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A User Guide for the Sign Sizing Program

Donna Sheehy
Kurt Krueger

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Note: The software mentioned in this publication can only run on the Forest Service IBM 615 using Forest Service protocols for accessing files. This publication contains information that might be useful in designing signs in general and therefore is being made available to our customers outside the Agency.

Abstract

Sheehy, Donna; Krueger, Kurt. 1999. A user guide for the sign sizing program. Gen. Tech. Rep. RMRS-GTR-40WWW. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 21 p. Available: http://www.fs.fed.us/rm/pubs/rmrs_gtr40.pdf

This user guide explains how to use the Forest Service Sign Sizing program. The program calculates the length and height of a rectangular sign panel for road and trail guide signs. Variable text messages and directional arrows can be mocked up using U.S. Federal Highway Administration standards. Users can make text or other changes and quickly determine the effect on sign size and appearance. After the sign is finalized, it can be printed and used for sign ordering. The sign text, size calculations, and other related information input into the database are saved for future reference.

Keywords: signboards; signposts; design; computer programs; standards

The Authors

Donna Sheehy is an operation and maintenance engineer for the Northern Region, Regional Office. Her duties also include acting as the Regional Sign Coordinator. She is a graduate of the Montana College of Mineral Science and Technology.

Kurt Krueger is a computer specialist with the Economics Research Work Unit, Rocky Mountain Research Station, Forestry Sciences Laboratory, Missoula, MT and a research specialist with the University of Montana. His work includes economic and landscape computer simulation. He is a graduate of the University of Wisconsin.

Contents

1. Introduction

Purpose

The Sign Sizing Program is a tool that allows the user to design and calculate the length, height, and area of a sign panel for road and trail guide signs that contain variable messages.

(The program can only run on the Forest Service IBM 615 using Forest Service protocols for accessing files.)

Background

The original PC program eliminated the tedious task of adding the horizontal dimensions of all the letters, numbers, arrows, characters and spaces for each line of text on a proposed sign. This process, done by hand, usually resulted in a high level of frustration and was time consuming. With the arrival of the DG, the program was enhanced and converted to run on the DG system. With the advent of the IBM system, the program was converted back to a PC system using Fox Pro.

The program allows the user to:

- Design a concise, precise, and balanced sign.
- Rapidly rerun text changes.
- Change height dimensions of the panel by trying more or less lines of text.
- Compare text line lengths to determine where abbreviations would shorten the panel length.
- View and print the final sign.
- Store any sign for future use.

The program cannot:

- Check spelling or abbreviations.
- Accept different letter sizes on the same sign.
- Automatically center lines of text.

The program checks:

- Correct arrow sequence.
- Arrow placement in a line of text.

References

This publication provides a summary of Forest Service signing guidelines to aid the user in using the Sign Sizing Program. For more detailed information regarding Forest Service sign standards, refer to:

U. S. Department of Agriculture, Forest Service, Engineering Staff. August 1998. Sign and Poster Guidelines for the Forest Service. EM-7100-15. Washington, DC.

Contacts

Any questions regarding the program may be referred to Donna Sheehy, R1 Sign Coordinator at 406-329-3312 (dsheehy/r1) or Kurt Krueger, Computer Programmer at 406-542-3243 (kkrueger/rmrs,missoula).

Program Conventions

The program accepts **ONLY** the following **characters:**

Alphabet A through Z - upper case
Numbers 0 through 9
Standard punctuation including:
, . / : ; ‘ - **$ & @**

Entering other characters results in an error message.

The program uses the following conventions for **reflectorized** road and motorized trail signs. Other reflectorized signs, such as warning and regulatory, have different margin and line to line dimensions.

- Letter, numeral, and spacing widths are based on Series “C” of the U. S. Deparment of Transportation, Federal Highway Administration, Office of Traffic Operations. 1966. Standard Alphabets for Highway Signs.
- Spacing for top, bottom, and end margins = ¾ of the capital letter height.
- Spacing between lines = ½ of the capital letter height.
- Spacing between words and characters = 4 times the letter stroke width.
- Fraction length = 1½ of the capital letter height.
- Combination, horizontal and slanted arrow length = 1¼ of the capital letter height.
- Vertical arrow length = the capital letter height.

The program uses the following conventions for **non-reflectorized** (non-motorized trail) signs. Dimensioning is for signs with 1 inch letters. Routed signs with 2 inch letters or more will will have proportional margin and line spacing requirements.

- Letter and numeral height defaults to 1 inch - standard for routed trail signs.
- Letter, numeral, and stroke widths are ¼ of the FHWA standard for 4 inch series “C” letters used for reflectorized signs.
- Letter to letter and numeral to numeral spacing is ½ of the FHWA standard for 4 inch series “C” used for reflectorized signs.
- Spacing for top, bottom, and end margins = 2 inches.
- Spacing between lines = 1 inch.
- Spacing between words and characters = 1 inch.
- Fraction length = 1½ inches.
- Combination, horizontal and slanted arrow length = 2 inches.
- Vertical arrow width = 1 inch.
- Word/numeral to combination, slanted and horizontal arrow = 1 inch.
- Vertical arrow to word/numeral spacing = 2 inches.

2. Signing Overview

Trail Signing

Guide signs are used to identify the trail route and its associated directions, and for guidance to and from destinations along the trail. The following rules are from the U. S. Forest Service "Sign and Poster Guidelines for the Forest Service" cited in the Introduction.

Signing Rules

1. Identify all trail legs at all forest development trail junctions with guide signs. (Exception: do not identify trail legs on which traffic is discouraged, prohibited, or against one-way traffic flow.)
2. Identification of destinations on guide signs is generally optional. However, if a destination has been identified on a guide sign, it must be identified on all subsequent guide signs along the trail until the destination is reached. Distances shall be used when showing any destination.
3. Identify destinations named on guide signs.
4. Use only names and numbers that appear on the most current visitor or trail map.

Messages

1. Required:

Route identification (trail name and number) and its direction(s).

Exit signing: as a minimum, show the direction and distance to the trailhead or trail access at the first junction from the trailhead or access point.

2. Optional:

Point destinations including recreation sites, geographic features, junctions with other trails or roads, and administrative sites. Show mileages as fractions to the nearest 1/4, 1/2 or 3/4 mile for destinations up to 3 miles. After 3 miles, round to the nearest mile. Use decimal kilometers up to 1 kilometer (0.1-0.9). Distance shall be rounded to the nearest kilometer (with no decimal) after 1 kilometer.

Abbreviate where message length causes excessive sign length and where the abbreviation cannot be misunderstood. Use standard abbreviations found in Chapter 2 of EM-7100-15.

Message Sequence

1. At a destination, center name of destination.
2. First trail route identification and its direction(s) - based on proper arrow sequence.
3. Destinations and mileages for features on or accessed by the first trail.
4. Second trail route identification and its direction(s) - again - based on proper arrow sequence.
5. Destinations and mileages for features on or accessed by second trail.

Layout

Text lines and arrows for trails and destinations are to be left justified first and then right justified, if possible.

Do not align trail numbers and trail mileages in the same column - offset mileage left or right under the trail number.

Sign Size

Routed signs. Recommend up to 4 lines of text - do not exceed 5 lines.

Reflectorized signs. Recommend up to 3 lines of text - do not exceed 4 lines.

Road Signing

Guide signs on roads inform drivers of