS	Hot Springs					35°24	82°30
NCA	Jacksonville		Y			34°42	77°24
OAJ	Jacksonvl/Ellis					34°48	77°36

North Carolina (cont.)

ISO	Kingston					35°18	77°36
EWN	New Bern		Y			35°06	77°06
RDU	Raleigh		Y	Y	Y	35°54	78°48
RWI	Rocky Mount					35°54	77°48
2DP	Stumpy Pt					35°42	75°54
ILM	Wilmington		Y	Y	Y	34°18	77°54
INT	Winston-Salem					36°06	80°12

North Dakota

Code	City	Maj	24	Cht	Txt	Lat	Long
BIS	Bismarck	Y	Y	Y	Y	46°46	100°45
P11	Devil's Lake					48°06	98°48
DVL	Devil's Lake					48°06	98°54
DIK	Dickinson					46°48	102°48
FAR	Fargo		Y	Y	Y	46°54	96°48
RDR	Grand Forks		Y			48°00	97°24
GFK	Grand Forks/Int					48°00	97°12
P67	Lidgerwood					46°06	97°42
MIB	Minot		Y			48°24	101°18
MOT	Minot/Intl	Y	Y	Y		48°18	101°18
P24	Roseglen					47°48	101°48
ISN	Williston		Y	Y	Y	48°12	103°36

Ohio

Code	City	Maj	24	Cht	Txt	Lat	Long
CAK	Akron		Y	Y	Y	40°54	81°24
LUK	Cincinnati		Y			39°06	84°24
CVG	Cincinnati/Cvng		Y		Y	39°06	84°42
BKL	Cleveland/Brk					41°30	81°42
CGF	Cleveland/Cuya					41°30	81°30
CLE	Cleveland/Hopk		Y	Y	Y	41°24	81°54
CMH	Columbus		Y	Y	Y	40°00	82°54

Ohio (cont.)

OSU	Columbus/OSU					40°00	83°00
LCK	Columbus/Rknb		Y			39°54	82°54
DAY	Dayton	Y	Y		Y	39°54	84°12
FFO	Dayton/Wright-P		Y			39°48	84°06
FDY	Findlay		Y			41°00	83°42
MFD	Mansfield				Y	40°48	82°30
SGH	Springfield					39°48	83°48
TOL	Toledo		Y	Y	Y	41°36	83°48
LNN	Willoughby					41°12	81°12
YNG	Youngstown		Y	Y	Y	41°18	80°42
ZZV	Zanesville		Y			40°00	81°54

Oklahoma

Code	City	Maj	24	Cht	Txt	Lat	Long
LTS	Altus		Y			34°42	99°18
ADM	Ardmore					34°18	97°00
BVO	Barlesville					36°42	96°00
CSM	Clinton					35°18	99°12
END	Enic/Vance		Y			36°18	97°54
WDG	Enid/Woodring					36°24	97°48
FSI	Ft Sill		Y			34°42	98°24
GAG	Gage/Shattuck			Y		36°18	99°48
HBR	Hobert		Y	Y		35°00	99°06
MLC	McAlester		Y	Y		34°54	95°48
TIK	Okla City/Tinkr		Y			35°24	97°24
OKC	Okla City/Rogrs	Y	Y	Y	Y	35°24	97°36
PWA	Okla City/Post		Y			35°30	97°42
PGO	Page					34°42	94°36
PNC	Ponca City					36°42	97°06
TUL	Tulsa		Y	Y	Y	36°12	95°54

Oregon

Code	City	Maj	24	Cht	Txt	Lat	Long
AST	Astoria		Y	Y	Y	46°06	123°54
3S2	Aurora					45°12	122°48
BKE	Baker					44°48	117°48
4BK	Brookings					42°00	124°18
BNO	Burns			Y		43°42	118°54
CZK	Cascade Locks					45°42	121°54
RVI	Corvallis					44°30	123°12
EUG	Eugene			Y	Y	44°06	123°12
LMT	Klamath Falls		Y		Y	42°12	121°42
4LW	Lakeview					42°12	120°18
MEH	Meacham					45°30	118°24
MFR	Medford	Y	Y	Y	Y	42°12	122°54
ONP	Newport					44°42	124°00
OTH	North Bend		Y	Y		43°24	124°18
ONO	Ontaria					44°00	117°00
PDT	Pendleton		Y	Y	Y	45°42	118°54
HIO	Portland/Hills					45°30	122°54
TTD	Portland/Trout					45°36	122°24
PDX	Portland/Intl		Y	Y	Y	45°36	122°36
RDM	Redmond	Y	Y	Y		44°18	121°12
RBG	Roseburg					43°12	123°24
SLE	Salem	Y	Y	Y	Y	44°54	123°00
SXT	Sexton Summit					42°42	123°18
DLS	The Dalles					45°36	121°12

Pennsylvania

Code	City	Maj	24	Cht	Txt	Lat	Long
ABE	Allentown		Y	Y	Y	40°39	75°26
BVI	Beaver Falls					40°46	80°19
BFD	Bradford		Y	Y		41°48	78°38
DUJ	Du Bois	Y	Y			41°11	78°54
ERI	Erie	Y	Y	Y	Y	42°05	80°11
FKL	Franklin					41°23	79°52

Pennsylvania (cont.)

CXY	Harrisburg		Y			40°13	76°51
HAR	Harrisburg	Text Forecast Only				40°13	76°51
JST	Johnstown					40°19	78°50
LNS	Lancaster					40°08	76°18
LBE	Latrobe					40°17	79°24
AOO	Martinsburg					40°18	78°19
MDT	Middletown					40°12	76°46
PHL	Philadelphia		Y	Y	Y	40°05	75°01
PNE	Philadelphia/N		Y			39°53	75°15
AGC	Pittsburgh					40°21	79°56
PIT	Pittsburgh/Intl	Y	Y	Y	Y	40°30	80°13
RDG	Reading					40°23	75°58
UNV	State College					40°48	77°52
AVP	Wilkes-Barre		Y	Y	Y	41°14	75°53
IPT	Williamsport		Y	Y	Y	41°15	76°55
NXX	Willow Grove		Y			40°11	75°08

Rhode Island

Code	City	Maj	24	Cht	Txt	Lat	Long
BID	Block Island					41°10	71°35
PVD	Providence		Y	Y	Y	41°44	71°26

South Carolina

Code	City	Maj	24	Cht	Txt	Lat	Long
AND	Anderson					34°30	82°42
NBC	Beaufort		Y			32°30	80°42
CHS	Charleston		Y	Y	Y	32°54	80°12
CAE	Columbia	Y	Y	Y	Y	34°00	81°06
MMT	Columbia/Mcntr					33°54	80°48
FLO	Florence		Y			34°12	79°42
GMU	Greenville					34°48	82°30
GSP	Greer		Y	Y	Y	34°54	82°12

South Carolina (cont.)

MYR	Myrtle Beach		Y			33°42	78°54
CRE	No Myrtle Bch					33°48	78°42
2PJ	Poinsett Range					33°42	78°30
SSC	Sumter		Y			34°00	80°30

South Dakota

Code	City	Maj	24	Cht	Txt	Lat	Long
ABR	Aberdeen		Y	Y	Y	45°30	98°24
BKX	Brookings					44°18	96°48
9V9	Chamberlain					43°48	99°18
0V1	Custer					43°36	109°30
HON	Huron	Y	Y	Y	Y	44°24	98°12
Y22	Lemmon					45°54	102°12
MHE	Mitchell					43°48	98°00
Y26	Mobridge					45°30	100°24
PHP	Philip					44°06	101°36
PIR	Pierre		Y	Y		44°24	100°18
RCA	Rapid City/Ells		Y			44°12	103°06
RAP	Rapid City	Y	Y	Y	Y	44°00	103°06
REJ	Redig					45°12	103°30
FSD	Sioux Falls		Y	Y	Y	43°36	96°42
ATY	Watertown					44°54	97°12
YKN	Yankton					42°54	97°24

Tennessee

Code	City	Maj	24	Cht	Txt	Lat	Long
TRI	Bristol	Y	Y	Y	Y	36°30	82°24
CHA	Chattanooga		Y	Y	Y	35°00	85°12
CSV	Crossville		Y			36°00	85°06
DYR	Dyersburg					36°00	89°30
MKL	Jackson		Y			35°36	88°54
TYS	Knoxville		Y	Y	Y	35°49	83°54

Tennessee (cont.)

MEM	Memphis		Y	Y	Y	35°06	90°00
NQA	Memphis/Mlngtn		Y			35°18	89°54
BNA	Nashville	Y	Y	Y	Y	36°06	86°42
MQY	Smyrna					35°54	86°30

Texas

Code	City	Maj	24	Cht	Txt	Lat	Long
ABI	Abilene			Y	Y	32°24	99°42
DYS	Abilene/Dyess		Y			32°24	99°48
ALI	Alice					27°42	98°00
AMA	Amarillo	Y	Y	Y	Y	35°12	101°42
AUS	Austin	Y	Y	Y	Y	30°18	97°42
BSM	Austin/Berg		Y			30°12	97°42
BPT	Beaumont		Y	Y	Y	30°00	94°00
NIR	Beeville		Y			28°24	97°42
BRO	Brownsville	Y	Y	Y	Y	25°54	97°24
HHF	Canadian					35°54	100°18
CDS	Childres					34°24	100°18
CLL	College Stn					30°36	96°24
NGP	Corpus Christi		Y			27°42	97°18
CRP	Corpus Chr/Intl	Y	Y	Y	Y	27°48	97°30
COT	Cotulla					28°30	99°12
DHT	Dalhurt					36°00	102°36
DFW	Dallas/Ft Wrth	Y	Y	Y		32°54	97°06
ADS	Dallas/Addison					33°00	96°54
NBE	Dallas/Hensley		Y			32°42	97°00
DAL	Dallas/Love			Y		32°54	96°54
RBD	Dallas/Redbird					32°48	96°54
DRT	Del Rio	Y		Y	Y	29°24	100°54
DLF	Del Rio/Lghln		Y			29°24	100°48
ELP	El Paso	Y	Y		Y	31°48	106°24
FWH	Ft Worth/Crswl		Y			32°48	97°24
FTW	Ft Worth/Mchm				Y	32°48	97°24
GLS	Galveston			Y	Y	29°18	94°54

Texas (cont.)

GVT	Greenville					33°00	96°00
GDP	Guadalupe Pass					31°48	104°48
HRL	Harlingen					26°12	97°42
HDO	Hondo					29°24	99°12
EFD	Houston/Elngtn		Y			29°36	95°12
HOU	Houston/Hobby		Y		Y	29°42	95°18
IAH	Houston/Int		Y	Y		29°54	95°24
JCT	Junction					30°30	99°48
GRK	Killeen/Gray		Y			31°06	97°48
HLR	Killeen/Hood		Y			31°00	97°48
NQI	Kingsville					27°30	97°54
LRD	Laredo					27°30	99°24
GGG	Longview					32°18	94°42
LBB	Lubbock		Y	Y	Y	33°42	101°48
REE	Lubbock/Reese		Y			33°36	102°06
LFK	Lufkin			Y		31°12	94°48
MRF	Marfa					30°24	104°00
MFE	McAllen					26°12	98°12
MAF	Midland			Y	Y	31°54	102°12
MWL	Mineral Wells					32°48	98°06
PSX	Palacias		Y			28°42	96°18
P61	Panhandle					35°24	101°24
PRX	Paris/Cox					33°36	95°24
RKP	Rockport					28°06	97°00
SJT	San Angelo	Y	Y	Y	Y	31°24	100°30
SAT	San Antonio/Int		Y	Y	Y	29°30	98°30
SKF	San Antonio/Kel		Y			29°24	98°36
P07	Sanderson					30°12	102°24
F39	Sherman					33°48	96°30
T46	So Brazos					28°00	95°54
SEP	Stephenville					32°12	98°12
TPL	Temple					31°06	97°24
TYR	Tyler					32°24	95°24
RND	Universal City		Y			29°30	98°18
VCT	Victoria		Y	Y	Y	28°54	96°54
ACT	Waco		Y	Y	Y	31°36	97°12

Texas (cont.)

SPS	Wichita Falls	Y	Y	Y	Y	34°00	98°30
INK	Wink					31°48	103°12

Utah

Code	City	Maj	24	Cht	Txt	Lat	Long
4BL	Blanding					37°42	109°30
U17	Bullfrog					37°30	110°42
CDC	Cedar City	Y	Y	Y		37°42	113°06
U24	Delta					39°18	112°36
U16	Eagle Range					41°06	113°06
U28	Green River					39°00	110°12
MLF	Milford					38°24	113°00
CNY	Noab					38°48	109°48
OGD	Ogden					41°12	112°00
HIF	Ogden/Hill		Y			41°06	112°00
PUC	Price					39°36	110°48
PVU	Provo					40°48	112°00
U67	Roosevelt					40°18	109°30
SLC	Salt Lake City	Y	Y	Y	Y	40°48	112°00
SGU	St George					37°06	113°36
VEL	Vernal					40°30	109°30
ENV	Wendover			Y		40°42	114°00

Vermont

Code	City	Maj	24	Cht	Txt	Lat	Long
BTV	Burlington	Y	Y	Y	Y	44°28	73°09
MPV	Montpelier		Y			44°12	72°34
9B2	Newport					44°25	72°01
RUT	Rutland					43°32	72°57

Virginia

Code	City	Maj	24	Cht	Txt	Lat	Long
CHO	Charlottesville					38°06	78°30
WAL	Chincoteague			Y		37°48	75°30
DAN	Danville					36°36	79°18
DAA	Ft Belvoir		Y			38°42	77°12
FAF	Ft Eustic					37°06	76°36
LFI	Hampton		Y			37°06	76°18
HSP	Hot Springs					37°36	79°30
LYH	Lynchburg			Y	Y	37°18	79°12
PHF	Newport News					37°00	76°30
NGU	Norfokk/Chmbrs		Y			36°54	76°18
ORF	Norfolk/Intl		Y	Y	Y	36°54	76°12
NTU	Oceana		Y			36°48	76°00
NYG	Quantico					38°30	77°18
RIC	Richmond	Y	Y	Y	Y	37°30	77°18
ROA	Roanoke		Y	Y	Y	37°18	80°00
SHD	Shenandoah Vly					38°18	78°54
IAD	Sterling/Dulles		Y	Y		39°00	77°30

Washington

Code	City	Maj	24	Cht	Txt	Lat	Long
BLI	Bellingham		Y			48°48	122°30
PWT	Bremerton					47°00	122°54
63S	Colville					48°30	117°48
PAE	Everette					47°54	122°18
S19	Friday Harbour					48°30	123°00
HQM	Hoquiam					47°00	123°54
MWH	Moses Lake					47°12	119°18
76S	Oak Harbour					48°12	122°42
OLM	Olympia		Y	Y	Y	47°00	122°54
4OM	Omak					48°30	119°30
PSC	Pasco					46°18	119°06
CLM	Pt Angeles					46°00	118°18
PUW	Pullman					46°48	117°06

Washington (cont.)

UIL	Quillayute St		Y	Y		48°00	124°36
RNT	Renton					47°30	122°18
SEA	Seattle/Tacoma	Y	Y	Y	Y	47°30	122°18
BFI	Seattle/King					47°30	122°18
SHN	Shelton					47°18	123°12
GEG	Spokane	Y	Y	Y	Y	47°36	117°30
SKA	Spokane/Frchld		Y			47°36	117°42
SFF	Spokane/Felts					47°42	117°18
SMP	Stampede Pass					47°18	121°18
GRF	Tacoma/Ft Lew		Y			47°06	122°36
TCM	Tacoma/McChrd		Y			47°12	122°30
TIW	Tacoma/Nrws					47°12	122°30
TDO	Toledo					46°30	122°48
60S	Vancouver					46°00	122°48
ALW	Walla Walla			Y	Y	46°06	118°18
EAT	Wenatchee		Y			47°24	120°12
NUW	Whidbey Is		Y			48°18	122°42
YKM	Yakima		Y	Y	Y	46°36	120°30

Washington, DC

Code	City	Maj	24	Cht	Txt	Lat	Long
DCA	National Arpt	Y	Y	Y		38°54	77°00

West Virginia

Code	City	Maj	24	Cht	Txt	Lat	Long
BKW	Beckley/Raleigh				Y	37°48	81°06
BLF	Bluefield					37°18	81°12
CRW	Charleston	Y	Y	Y	Y	38°24	81°36
CKB	Clarksburg					39°18	80°12
EKN	Elkins			Y	Y	38°54	79°54
HTS	Huntington		Y	Y	Y	38°24	82°36
LWB	Lewisburg					37°54	80°18

West Virginia (cont.)

MRB	Martinsburg		Y			39°24	78°00
MGW	Morgantown		Y			39°42	79°54
PKB	Parkersburg		Y			39°18	81°36
HLG	Wheeling					40°12	80°42

Wisconsin

Code	City	Maj	24	Cht	Txt	Lat	Long
ATW	Appleton					44°12	88°30
VOK	Camp Douglas					43°54	90°18
EAU	Eau Claire		Y	Y		44°54	91°30
GRB	Green Bay	Y	Y	Y	Y	44°30	88°06
JVL	Jamesville					42°36	89°00
LSE	La Crosse		Y	Y	Y	43°54	91°18
LNR	Lone Rock					43°06	90°06
MSN	Madison	Y	Y	Y	Y	43°06	89°18
MTW	Manitowoc					44°48	87°42
MKE	Milwaukee/Mtch		Y	Y	Y	43°00	87°54
MWC	Milwaukee/Tmrmn					43°06	88°06
CWA	Mosinee					44°48	89°42
OSH	Oshkosh					44°00	89°36
RHI	Rhinelander					45°36	89°30
CMY	Sparta					44°00	90°42
AUW	Wausau					44°48	89°36

Wyoming

Code	City	Maj	24	Cht	Txt	Lat	Long
BPI	Big Piney					42°30	110°12
CPR	Casper		Y	Y	Y	42°54	106°30
CYS	Cheyenne	Y	Y	Y	Y	41°12	104°48
COD	Cody					44°30	109°00
EVW	Evanston					41°12	111°00
GCC	Gillette					44°18	105°30

Wyoming (cont.)

JAC	Jackson Hole					43°36	110°42
LND	Lander	Y	Y	Y	Y	42°48	108°42
LAR	Laramie		Y			41°18	105°42
RWL	Rawlins					41°48	107°12
RIW	Riverton					43°00	108°24
RKS	Rock Springs		Y	Y		41°42	109°06
SHR	Sheridan		Y	Y	Y	44°48	107°00
WRL	Worland		Y			44°00	108°00
P60	Yellowstone					44°36	110°24

INDEX

ACCU-WEATHER FORECASTER™

VACATIONS
BUSINESS TRIPS
PICNICS
FARMING
GARDENING
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INDUSTRY
TEACHING
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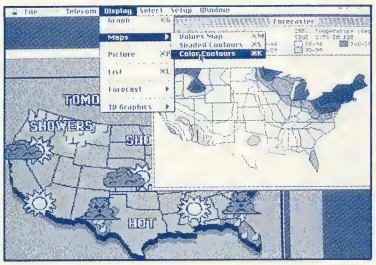
FUN

Get a forecast from the pros or create your own! Watch storms as they move across the country toward *you.* Create your own customized Color Contour Maps. Choose the weather stations you would like to view and select temperature, barometric pressure, visibility, or any one of a dozen different data types. You may also zoom in on your maps and zoom out again–ALL-OFF-LINE!

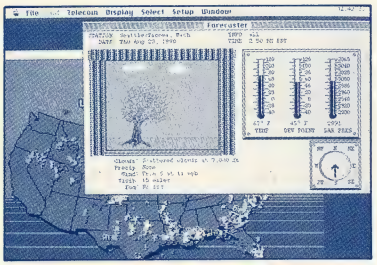


EASY

Fully automated telecommunications and access. Menus let you select the information you want, then sit back and watch the information roll in. Use Graph View to analyze data with ease, as you plot dew point versus time over the last 24 hours and overlay a plot of cloud base on the same graph.

EXCITING

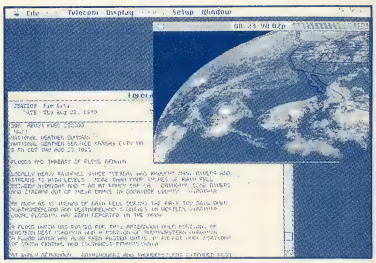
See the location of lightning strikes even before you hear the thunder! Access damage reports from tornadoes, hail, severe thunderstorms exactly as reported by police and other emergency response agencies. Get the inside scoop on National Weather Service internal discussions!



Actual unretouched screen shots

INFORMATIVE

What does it look like out the window? Let the Accu-Weather Forecaster show you with the Picture View. Where are the hottest and coldest places right now? Find out with List View. Sort the weather stations from highest to lowest pressures, from windiest to dead calm, or by any other data type.



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Full color graphics in rich detail, sophisticated graphs and charts, and Accu-Weather's proprietary high resolution Advanced Map Plotting System™ (AMPS™ give you unlimited display capabilities).

You predefine your request; get the data and graphics, then disconnect–all further graphic display and analysis is done with no additional connect time. And Accu-Weather provides discount rates to users of this software.

THE SOFTWARE TOOLWORKS

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2190020-016001

Forecasting Guidebook

Making Your Own Weather Forecast

Using the Accu-Weather Forecaster™

by

Eric W. Danielson

Professor of Meteorology
Hartford College for Women
Hartford, Connecticut

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This Forecasting Guidebook is designed for use with the AccuWeather Forecaster, a computer program which uses telecommunications to access and display live weather data.

The Accu-Weather Forecaster is a product of Metacomet Software, Inc., in cooperation with Accu-Weather, Inc. Copies of the program are available through software dealers and directly from Metacomet Software.

The screen images shown in this book are from the IBM® version of the program. The Apple® Macintosh® version is similar, although there are some variations. Refer to the User's Manual for detailed instructions in the use of the program.

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Using This Guidebook

The purpose of this book is to guide you through the process of forecasting the weather, using **The Accu-Weather Forecaster** and live weather data from **Accu-Weather**. The activities lead you to view the atmosphere in a number of different ways. Each view contains its own clues about the weather--now and in the future.

Accompanying this book you will find a **Forecast Worksheet**. Use this worksheet to record your observations, comments, thoughts, etc., as you proceed through the activities. Having all the data in one place is a great help at forecast time.

Also accompanying this book is the **24 Hour Weather Forecast** form. Enter your forecast on this page.

It is not necessary to complete each activity, every time you make a forecast! As you will see, there is no one right way to come up with a forecast. You probably will develop your own favorite method, which may include only a few of the activities presented in this book, and others not mentioned here at all.

Of course, the more you know about the weather, the better your forecast is likely to be. Thus, the more activities you do, the better. However, if you want to skip some activities, here is some advice:

1) **Local weather** (Activities 2 and 4) is important for every forecaster, no matter where you live. Always do these two activities.

2) The **large-scale picture** (Activities 6 and 7) also is essential for nearly every area. (But see the next item!)

3) If you live in the very southernmost U.S., the large-scale weather map often will be less important - especially in summer. **Regional weather** (Activity 5) will be more important to you. (But don't ignore the large scale picture entirely--you don't want to miss a hurricane!)

Some General Thoughts About Weather Forecasting

There are two things the weather can do:

(1) stay the same, or **(2) change.**

If you think it is going to stay the same, you issue a **"persistence"** forecast: You say that tomorrow's weather will be like today's.

Of course, eventually the weather will change. There are two basic ways the weather changes at a given place:

1) weather patterns move, bringing in fronts, highs, lows, etc., from elsewhere (these are known as **"advective changes"**).

2) weather patterns themselves change and develop, so that, for example, today's weak front may intensify and cause thunderstorms tomorrow (these changes are known as **"local changes"**).

Thus, even if your local weather has been constant for a week, you must be sure that some weather system isn't going to blow in from elsewhere, before you select a persistence forecast (advective change).

And, even if there are no signs of a weather system bearing down on you, remember that your weather still may change, as all the air around you gradually becomes warmer or more humid or whatever (local change).

Activity 1
Getting the Data from Accu-Weather

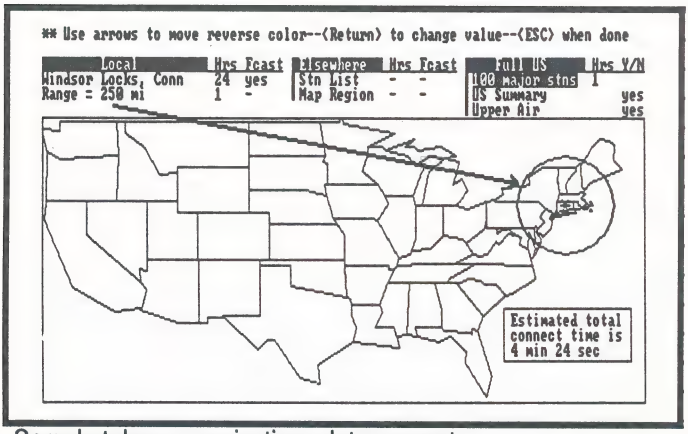
Several of the activities described in this activity guide require you to analyze current weather data from Accu-Weather. The procedure for getting data is detailed in the User's Manual.

There are two ways for you to get the data required in these activities. You can either:

1) request the data needed for all the sections all at once

2) request the data for each section, one section at a time

We recommend the first choice, since you will usually need to use the full range of data, and it is simpler to get it all at once.



Sample telecommunications data request

The sample request chart shown above would enable you to get all the information that you need for these activities. The example is for someone living in central Connecticut - in your own case the nearest **National Weather Service (NWS)** station will be your own (as

originally defined by you in the Setup section of the program).

Notice that the sample request above will provide you with the following information:

1) The past 24 hourly reports for the nearest NWS station
2) Forecast information for the nearest NWS forecast station
3) The most recent hourly reports from all stations within 250 miles of your home base
4) The most recent hourly reports from 100 major stations around the country
5) National weather summary discussion

Activity 2
The Weather at Your Doorstep
Observing Local Weather

If you were to make a trip around the world, where would you begin? At your own doorstep, of course. Similarly, to make a forecast of tomorrow's weather you begin with the weather on your own doorstep - the weather conditions right here, right now. Making a careful weather observation is the first step in forecasting the weather. In fact the easiest and sometimes the best forecast is simply to say that the weather will stay the same. Thus, if it is sunny today, you forecast sunny for tomorrow; if it is cloudy, then forecast cloudy. This is known as "**persistence forecasting**". Using only persistence forecasting you can be accurate some of the time; how often depends on where you live and the

time of year - and luck! So, first you need to observe your own weather.

Observe weather conditions at your location now. Observe as many of these items as possible. Most of the items do not require special instruments. Record them on the **Forecast Worksheet** which accompanies this book.

Clouds:
- Total cloud amt (in 10ths of sky covered)
- Cloud types observed

Wind:
- Wind direction
- Wind speed

Precipitation:
- Current
- Past 3 hours

Barometric pressure:
- Current pressure
- 3-hour pressure change

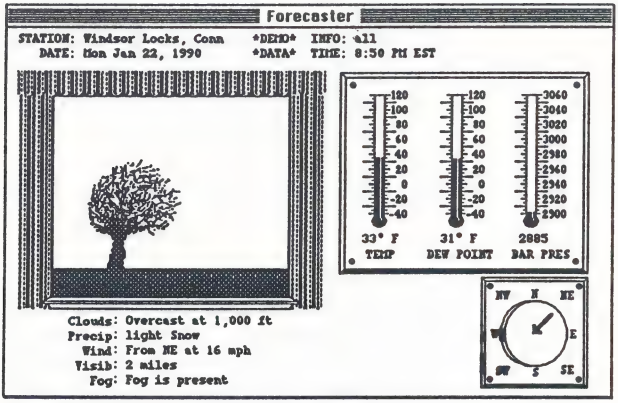
Temperature:
- Air temperature
- Dew point temperature

Other information:
- Visibility
- Relative humidity

Examine your report carefully. Think about what each piece of information means. Now you have begun your forecast journey, in a most important way: you know your starting point!

Activity 3
Checking Your Observation
Is It Correct and Representative?

It is a good idea to compare your observation with those at nearby stations. Observation errors can be caught this way.



Sample display using Picture format

1) Using the **Picture** format, display the latest weather information from two or three stations near you.

2) Compare the data displayed with the data you just observed in Activity 2. (Some types of data, such as cloud types, are not provided in the hourly reports).

   Do the data look consistent? We don't expect the reports to match exactly, but they should be similar. Here are some ranges; normally we would expect the reports to match within these ranges:

Total cloud cover:	within 2/10.
Wind direction:	within 45 degrees
Wind speed:	within 10 miles per hour
Precipitation:	same
Barom. pressure:	within 0.05 inches
Air temperature:	within 5 degrees F
Dew point temp:	within 5 degrees F
Visibility:	both stns more than 5 mi (or both less than 5 mi)

Of course, if the "nearest station" is quite a distance away, or lies in a different setting (it's on the coast while you are inland, for example), items like winds, clouds, temperature and precipitation may differ more than the values shown above. Consider this as you compare values. As you compare, choose one of these three:

a) **Match**--The data for this item match, within the ranges listed.

b) **Different setting**--The data don't match, probably because of differences in the stations' settings (e.g you live inland but the reporting station is on the shore).

c) **Unknown**--The data don't match, and you don't know why.

3) Look at the data for each station, comparing them with your own observation and indicating for each item whether it is a "match", "different setting" or "unknown". When finished, look back at the items you marked "unknown". There are two possible reasons for unknown:

a) **Mistake**--You or the other observer made a mistake;

b) **Real difference**--There is a real difference between the weather at your location and that at the other station, and it is not caused by differences in topographical setting.

Check your own observation for each "unknown" you assigned; then make your own judgement whether each is an error or a real difference in the weather.

4) Correct your observation if necessary as a result of step 3 above.

5) Now your observation is as reliable as possible, and you know about the weather at the stations immediately surrounding your station. Record your findings on your **Forecast Worksheet**, in the space provided.

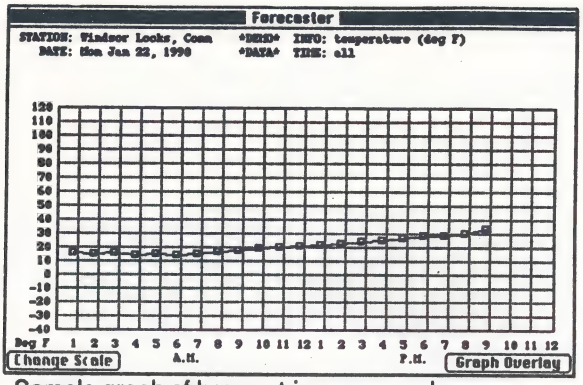
Activity 4
Checking for Trends in the Local Weather

Sometimes you can spot weather changes by looking into the distance: you might see a line of thunderstorms moving in from the west, for example.

In this activity you will try to spot weather changes by looking into the past. You will prepare plots of local weather conditions over the past few hours, and look for trends. This type of trend analysis is an important ingredient in any weather forecast.

Of course, much of the hour-to-hour change in the weather is due to **"diurnal variations"**. Diurnal variations are the daily rhythms of temperature, air pressure, etc. On a typical day the temperature will rise through the morning, reach a maximum in the afternoon, and cool throughout the night, reaching a minimum value around daybreak. Air pressure also shows a slight daily rhythm, with highest values at 10 a.m. and 10 p.m. local time, and low values at 4 a.m. and 4 p.m. Wind speeds tend to be lightest at sunrise and strongest in the afternoon. Even clouds show diurnal variations: stratiform clouds are most common in early morning, cumuliform in the afternoon. When you observe a trend in the local weather, be sure to consider it in the context of these normal daily variations.

This activity uses the **Graph** display, in order to see changes over the past 24 hours.



Sample graph of barometric pressure changes

1) Choose the **Graph** format, and change the station selection to the **"Nearest NWS Station"**.

2) Display the data for each type of weather information. For each item (barometric pressure, for example), see if there seems to be:

   a) a trend toward higher values
   b) a trend toward lower values
   c) a daily up-and-down cycle (diurnal variation)
   d) a combination of the above
   e) no trend at all: values remain about the same throughout the day.

3) Record your finding for each weather element on your **Forecast Worksheet.**

Activity 5
Moving Outward - Observing Weather in Your Region

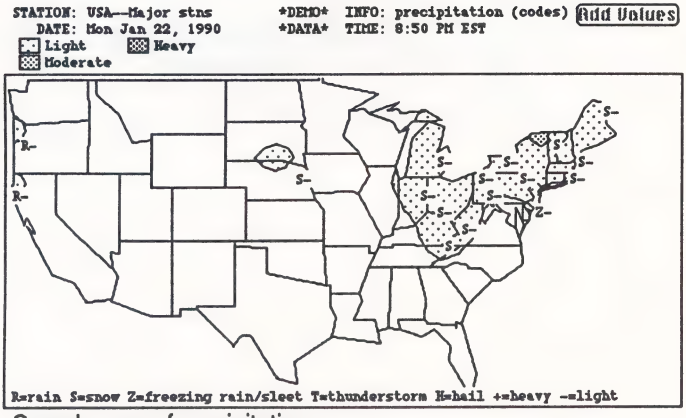
Now we move a little farther away from home, and examine the weather within several hundred miles. To do this we will use The Accu-Weather Forecaster's **Map** format.

We will focus on two types of weather information: cloud base and precipitation.

Preparation:

Choose the **Map** function, and change the station selection to a Range of 250 miles. (This will get data from all stations within 250 miles of your location.)

Precipitation:



Sample map of precipitation

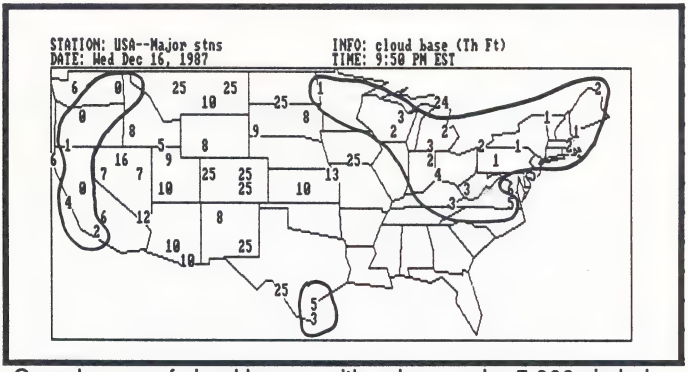
1) Now choose a contour map for **Precipitation** (and ask for a display of values)

2) Print the map and study it, noting which stations are reporting precipitation.

3) What patterns do you see on the map? Enter your observations onto the **Forecast Worksheet.**

4) If you have the appropriate weather data, repeat steps 1-4 for the previous hour. Compare the sizes and positions of the areas of precipitation on the current map and the map from the previous hour. Are they growing? Moving? Record your observations on the **Forecast Worksheet**.

Cloud Base:



Sample map of cloud bases, with values under 5,000 circled

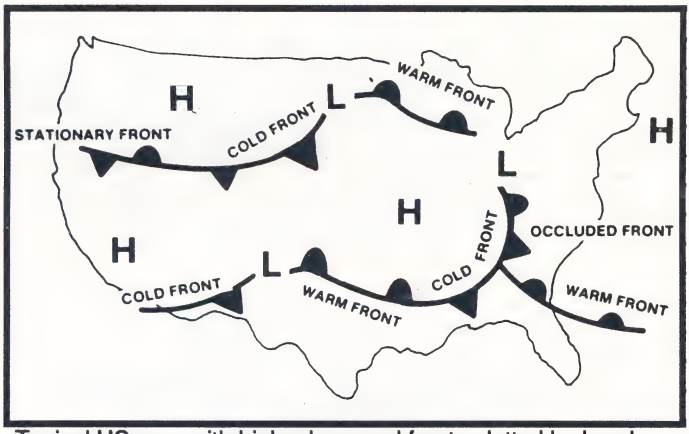
1) Display the values of **Cloud Base** for the region.

2) Print the map.

3) Forecasters are particularly interested in tracking low clouds (because most precipitation falls when low clouds are present). With a pencil, draw a loop around the groups of stations which report cloud bases at or below 5,000 feet (indicated as 0 through 5 on the map).

4) Your map now shows you a detailed picture of the cloud bases in your region.

Activity 6
Highs, Lows & Fronts - Where Are They Now?



Typical US map with highs, lows and fronts plotted by hand

Now you know the weather at your doorstep and in your neighborhood; the next step is to learn about the weather patterns farther away from home. If you were planning to travel across the United States on foot, you would want to study the topography of the country very closely. You would want to locate mountain ranges too high to cross, valleys with rivers too deep to wade or too wide to swim, and places where the terrain would be too steep or rough to pass through.

Similarly, if you're interested in travelling through the weather into tomorrow, you need to learn its topography. You need to "see" the lows and highs, the regions where steep pressure slopes cause strong winds, and fronts where sudden weather changes occur. Such highs, lows and fronts often are called **"synoptic scale features"**. A typical synoptic scale feature covers a region hundreds of miles across, and has a lifetime of several days. Synoptic scale features are important because they control most weather events in the regions they cover. Synoptic scale patterns show the weather's topography.

In this activity you will find the highs, lows and fronts of a typical weather map.

A meteorologist could spend a week analyzing the synoptic scale patterns that prevailed at a single moment. This is not because meteorologists are especially slow, but because of the great richness of detail accompanying a typical high, low, or front. In the case of a low pressure system, for example, the meteorologist will want to know the location of the center, in what direction it is traveling and how fast, how large its cloud shield is, what kinds of clouds prevail in it, how the temperature and humidity vary across it, what it looks like at various heights above the ground, etc., etc.

We don't suggest you spend a week on this activity. Instead, we will show you a number of ways of studying synoptic weather patterns. You certainly don't have to do all of them to come up with a forecast! But the more you know about the weather's topography, the better.

Finding Highs, Lows, and Fronts - The Easy Way

This activity tells you where professional meteorologists have located synoptic scale features for the present weather situation. This information is available every 6 hours.

```
STATION: Full US                          INFO: Summary and Forecast
DATE: see below                           TIME: see below
**************************************************************************

MAJOR MAP FEATURES AT 7 PM EST THURSDAY...A COLD FRONT CURVED
FROM A LOW OVER SOUTHWEST MANITOBA /29.08/ ACROSS EASTERN NORTH
DAKOTA...SOUTH CENTRAL SOUTH DAKOTA...THE NEBRASKA PANHANDLE...
SOUTHWEST WYOMING...NORTHERN UTAH...WEST CENTRAL NEVADA AND
CENTRAL CALIFORNIA INTO THE PACIFIC OCEAN.  A WARM FRONT REACHED
FROM THE COLD FRONT OVER NORTHEASTERN SOUTH DAKOTA TO SOUTHWEST
IOWA.  A COLD FRONT CURVED FROM A LOW OVER THE WESTERN SHORES OF
NOVA SCOTIA /29.76/ ACROSS THE ATLANTIC OCEAN...THROUGH A LOW
OVER EAST CENTRAL NORTH CAROLINA /29.70/...THEN CONTINUED THROUGH
NORTHEAST GEORGIA AND THE CENTRAL FLORIDA PANHANDLE INTO THE
NORTH CENTRAL GULF OF MEXICO.  A LOW WAS OVER THE SOUTHERN TIP OF
JAMES BAY /29.35/.  HIGHS WERE OVER NORTHWEST NEW MEXICO /30.15/
AND THE NORTHWEST GULF OF MEXICO /30.00/.
```

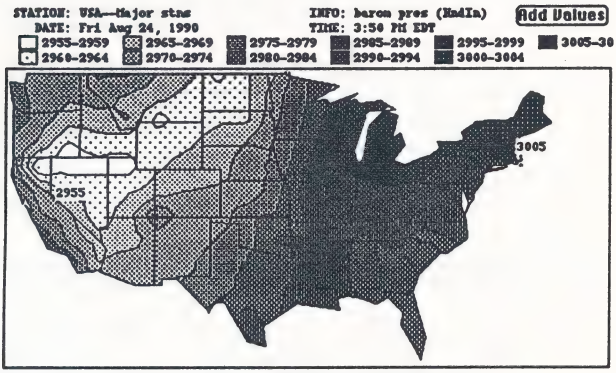
Portion of a sample "US Summary" report.

1) Request **"US Summary"** from the **Forecast** menu. This gives the latest (every 6 hours) National Weather Service summary of highs, lows, and fronts across the United States.

2) Plot the positions of the highs, lows and fronts onto a blank map.

Finding Highs, Lows and Fronts - Do It Yourself

Here you work with raw data to locate highs, lows and fronts. Although this is more work than the method above, it is your own work; and you can do it every hour, not just every 6 hours.



Sample shaded map of barometric pressure

1) Choose the Accu-Weather Forecaster **Map** display.

2) Change the station selection to **"USA Majors"**. This provides data from 100 major weather reporting stations throughout the country.

3) Choose **Barometric Pressure**, and ask for contours with values.

4) Print the map and study the isobar pattern carefully. Notice that only the highest high and the lowest low will have labeled values. Look for any additional high and low centers, and label them "High" or "Low".

5) The next step is to find the fronts - if any. Fronts lie through low pressure regions, on the boundary between a warm mass and a cold mass. Use the **"Model Storm System"** figure (pages 20, 21) to help you know what to look for. But remember: finding fronts on a map often is difficult; don't be discouraged if you have trouble. The remaining steps provide additional information to help you find the fronts.

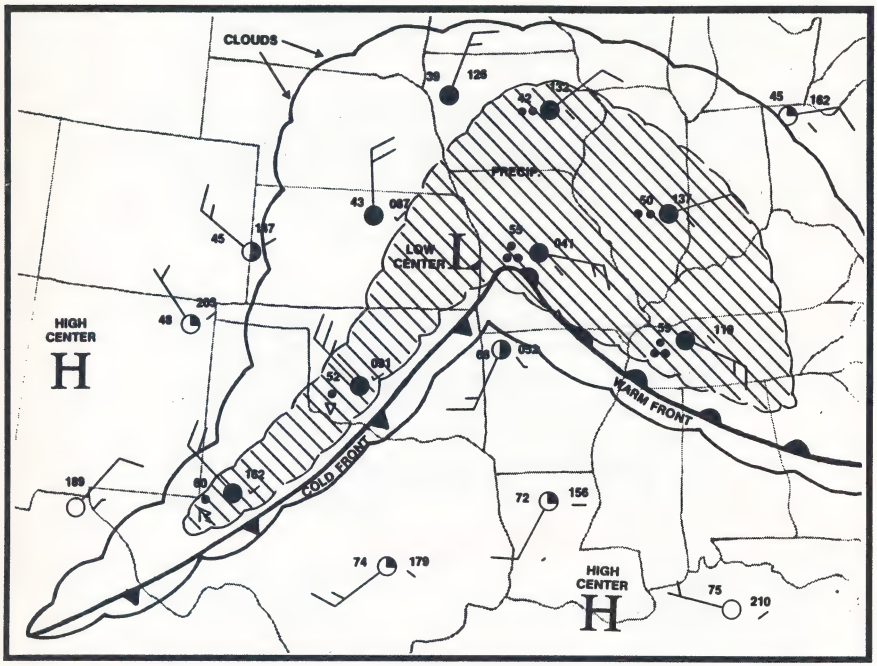
6) Request and print the following maps (still using "USA Major" stations):

    a) temperature (shaded)
    b) wind direction (arrows)
    c) cloud base (shaded)
    d) precipitation (shaded)

7) Study your maps of barometric pressure, temperature, wind direction, cloud base, and precipitation. Compare them with the model frontal system. Do you find evidence for fronts? If so, mark the fronts' locations onto your isobar map. If not, perhaps there are no fronts on this map! And remember - actual weather conditions rarely are a perfect match with the ideal model.

8) As you practice finding fronts by yourself, you may want to compare your findings with those of the NWS experts (refer to "The Easy Way" above).

MODEL STORM SYSTEM



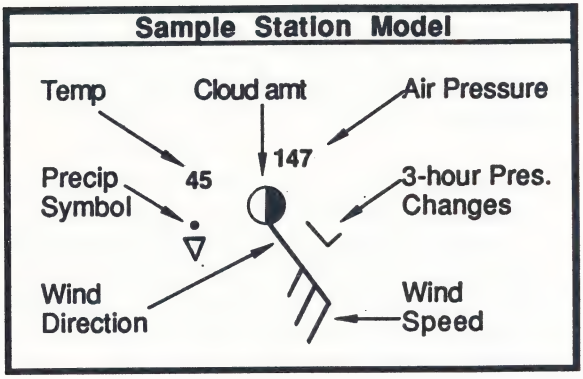
The **low pressure center** (large L) is the center of activity for this storm system. Winds circulate around it in a counter-clockwise direction. There also is an extended area of precipitation and cloud cover.

In the two **high centers** (large H's) skies are generally clear, with no precipitation. Winds circulate in a clock-wise direction around the highs. The high center on the left corresponds to a cold air mass. The high center on the lower right corresponds to a warm mass.

A **cold front** (line with triangles) extends out from the Low center. This is the leading edge of a cold air mass moving in from the west, bringing in colder temperatures and northwest winds. Along the front, there is precipitation, inlcuding a thunderstorm.

A **warm front** (line with half circles) extends out from the Low center. The warm mass south of the low center is moving northward, around the low center. There is an extended band of cloud cover and steady precipitation north of the warm front.

How to Read a Plotted Weather Report



Clouds:

- Clear
- Partly cloudy
- Mostly cloudy
- Overcast

Precipitation:

- Very light rain
- Light rain
- Moderate rain
- Rain shower
- Thunderstorm

Wind:

Winds blow into the circle, along the wind arrow

Short feather means 5 knots; long feather means 10 knots

Barometric Pressure:

Numeric value is in millibars
e.g. 1018.2 –> 182

3-hour changes:

- Rising, then falling
- Rising, then steady
- Rising steadily
- Falling, then rising
- Steady
- Falling, then rising
- Falling, then steady
- Falling steadily
- Rising, then falling

Activity 7
Highs, Lows & Fronts - Where Are They Going?

As you know, weather systems don't tend to stay put. Highs, lows and fronts often move considerable distances from day to day. Thus, to make a forecast you need to know where the present weather systems are headed.

Forecasters use a number of methods to predict how weather systems are likely to move. Many modern methods are very sophisticated, requiring detailed computer analysis of the atmosphere at many different levels. Here we will introduce two straightforward, uncomplicated methods: using continuity, and using upper air winds.

Forecasting Using Continuity

A girl went to the doctor complaining of a pain in her little toe. The doctor (who was not too smart) could not find anything wrong with the toe. Finally he asked the girl "Have you ever had this problem before?" "Yes, twice," the patient replied. "Well," the doctor answered, "you have it again." What does this story have to do with weather forecasting? Not much, and a lot. Often, a meteorologist, wanting to know how fast a front or a low is moving, will ask "How fast has it been moving in the past?" When he finds the answer, he will likely say "Well, it will do it again."

How do you find out how fast a front has been moving? By sketching its changing position on a weather map every three hours or so. Once you have a collection of plotted past positions on your map, it's easy to predict the front's future movement.

1) Take a blank map, and plot the position of each high center, low center, and front. Plot all of these features with a pencil of one color. In one corner of your map, label the date and time for all these features.

2) Repeat this process for as many past maps as possible (back to 24 hours ago). Plot each set of

highs, lows and fronts onto the same map; use a different color for each time. A three hour time interval between maps is best.

3) Now you can sketch future positions of each weather feature you have been following. Just draw them in, one more step in the direction they are moving. You can continue this process for up to 12 hours or so into the future. This **"continuity forecast"** will be an important tool in making your final forecast.

Forecasting Using Upper Air Winds

Picture an iceberg, floating low in the water. You know that much of the iceberg lies beneath the water's surface. How will the iceberg move? It will drift with the currents in which it is floating. Since the iceberg extends far below the surface, its motion will be influenced by deep currents.

Like an iceberg, the highs, lows and fronts on a weather map are not flat. From earth's surface, weather systems extend thousands of feet upward into the atmosphere. And, like the iceberg, the weather systems are steered by the currents in which they are embedded. Thus, forecasters use "winds aloft", or "upper air", information to predict how highs, lows and fronts will move.

Upper air observations are made twice daily, at 7:00 a.m. and 7:00 p.m. EST. The data are collected by radiosonde balloons at about sixty stations nationwide. The radiosondes measure and transmit data on air pressure, temperature, humidity, and wind direction and speed, at many altitudes from earth's surface to the stratosphere.

Forecasters have found that winds at approximately 35,000 feet above the earth's surface have a strong influence over the motion of highs, lows and fronts across the earth's surface. Since jets often fly at this level, the winds at 35,000 ft. are called **"jet stream winds"** or "steering winds".

Here is how to use the upper air jet stream winds:

1) From the TV Graphics--Chart 2 menu, select **"JetStream"**. This will give you the latest 35,000 ft. wind pattern across the United States.

2) Examine the jet stream. wind flow. The graphic shows a band or bands of the strongest jet stream flow. These are the places where the jet stream winds will have the greatest effect.

3) Compare the upper air map with the corresponding surface weather map. Imagine the steering winds to be "pushing" highs, lows and fronts across the map.

4) Take a blank map, and plot the present positions of highs, lows and fronts. Then, using the steering winds, plot your estimated locations of these features 6 hours from map time. Then repeat the process for a 12-hour forecast. Here are some rough guidelines:

    a) Lows tend to follow steering winds better than highs do. A typical low will move in the direction of the steering winds, at about one-half the steering winds' speed. Thus if the 35,000 ft. winds above a low are blowing at 60 mph, you can expect the surface low to move at 30 mph - or about 180 miles in six hours.

    Sometimes, a low at the jet stream level will lie directly above a surface low. This happens most often at the end of a low's life span, as it is weakening. In such a case, the circular steering winds imply that the surface low will show little or no movement. This stagnation of weakening lows is a fairly common event.

    b) Fronts also follow jet stream winds; but generally the winds blow along as well as across the front. Only the portion of the wind blowing across the front will move it forward. A front lying parallel to the upper wind flow may show little or no motion.

    As a general rule, cold fronts move more consistently, and more in response to the

steering winds, than warm fronts. Surface warm fronts often seem to misbehave, dawdling too long in one spot and then jumping forward great distances in no time at all.

c) Some highs follow steering winds tolerably well. Others do not. Warm surface highs often lie beneath highs aloft, which means the steering winds are circular and the high will be more or less stationary. Cold highs rarely reach as high in the atmosphere as 35,000 ft; nonetheless, these upper air winds often give a good indication of the surface high's motion.

You can see from the above guidelines that forecasting using upper air winds is an imperfect science! Don't let that discourage you, however. Steering winds do give useful information about weather systems' movements. Like many other forecasting techniques, however, you must use this one with caution and judgement. It is not "guaranteed to give perfect results every time"--which is the sort of thing that makes weather forecasting the challenge we all enjoy.

Activity 8
Listening to What the Pros Are Saying

Until now, you have been on your own for the most part: you have taken your own observations, made your own graphs and maps, found fronts and lows yourself, interpreted the weather patterns yourself. Here's your chance to see what others are thinking about the weather you have been studying so carefully.

There are a number of interesting discussions and forecasts available through Accu-Weather and The Accu-Weather Forecaster. These include a summary of current weather conditions, and local and national forecasts.

Of course you might not want to read them yet! At this point, reading someone else's summary of current conditions or forecast is a little like peeking at the solution to a crossword puzzle while you're still working on it. Perhaps you would rather wait until you have completed your forecast on your own? Then you can see what the others think.

But if you want to look, go ahead; after all, those other people don't necessarily have the right answers either!

1) Choose the **Forecast** activity from The Accu-Weather Forecaster.

2) Select **"US Summary"**, and read the information. This summary is several pages long and has a lot of important information. It begins with an overview of important weather events throughout the nation. Then there is a description of the current weather map, specifying the locations of highs, lows and fronts. This is followed by a forecast for general regions of the country, and concludes with the predicted map positions for the following day.

3) Select the **"Text"** forecast for your location. This is a brief text forecast for your local region.

4) Select the **"Chart"** forecast for your location. This forecast is prepared by a powerful computer of the National Weather Service. It uses a special computerized model of weather patterns and current conditions to create a detailed "chart" of forecast conditions over the next 36 hours. Remember, the fact that this is based on a computer model does not necessarily mean that it will be more accurate than a "human-based" forecast.

5) After you have examined the above mentioned discussions and forecasts, enter on your **Forecast Worksheet** any information you feel might be helpful to you in making your forecast.

Activity 9
Determining Typical Local Weather

Do you know the average daily high and low temperatures for this month in your area? How many days per month experience precipitation? What is the prevailing wind direction? What air masses are most common? Before attempting to forecast the weather, you should know the answers to questions like these. Such information is known as **climatological data**. You can think of climatological data as hints that nature gives to the forecaster. Forecasters always keep climatology in the back of their minds when preparing forecasts. A forecast that differs greatly from the climatological odds for the region should be founded on very strong reasons!

You can find out climatological data for your region through several sources:

1) published reference books (such as The World Weather Guide by E A Pearce and C G Smith, Hutchinson, London, 1984, or The World Almanac Book of Facts, Pharos Books, New York, 1987)

2) local or state government agencies (such as the Department of Environmental Protection or the Department of Agriculture)

3) Accu-Weather's on-line data base of **"Daily/Monthly Tabulated City Summaries"** (refer to the Telecommunications, Explore Accu-Data, and Incredible Weather Data Base sections of the Accu-Weather Forecaster Manual).

Activity 10
Making Your Forecast

Now comes the most interesting, but also the most difficult, activity: making your forecast! You probably are looking forward to that last list of steps, which will guide you through making a professional weather prediction.

Well, here's the bad news: there's no such list. Just when you could use the most help, help evaporates, like morning dew. The reason is that there is no single recipe for making a weather forecast. Items that are important one time don't seem to matter the next; rules that work perfectly today don't always work tomorrow.

The problem is that the weather is too creative to be captured by any one recipe. Millions and millions of factors affect the weather, resulting in so many possibilities for tomorrow's forecast that we can't even list them all.

However, we don't mean to be totally uncooperative. Below is a scheme for arriving at a 24-hour forecast. If you follow it conscientiously, and practice, most of your forecasts should be fairly accurate.

But please do not consider this the only way, or even the best! When you're starting with a specific weather pattern and struggling to predict how it will behave, your own personal experience and common sense are more important than any step-by-step forecast guide.

And that, of course, is what makes it all so much fun!

1) Review Present Weather Conditions

Most meteorologists begin a forecast by reviewing the present weather and its causes. What is it doing outside now, and why? You have the answers to these questions on your worksheet, in the sections for Activities 2 and 6. Review these sections now.

2) Will Weather Patterns Stay the Same?

Do you expect the patterns identified above to change in the next 24 hours? Remember they can change either by moving, by changing strength, or both. Consider the evidence for change: this includes your Worksheet comments about continuity (Activity 7), and the professionals' discussions (Activity 8).

If you feel satisfied the patterns will not change, then issue a persistence forecast: tomorrow will be like today. This is the easiest forecast to make - and overall the least accurate. Use your observations for the past 24 hours to predict cloud cover, temperatures, etc., for the next 24 hours. But if you feel that the patterns will change, as they usually do, then you need to continue to step 3.

3) What Will Weather Patterns be in 24 Hours?

Next, decide what the synoptic pattern will look like in 24 hours. You have a number of aids for this: your continuity forecast in Activity 7, and the discussions of Activity 8. If all these sources suggest the weather patterns will behave in the same way (a miracle), your job is easy: you make a map showing the predicted weather patterns 24 hours in the future. Then you can proceed to step 4.

But if your information from Activities 7 and 8 suggests different futures, then you have to make a decision. You must decide which evidence to accept and which to ignore. One hint might be found in the regional weather you observed in Activity 5. These observations might give advance notice that the weather patterns are following continuity, or the steering winds, or whatever.

Remember you must forecast changes in the intensity of weather patterns, as well as their changes of position. Forecasting changes in intensity is difficult. As a general rule, lows intensify when their air becomes less stable. In fact, stability is lessened whenever the air near the ground is warmed, or when the air high aloft is cooled. So if you expect a low to move from cold land to warm water, you can expect its stability to lessen, and the low to strengthen. Similarly, colder air flowing in aloft

will de-stabilize the air, and lead to strengthening of a low (or front). The rules for highs are just the opposite: cooling at the surface, and/or warming high aloft, will cause stronger high cells.

After you have weighed all the evidence, prepare a map showing your prediction of the synoptic pattern for 24 hours hence. Sketch your map in the space provided at the top of the **Forecast Form** which accompanies this book.

4) Major Changes in the Next 24 Hours

Now you are ready to complete the "**Background**" section of your forecast. In a couple of sentences, write down the major events in the next 24 hours' weather as you see them. For example, "The high pressure that has controlled our weather for the past two days will continue to do so". "Little change is expected from yesterday." Or, "Our current warm, humid weather will change due to the passage of a cold front sometime this evening. The front will bring a period of showers; then the weather will become cooler and drier."

Now, turn to the **Detailed Forecast** section of the **Forecast Form**, and put on your thinking cap. Based on the above analysis, you are ready to put more details into your forecast.

5) Forecasting Cloud Conditions

To predict cloud conditions, compare the present map with your forecast map. Is a warm front on the way? Will a high pressure cell be in your region tomorrow? - or what? If the warm front or high pressure cell arrives unchanged, you can expect its present cloud patterns to prevail in your region tomorrow. But if the feature is changing in strength, you will have to modify this estimate of cloud conditions.

Here are three general rules about cloud cover:

- Clouds become both thicker and lower as lows (or fronts) intensify, higher and thinner as lows weaken.
- Stratus cloud types are more common in the late night and morning, whereas cumulus clouds are more common and thicker in the afternoon.
- Large cloud masses often move at steady rates. Your regional and synoptic cloud maps might help you follow cloud movements and decide when clouds might arrive.

So, looking at tomorrow's map and considering the three cloud rules, write down the cloud cover you expect as today's weather changes to tomorrow's.

6) Forecasting Precipitation

When you forecast precipitation, here are some things to remember:

- Precipitation comes from clouds! - usually low clouds, sometimes middle clouds. If you are not forecasting middle or low clouds, don't worry about precipitation.
- Precipitation areas often move at a steady rate (like the clouds mentioned on the previous page). Look at past maps to see if a precipitation zone is moving steadily toward you.
- Steady precipitation tends to fall from stratiform clouds. Showers fall from cumuliform clouds.
- Discussions and computer-made forecasts can be very helpful. (But don't use this information if you feel it is cheating!)

7) Forecasting Wind Speed and Direction

Unless you are expecting a gale or hurricane or other strong wind, you probably don't have to worry about forecasting wind speed. The reason is that deciding whether the wind will be 10 mph or 15 is difficult, and most people don't care. More important is wind direction: you should predict it each day, partly as an aid in forecasting temperature.

Wind direction is rather easy to forecast, once you have completed your weather forecast map. Just remember how the winds flow around high and low pressure centers:

- Highs–clockwise and away from the center
- Lows–counter-clockwise and towards the center

Also, remember that there often are sudden wind shifts when a front passes (for example shifting from southwest to northwest with the passage of a cold front).

8) Forecasting Temperature

A good starting point for the temperature forecast is the Accu-Weather Forecaster's graph of temperature at your station for the past 24 hours (see Activity 4). If you are not expecting important changes in the weather patterns, then forecast temperatures like the ones on the graph. But if the patterns are changing, your temperature forecast will differ from yesterday's graph. Here are some rules of thumb:

- For most places, south or southwest winds mean warmer weather; north to west winds, colder weather. (If you live on the coastline, this may not apply to you.)
- Fronts can bring sudden changes in temperature.
- Look "upstream" from your station, to see what temperatures are reported. For example, if your wind is from the northwest, look at the temperatures of stations to the northwest. Often those temperatures are a hint of what is to come.
- The temperature changes more from day to night when the air is drier. So if you are predicting that the air will become more humid and cloudy, then also expect to see less change from day to night temperatures. With heavy clouds and precipitation, there may be no day-to-night changes at all.
- In windy weather, the temperature shows less daily up-and-down change than on calm days.
- Know the average and the record for the region at this time of year. When in doubt about forecasting the temperature, adjust toward the average, and avoid forecasting new records.

Activity 11
Verifying Your Forecast

Once you have made your forecast, you now have the fun of watching the weather and checking your forecast's accuracy: this is known as "verifying" your forecast.

The simplest way to verify your forecast is to record the actual cloud cover, precipitation, wind and temperature conditions in the same boxes on your forecast sheet, using a different color of pen. Then it's easy to check your accuracy. If you want to grade yourself and watch your improvement as a forecaster, you will need a grading scheme. Here is one such system. It is scored like golf: the fewer points you get, the better your score.

Use the following point system for each forecast period (such as "This Afternoon", or "Tomorrow"):

1) **Clouds:** For every tenth of cloud cover difference between forecast and observed, give yourself 2 points. (Thus if you predicted cloud cover of seven-tenths, and it actually was five tenths, give yourself 4 points).

2) **Precipitation**:

If you predicted precip and it occurred	-10
If you predicted precip but it did not	+15
If you predicted no precip and none occurred	- 5
If you predicted no precip but it did occur	+15

3) **Wind Direction:**

If your direction was perfect:	0
If you missed by 45 degrees:	+ 2
If you missed by 90 degrees:	+ 6
If you missed by 135 degrees:	+10
If you missed by 180 degrees:	+15

4) **Temperature**: Subtract your predicted temperature extreme from that actually observed. For every degree of difference, give yourself 1 point. (Thus if you predicted an afternoon high of 36 and it actually was 31, you get 5 points.

Add all of your points (and subtract negative points) for each time period, then add together your points for all time periods, to give yourself a final score.

By scoring yourself in this fashion, you can watch your progress in forecasting the weather!

And if your forecasts are real good, you might want to try getting a job at **Accu-Weather!**

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2190020-355001

Accu-Weather Forecaster™ (Mac)
Subscription Procedures

The Accu-Weather Forecaster is used in conjunction with Accu-Data™: Accu-Weather's® complete dial-in weather database. Accu-Data provides exciting, up-to-the-minute data and color graphics for use with the Accu-Weather Forecaster.

As a special offer to you as a purchaser of the Accu-Weather Forecaster, you can subscribe to Accu-Data at substantially discounted rates... as low as 10¢ per minute.

Account Number and Password

Your Accu-Data account number and password are shown on the sticker to the right of this paragraph. This account provides one hour of free access time and enables you to explore the database free of charge before your subscription is established. This free access time must be used within 30 days of your initial log-in.

Accu-Weather Forecaster™
Mac Version
Acct #: **AWFM11F3B**
Password: **BGZWPLV**
2190020-670001

Setting Up Modem Parameters

Before the Accu-Weather Forecaster can communicate with Accu-Data, you need to provide some information to the program. Activate the Telecom selection under the Setup menu. The Telecom Setup dialog box will appear. Enter your account number and password into the spaces provided. For the phone number, enter the Accu-Data Access Number listed in the adjoining box. Once you have established your Accu-Data account, you may elect to use a toll-free number instead. This toll-free number will be given to you on-line. A usage charge of 19¢/minute is assessed when you use the 800 number. For more information on configuring the Modem for use, consult the Accu-Weather Forecaster Users Guide.

Accu-Data Access Number

(814) 237-0652

Establishing Your Account

The first time you activate the Get Data or Explore Accu-Data command, the program will enter an interactive mode with the Accu-Data database. At this time you may to choose your subscription package and billing options. Alternatively, you may postpone choosing a subscription package until you become more familiar with the Accu-Weather forecaster and its features. You are not required to select a subscription package to receive your hour of demo time, but you can receive additional demo time by selecting a subscription option early in your demo usage.

Connect Time Rates

There are two classes of service available: Personal and Commercial/Institutional. A personal user is given discounts of up to 60% over standard Commercial/Institutional rates. Your personal use cannot be for commercial, business, institutional or employment purposes. The connect time rates for both service classes are shown in the adjoining table. Accu-Data supports 300, 1200, and 2400 baud modems. *The rates listed are for 300 or 1200 baud access. 2400 baud access is subject to a 50% surcharge.*

	Personal	Commercial/ Institutional
Night Rate (Midnight to 5 AM)	10¢/minute	10¢/minute
Day Rate (5 AM to 7 PM)	39¢/minute	79¢/minute
Evening Rate (7 PM to Midnight)	19¢/minute	49¢/minute

Telephone Numbers

For questions regarding the Accu-Weather Forecaster program, contact The Software Toolworks Technical Support at (415) 883-3000. For information regarding subscription to the Accu-Data database, contact an Accu-Weather Marketing Representative at (814) 234-9601 x400. (continued over)

Subscription Options

There are three subscription options: One Month Sampler, Three Month Special, and Super Saver. The features of each option are described in the following tables:

Personal	One Month Sampler	Three-Month Special	Super Saver
One-Time Subscription Charge	$39.95	$49.95	$99.95
Free Demo Time (to be used within 30 days of first log-in)	1 hour*	1 hour*	1 hour*
Minimum Monthly Connect Time Charge	No monthly minimum for 1 month, $9.95 after	No monthly minimum for 3 months, $9.95 after	No monthly minimum for 12 months, $9.95 after
Free monthly time	First $15 of actual usage during first month is free	First $10 of actual usage during each of the first 3 months is free	First $10 of actual usage during each of the first 12 months is free

Business/Institutional	One Month Sampler	Three-Month Special	Super Saver
One-Time Subscription Charge	$79.95	$99.95	$199.95
Free Demo Time (to be used within 30 days of first log-in)	1 hour*	1 hour*	1 hour*
Minimum Monthly Connect Time Charge	No monthly minimum for 1 month, $24.95 after	No monthly minimum for 3 months, $24.95 after	No monthly minimum for 12 months, $24.95 after
Free monthly time	First $25 of actual usage during first month is free	First $25 of actual usage during each of the first 3 months is free	First $25 of actual usage during each of the first 12 months is free

*If you sign up for any of these subscription packages at the beginning of your first log-in you will receive a second free demo hour. If you sign up at the beginning of your second or subsequent log-in you will receive additional free demo time equal to the amount of your free demo hour remaining unused at the time of sign-up. The sooner you sign up, the more free time you will receive.

Billing

MasterCard, Visa, or Discover Card will be billed directly for all charges.

To keep your account active, Accu-Weather, Inc. will bill you the Minimum Monthly Billing each month. This represents a minimum payment and will be used as a credit against your usage. Your monthly usage of system connect time will be offset against the minimum monthly billing and then the charge will be forwarded to your card issuer. You may cancel your account at any time on 30 days notice. Closed accounts will be subject to a new subscription charge to reopen.

For Business/Institutional users, volume discounts and bundled toll-free access accounts are available on annual term agreements. Multiple site discounts are also available. In addition to credit card payment, Business/Institutional users may establish a credit account directly with Accu-Weather, Inc. Contact an Accu-Weather Marketing Representative at (814) 234-9601, x400.

Rates are subject to change without notice.

ACCU-WEATHER
FORECASTER

24 Hour Weather Forecast

Preparation:

Weather Forecaster (name): _____

Forecast for (location): _____

Prepared on (date): _____ at (time): _____

1. National Forecast Map:

Map forecast to occur on (date): _____ at (time): _____

2. Background: (summary of the major features affecting today's and tommorrow's weather)

3. Detailed Forecast:

	Today	Tonight	Tomorrow
Cloud type and amount			
Precipitation			
Winds			
Temperature range			

4. General Forecast: (summary of the conditions you predicted in the table above)

2190020-305001

ACCU-WEATHER
FORECASTER

Forecast Worksheet

Forecaster: _____ Location: _____

Date: _____ Time: _____

Activity 2: PRESENT WEATHER

Clouds:
Total Cloud Amt: _____ Cloud Types: _____

Wind:
Wind Direction: _____ Wind Speed: _____

Precipitation:
Present: _____ Past 3 Hours: _____

Barometric Pressure:
Current Pressure: _____ 3-Hour Pressure Change: _____

Temperature:
Air Temperature: _____ Dew Point Temperature: _____

Other Information:
Visibility: _____ Relative Humidity: _____

Activity 3: CHECKING YOUR OBSERVATION

The weather reported at near-by stations differs from local observations in these ways:

Activity 4: LOCAL WEATHER TRENDS

Comment on trends you observe in each of these:

Clouds: _____

Wind: _____

Precipitation: _____

Barometric pressure: _____

Temperature: _____

Other Information: _____

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On what type of computer are you using this program?

☐ IBM PC or compatible ☐ Macintosh ☐ Apple II series/II GS ☐ Other_____

Where was this program purchased?_____

Please rate the following on a scale from 1 to 10; 10 being the highest rating:

*Ease of Learning*____ *Performance*____ *Documentation*____ *Value*_____

*Ease of Use*_____ *User Support*____ *Packaging*_____ *Overall Satisfaction*____

Comments:_____

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THE

MIRACLE

PIANO TEACHING SYSTEM

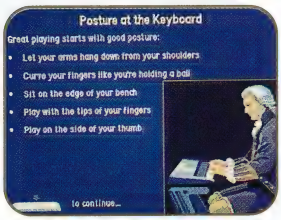
THE SOFTWARE TOOLWORKS

Now You're Playing To Learn Instead of Learning To Play.

Isn't it great when technology comes along and solves a problem for people? That's exactly what **The Miracle Piano Teaching System** is all about. All of a sudden, this major technological breakthrough makes learning to play the piano fun. Maybe you thought the joy of making music was beyond your reach. **The Miracle Piano Teaching System** changes everything!

Lessons are customized to your abilities

This flexible, dynamic system combines the best of traditional teaching methods and recent innovations not found anywhere else. The result is an entertaining, rewarding musical experience for everyone. The next generation of musical genius may be students of **The Miracle**!



Everything you need to make music.

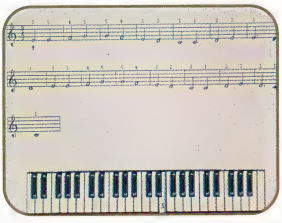
The minute you touch it, you're making music. And through a unique interactive system, **The Miracle** creates a custom

approach to learning the keyboard that is completely personalized. You learn as you play. At your own pace, at your own level, whenever you want.

Play as you learn, at your own pace and at your own level.

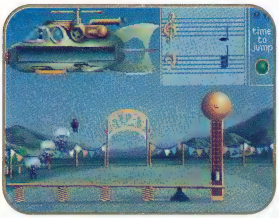
Do You Want To Rock or Bach? Either Way, You've Got Great Backup.

One of the greatest satisfactions of making music is playing with other musicians. And for the first time ever, **The Miracle Piano Teaching System** brings this thrill to beginners. Choose from contemporary, classical, rock, jazz, and country. By the end of the first lesson, you won't just be playing, you'll be playing along with The Miracle Orchestra! **The Miracle** will have you playing along with the lessons and games on your TV or computer screen, and you'll learn by actual notes, not just by numbers. So before long, you'll be able to read music, play songs in rhythm, and perform two-handed piano pieces.


Learn to play familiar songs at your own pace.

Basic Training Has Never Been So Much Fun

The Miracle Piano Teaching System is designed to work with a variety of systems, including: Nintendo Entertainment System®, Super Nintendo Entertainment System, IBM PC & Compatible computers, Commodore Amiga computers, Macintosh® computers. Written by professional music educators, this program makes learning the basics a pleasure. It is the ideal system for beginners, or even for those who just need to brush up on basic piano skills. It doesn't matter whether you're six or ninety-six; **The Miracle** brings the joy of music to everyone. By taking full advantage of computer technology, **The Miracle** makes learning keyboard fundamentals faster and easier than ever before. Using Artificial Intelligence Technology, it monitors each lesson and builds a series of personalized exercises just for you, based on your individual needs. And by borrowing the fun of video games, it makes kids (even grown-up kids) *want* to learn.



Learn chords the fun way.

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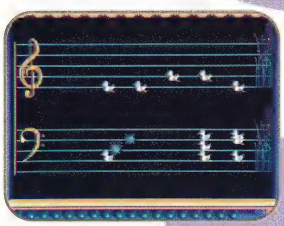
Professor
The Juilliard



Learn to recognize notes on the musical staff.

A Professional Instrument That Grows With You

Learn to recognize melody patterns and fingering techniques.

The Miracle is not only an ideal tool for learning, it delivers lasting value as a high-quality, sophisticated musical instrument. The professional keyboard features full-sized, pressure sensitive keys that respond to your touch just like a piano. With over 100 other instruments available at a single keystroke, and a built-in stereo sound system, you can make an entire orchestra come to life whenever you play. As you grow as a musician, **The Miracle** keyboard is compatible with the entire world of modern synthesizers through built-in MIDI connections. (That's Musical Instrument Digital Interface, the world-wide standard for computerized music.)

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School of Music

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THE MIRACLE
PIANO TEACHING SYSTEM

THE MIRACLE PIANO TEACHI

- **Professional Keyboard**
  • 49 standard-sized velocity-sensitive keys • 128 digitized instruments and sound effects – piano, harpsichord, organ, vibes, violin, trumpet, flute, sax, synthesizer, guitar, drums, and many more • Fully MIDI-compatible • Built-in 4" stereo speakers – no connections required • Standard RCA jacks let you connect to your home stereo for even bigger sound • Plays up to 16 notes and up to 8 different instruments at a time • Split keyboard can provide different sounds for left and right hands • Plug-in power adapter means no hassles with batteries • Stereo earphones included for private practice • Sustain pedal for realistic piano performance
- **The Miracle Orchestra**
  Learn to play your favorite songs with full orchestral accompaniment
- **Rhythm Practice**
  Develop an understanding of timing and a sense of rhythm
- **Note Practice**
  Learn how to read notes
- **Roboman**
  Video game teaches rhythm and timing
- **Ripchord**
  Video game teaches chords
- **Aliens!**
  Video game teaches pattern mastery and proper fingering technique
- **Shooting Gallery**
  Video game teaches note reading
- **Demonstration**
  The Miracle plays the piece for you to help you learn
- **Improved Accompaniment**
  Piano demonstrates melody along with accompaniment
- **Flashcards**
  Quick and easy drill teaches music theory
- **Songs**
  Learn songs in all styles of music, including classical, rock, contemporary, jazz and country
- **Lessons**
  Build piano skills at your own pace with hundreds of lessons
- **Progress Tracking**
  Automatically tracks the progress of multiple students
- **Mouse Support**
  Convenient point-and-click graphic menu display (Mouse optional – it's a breeze to use without a mouse, too!)
- **Volume Control**
  Control volume for orchestration, melody, and sound effects
- **Enhanced Graphics**
  Higher resolution for easy readability
- **Certificates**
  Prints achievement certificates
- **Recording Studio**
  Record and play back your own music
- **Adjustable Metronome**
  Set metronome tempo to your own speed for easier learning
- **Hypertext**
  Onscreen glossary provides additional information on key topics
- **Add-on Song Collections**
  Available to teach you to play more of your favorite songs using The Miracle Piano Teaching System

G SYSTEM FEATURES

NES	Super NES	IBM PC	Amiga	MAC
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	Enhanced Scrolling			
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		•	•	•
•	Improved Graphics	•	•	•
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THE SOFTWARE TOOLWORKS

60 Leveroni Court • Novato, CA 94949

(415)883-3000 R121

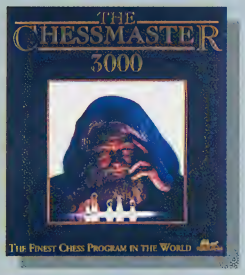
The Miracle is manufactured in the USA

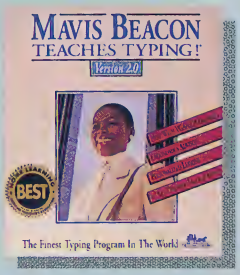
All images shown are actual unretouched IBM screen shots. Other versions may vary.

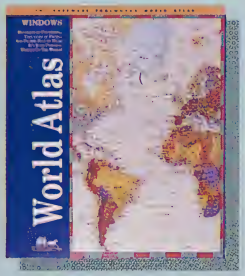
60 Leveroni Court
Novato, CA 94949

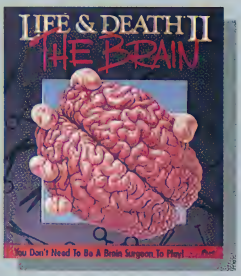
THE SOFTWARE TOOLWORKS® CATALOG

SOFTWARE FOR FUN & INFORMATION









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CONTENTS:

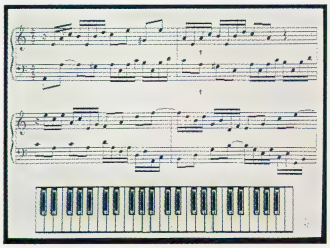
KEY TO SYMBOLS:

THESE SYMBOLS INDICATE FORMAT AVAILABILITY:

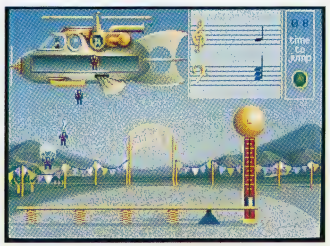
- NINTENDO ENTERTAINMENT SYSTEM — NES
- GAME BOY — GB
- SUPER NINTENDO ENTERTAINMENT SYSTEM — SNES
- IBM — IBM
- IBM CD-ROM — CD
- WINDOWS — W
- MULTIMEDIA CD-ROM — MM CD
- MACINTOSH — M
- MACINTOSH CD-ROM — M CD
- AMIGA — A
- APPLE II FAMILY — II
- APPLE IIGS — IIGS
- ATARI ST — ST
- COMMODORE 64/128 — C64

IT'S A MIRACLE!

THE MIRACLE PIANO TEACHING SYSTEM



This major technological breakthrough makes piano lessons fun! Because you're playing to learn...not just learning to play. The minute you touch *The Miracle Piano Teaching System*, you're making music. And through a unique inter–active system, *The Miracle* creates a custom approach to learning the keyboard that is completely personalized. You play – and learn – at your own pace, at your own level, whenever you want.



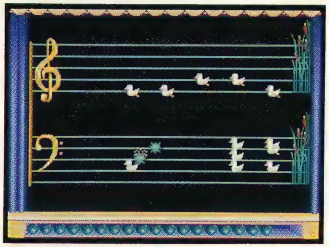
Exciting, arcade-quality video games...learn while you play!

Hundreds of lessons teach you all styles of music: classical, rock, jazz, contemporary and country. By the end of the first lesson, you won't just be playing, you'll be playing along with the built-in Miracle Orchestra. (Imagine a jazz guitar – or saxophone – accompanying your tune.)

Over 200 lessons and from 40 to 100 musical pieces included.

Before long, you'll be able to read music, play songs in rhythm, and perform two-handed piano pieces. Using Artificial Intelligence Technology, *The Miracle*

monitors each lesson and builds a series of personalized exercises just for you. And by borrowing the fun of video games, it makes kids (even grown-up kids) want to learn. It doesn't matter whether you're 6 or 96 – *The Miracle* brings the joy of music to everyone.



Learn at your own pace, and at your own level.

As a stand-alone instrument, *The Miracle* rivals the music industry's most sophisticated MIDI consoles, with over 128 digital instrument sounds and effects, 49 full-sized velocity sensitive keys, foot pedal, 4" speakers, and stereo earphones. It's designed to work with your Nintendo Entertainment System, Super Nintendo Entertainment System, IBM PC Compatible, or Commodore Amiga.

THE MIRACLE PIANO TEACHING SYSTEM					
NES	802041	$379.95	SNES A	802044	$479.95
IBM	802108	$479.95		802028	$479.95

SONG COLLECTIONS VOLUMES I AND II

Expand your repertoire! *The Miracle Song Collection: Volume I* adds 40 popular titles to your *The Miracle Piano Teaching System*, including: "La Bamba," by Richie Valens; "Sara," by Stevie Nicks; and "This Masquerade," by Leon Russell. *Volume II* adds 40 MORE titles, including: "Eleanor Rigby," by John Lennon and Paul McCartney; "Faith," by George Michael; "The Girl Is Mine," by Michael Jackson; and "People Get Ready," by Curtis Mayfield. Each song includes two levels of playing difficulty and is fully arranged with complete accompaniments for a truly impressive sound.

THE MIRACLE SONG COLLECTION VOLUME I					
IBM	802111	$49.95	A	802211	$49.95

THE MIRACLE SONG COLLECTION VOLUME II		
IBM	802112	$49.95
A	802212	$49.95

THE CHESSMASTER®

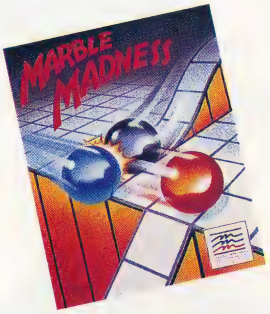
No matter what your level of play, here's the perfect chess opponent...patient, crafty, and willing to teach you some new techniques. Sixteen levels of play, from Newcomer to Grand Master, 3-D board designs, and dazzling animation.

THE CHESSMASTER		
SNES	111011	$64.95

CAPTAIN PLANET™ AND THE PLANETEERS™

Leap into the action of the top-rated kids TV show to help foil the Earth's worst eco-villains. Fire up your Eco-Copter to airlift an elephant...face a radioactive showdown with Duke Nukem...and become Captain Planet's #1 eco-ally.

CAPTAIN PLANET AND THE PLANETEERS		
NES	111005	$49.95



MARBLE MADNESS™

The ultimate test of nerves and reflex. Roll down 3-D raceways to beat the clock or the other guy's marble. But watch out for sneaky Steelies, hounding Hammers and merciless Marble Munchers as you go! A blockbuster game of skill, speed, and split-second timing, for one or two nimble players.

MARBLE MADNESS		
GB	111004	$34.95

KLAX™

Colored tiles are coming at you... slowly at first, then faster and faster and FASTER. Your job? Stack 'em up in piles of 3, vertically, horizontally, or diagonally. Kind of like tic-tac-*tile*. Sounds easy but it isn't. No matter how tough it gets, though, the hardest part is pulling yourself away from this totally addictive game!

KLAX		
GB	111003	$29.95

LOOK OUT! IT'S PAPERBOY® 2!

AND IT'S AVAILABLE IN SUPER NES, NES & GAME BOY FORMATS

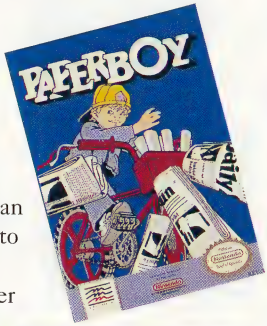
PAPERBOY® 2

Hop on your bike for a brand new, free-wheeling ride up and down the avenues of suburbia. You'll have to move quickly, as you maneuver around tricycles, lawnmowers, not-so-domesticated animals and other hazards in your efforts to flawlessly deliver to subscribers (and break windows of non-subscribers). More enemies, more obstacles, more houses, different challenges, and twice the fun.

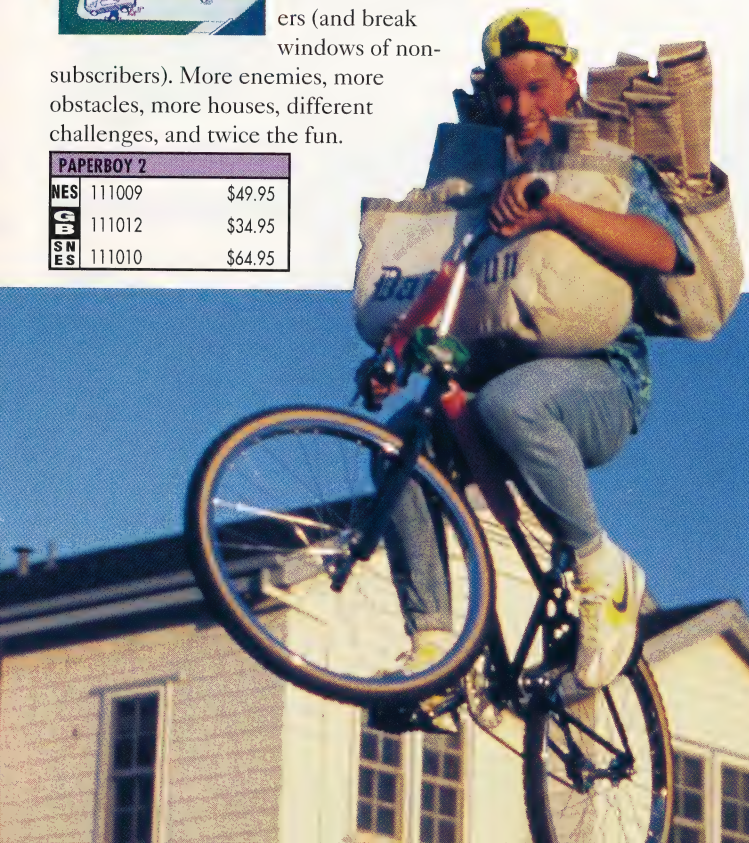
PAPERBOY 2		
NES	111009	$49.95
GB	111012	$34.95
SNES	111010	$64.95

PAPERBOY®

The original hit game, with over 1½ million sold! *Paperboy* is the classic adventure through a suburban neighborhood: into flowerbeds, past yapping dogs, over curbs. Unending thrills, spills, challenge and excitement.



PAPERBOY		
NES	110311	$42.95
GB	110475	$29.95



DAYS OF THUNDER™

You're a rookie stock car driver, sitting on eight cylinders of mean machine that's packed with horsepower and ready to jam. Now experience all the tire-screeching stock car action of the movie *Days of Thunder*. You'll have to think fast, move faster and use real racing strategies to win!

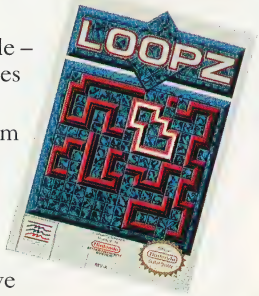
DAYS OF THUNDER					
NES	110482	$54.95	GB	110502	$29.95

DIRTY HARRY™

You're Detective Harry Callahan, out to get a ruthless drug-smuggling ring. Crack the case and face the kingpin himself in a blazing showdown on Alcatraz. Go ahead...make your day.

DIRTY HARRY		
NES	110480	$31.95

LOOPZ™



It seems so simple – just connect pieces of different sizes and shapes to form complete loops. But it's not as easy as it looks, and it may be the most addictive game ever! Ten tortuous levels.

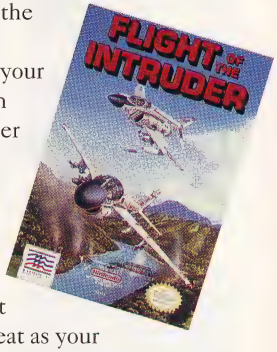
LOOPZ					
NES	110479	$42.95	GB	110485	$29.95

WORLD LEAGUE SOCCER™

Fully scaled, arcade-quality action pits you against the best teams in the world, and hundreds of different player personalities! All the excitement of real soccer, now on Super NES!

WORLD LEAGUE SOCCER		
SNES	011014	$59.95

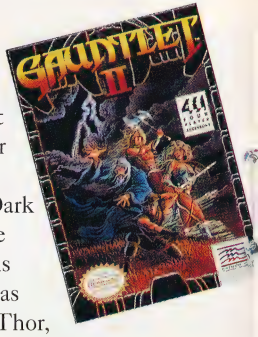
FLIGHT OF THE INTRUDER™



Relive the thrill of the movie *Flight of the Intruder*...Fight for your life, flying either an A-6 Intruder bomber or an F-4 Phantom fighter in twelve different missions, including intense night sequences and over 50 combat rounds. Feel the heat as your weapons detonate with incredible realism.

FLIGHT OF THE INTRUDER		
NES	110501	$42.95

GAUNTLET® II



Technical wizardry delivers all the action of the popular Gauntlet arcade game! Search for magical treasures... explore 106 different Dark Dungeon mazes...battle ghosts, demons, dragons and other deadly foes...as you live the fantasy of Thor, Thyra, Questor and Merlin. Up to four can play at once, each assuming a different character role!

GAUNTLET II					
NES	110478	$24.95	GB	110499	$31.95

IT'S YOUR MOVE...

THE JOY OF CHESS – BETTER THAN EVER

THE CHESSMASTER® 3000

The ultimate *Chessmaster* with a turbocharged chess engine and enhanced graphics. Learn rules, strategies, and intricacies of the game. Then play a wide variety of chess personalities each with his or her own quirks. Or create your own opponents! An infinite number of game levels and new features make learning easy for the novice, as well as challenging for even the most expert player.

THE CHESSMASTER 3000		
IBM	106099	$49.95
W	106100	$59.95

THE CHESSMASTER® 2100

The classic *Chessmaster*– loved by critics and players alike. Stunning 2-D and 3-D graphics, a mammoth opening library, and unlimited levels of play. Over a million copies sold!

THE CHESSMASTER 2100					
M II	103299	$49.95	A IIGS	103313	$49.95
	103307	$49.95		103301	$49.95
C64	103303	$39.95			

GIN KING/ CRIBBAGE KING®

For the beginner or true card shark... hone your Gin and Cribbage skills to razor perfection. Seven Artificial Intelligence computer personalities – each with his or her own playing style – await you. You can even ask for hints. Excellent full-color, high-resolution graphics.

Play cribbage like a king.

GIN KING/CRIBBAGE KING					
IBM	103493	$24.95	M	103495	$39.95
A	103499	$49.95	IIGS	103497	$49.95

THE GAMES PEOPLE PLAY™

Artificial Intelligence transforms your favorite board and card games, and gives you a different challenge every time you play. Includes Backgammon, Checkers, Gin, and Cribbage, with multiple levels of play for each. Lifelike graphics and color add to the fun.

THE GAMES PEOPLE PLAY		
IBM	104118	$39.95

D/GENERATION™

Action adventure meets virtual reality! Something is definitely wrong at the Genoq corporate headquarters, and things are not what they seem. Within this graphically innovative environment, search for clues and solve puzzles that reveal your mission as you race against time (and fate) through a security system run amok.

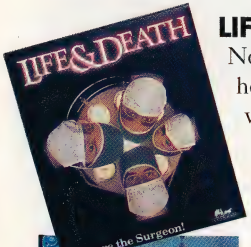
D/GENERATION		
IBM	106067	$49.95

CAPTIVE™

Held captive for 200 years in an orbiting space prison (for a crime you didn't commit!), your only hope of escape is a briefcase computer and the droids who respond to your frantic calls for help. The run away smash-hit of European game players!

CAPTIVE		
A	104350	$44.95

SCALPEL, SUTURE...SPONGE!!

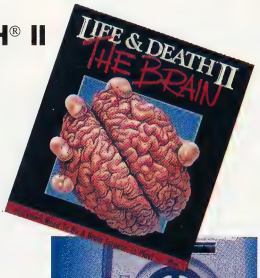


LIFE & DEATH®

Not for the faint of heart – or clumsy of wrist. You hold a human life in your hands as you cut into living flesh. Your skill with the scalpel while monitoring on-screen EKG, pulse, blood pressure and other vital signs will determine whether your patient goes to recovery...or the morgue. Watch where you make that incision!

It's time for the cut...but which of these things is the scalpel?

LIFE & DEATH					
IBM	101663	$34.95	M	101664	$49.95
A	101665	$39.95	IIGS	103352	$49.95

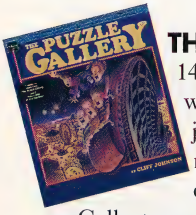


LIFE & DEATH® II – THE BRAIN

Welcome to the Neurosurgery Wing, Doctor. It's the ultimate medical adventure into the depths and mysteries of the *human brain!* Your hectic day begins with x-rays, CAT scans, Ultra-sound and MRIs, with stunning color graphics and digitized sound. Only you can decide – does your patient need The Knife? Warning – operate in Nightmare Mode and things could get completely out of hand!

You make life and death decisions on the Neurosurgery ward.

LIFE & DEATH II-THE BRAIN					
IBM	(3.5") 104344	$49.95	IBM	(5.25") 104114	$49.95



THE PUZZLE GALLERY™

140 of your favorite puzzles – word searches, crosswords, jigsaws, jumbles, codes, mazes, and more – in the craziest carnival ever. Collect your wits and dive on in!

THE PUZZLE GALLERY		
IBM	104347	$39.95

THE HUNT FOR RED OCTOBER™

Test your brilliance in stealth, evasion and navigation as Commander of the Red October, in the ultimate submarine simulation game.

THE HUNT FOR RED OCTOBER					
IBM	116204	$29.95	M	116207	$29.95
A	116202	$29.95	II	116200	$29.95
IIGS	116205	$29.95	ST	116209	$29.95
C64	116201	$29.95			

LOOPZ™

The can't-put-it-down classic. Form loops out of different sizes and shapes. It sounds easy... but perhaps you'll just have to see for yourself! Ten tortuous levels.

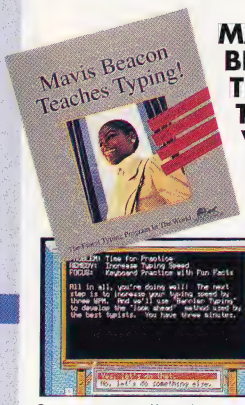
LOOPZ					
IBM	110490	$39.95	A	110487	$49.95

DAYS OF THUNDER™

Experience all the tire-screeching stock-car action of the movie *Days of Thunder.* You'll have to think fast and use real racing strategies to win!

DAYS OF THUNDER		
IBM	104168	$34.95

THE WORLD'S PREMIER TYPING PROGRAM

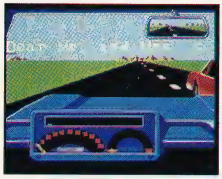


MAVIS BEACON TEACHES TYPING!® VERSION 2.0

Lessons are tailored to your unique level of ability.

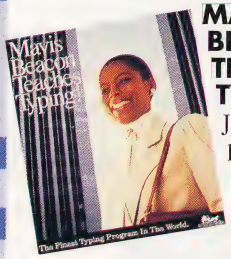
The perfect typing teacher: tireless, attentive, and best of all, fun.

Over 1.5 million people have learned to type with *Mavis Beacon*. But now it's better than ever! This new release adds some hot features to the best-selling classic...like new EGA/VGA graphics support, a 10-key teaching mode, and a frustration sensor to help pace new typists. The classes are tailored to your unique strengths and weaknesses.



First, you'll start at the Chalkboard to outline your lesson; next it's on to the Classroom where you actually begin typing. (On-screen ghost hands mimic your actual movements so you don't need to watch your hands.) Then it's back to the Chalkboard for Mavis to critique your performance. Finally, in the Workshop, you work on your weaknesses with the help of a clock, metronome, and three typing speeds. Every lesson is made interesting with quotes from history's greatest writings, rhymes and jokes, and fascinating facts from the *Guinness Book of World Records*. You get time out for recess and skill-building in the arcade with a classic driving game, plus two irresistible new games as well!

MAVIS BEACON TEACHES TYPING! V2.0					
IBM	106102	$49.95	W	106103	$59.95



MAVIS BEACON TEACHES TYPING!®

Join the hundreds of thousands of happy typists who've learned from Mavis! And discover why this classic Artificial Intelligence Software System has won rave reviews from the critics: "...my first choice among typing programs" (*MacWorld*); "...that rare kind of program that's even better than the copy-writers say it is..." (*Computer Shopper*); " ...one of the most visually exciting programs I've ever seen..." (*PCM*); "...the best dollar value around..." (*PC Magazine*).

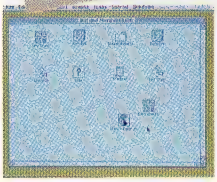
MAVIS BEACON TEACHES TYPING!					
M	101657	$49.95	A	101616	$49.95
II	101609	$39.95	IIGS	101610	$49.95
ST	101619	$49.95	C64	101612	$39.95

THE BOTTOM LINE

MAKE YOUR DOLLARS COUNT

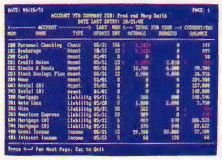
DOLLARS AND SENSE®

Why go through the agony of balancing your budget every month when you can have a personal financial adviser do it instead? *Dollars and Sense* does that once abhorred job with ease. Since 1984, *Dollars and Sense* has been a leading financial management application for hundreds of thousands of home and small business budgets. With its icon interface, pull-down menus, and command keys, it gives you three ways to interact with the program – you can even create your own icon-based commands!



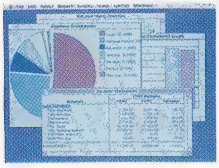
Graphical interface is easy – even fun – to use.

Dollars and Sense manages all your accounts – bank accounts, credit cards, loans, investment accounts, even IRAs. Your computer can generate checks, automatically record income and expenses, help balance your checkbook, and produce professional financial statements. At tax time, prepare your finances quickly and easily with data conveniently accumulated by *Dollars and Sense.*

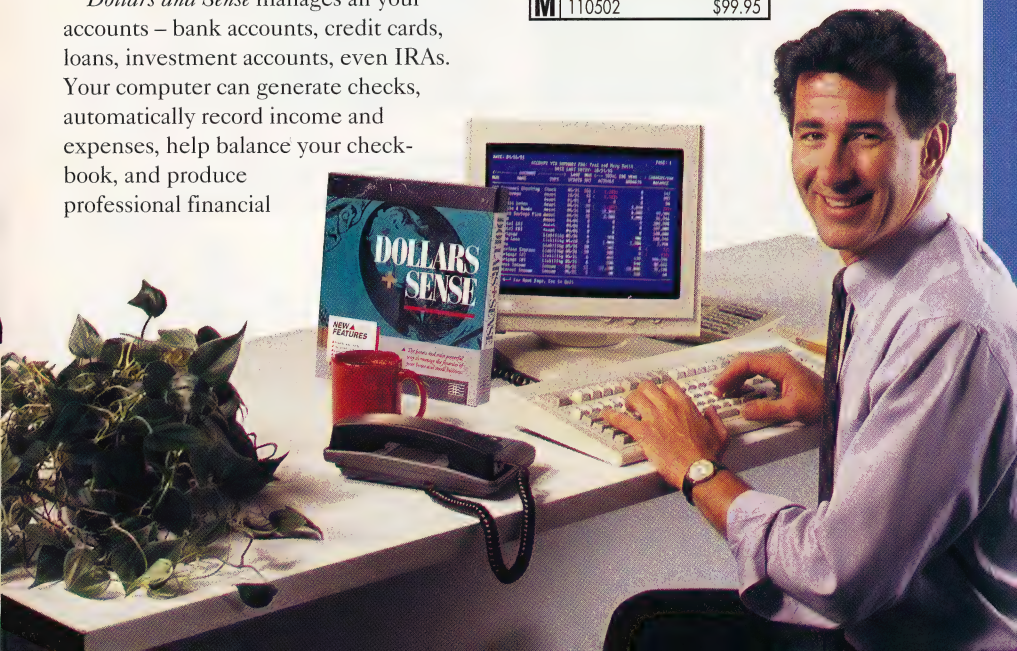


Master your finances in minutes.

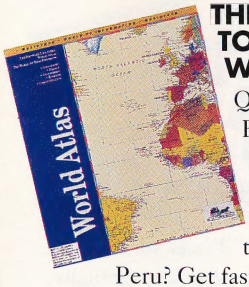
Features include user-created icons, interactive running balances, custom check layout, a "set start-up" feature, adjustable fonts and column widths in reports, automatic double-entry accounting, a nine-level accounting hierarchy, sorting capability, and on-line help. There are also new reports and graphs, support of world and European date and amount formats, and quick and easy account reconciliation.



DOLLARS AND SENSE		
IBM	110503	$99.95
M	110502	$99.95



AROUND THE WORLD!



THE SOFTWARE TOOLWORKS® WORLD ATLAS

Quick! Where's Bhutan? What's the population of Italy? The number one import of Iran? Or the military budget of Peru? Get fast answers with *World Atlas* – the almanac, world factbook and atlas in one.

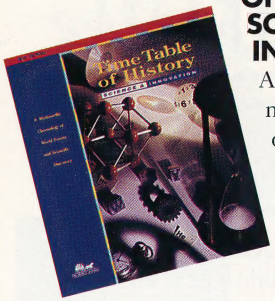
Designed for travelers, teachers, business people, and other curious minds, only *World Atlas* gives you instant access to more than 200 fully detailed maps – including regions, countries, even oceans! – in the highest-resolution graphics available on an electronic atlas. Plus, a huge database of international information offers valuable facts on hundreds of topics.

Now, in moments, you can research facts on: government, demographics, climate, environment, economic indicators and more!

Explore the world. Get to know any country. It's easy – and it's fun. A single keystroke moves you from country to country, and a handy on-screen index offers a world of other fascinating facts. There's even a CD-ROM version! "Compared to other packages in this category, *The Software Toolworks World Atlas* is the winner." – *BYTE Magazine.*

THE SOFTWARE TOOLWORKS WORLD ATLAS 2.0					
IBM	(3.5") 106097	$69.95	IBM	(5.25") 106073	$69.95
C/D	130111	$79.95	W	110522	$79.95
MM CD	110520	$149.95	M	104116	$79.95
M CD	110507	$89.95			

TIME TABLE OF HISTORY: SCIENCE AND INNOVATION



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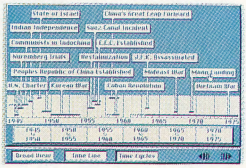

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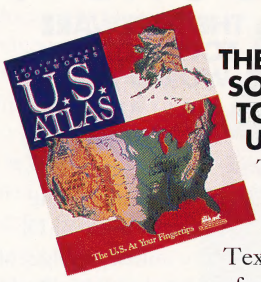

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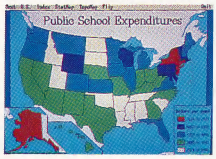

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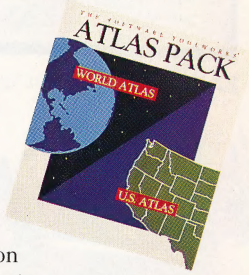

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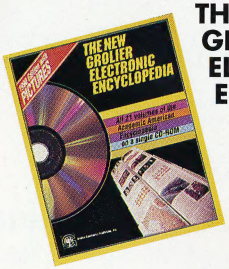

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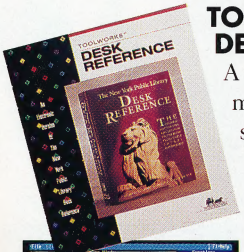

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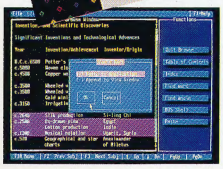

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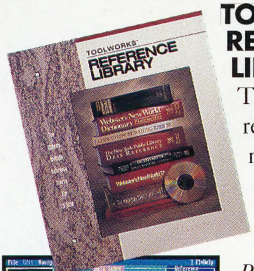

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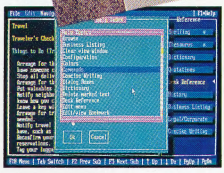

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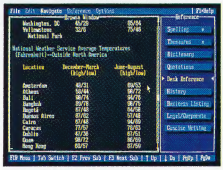

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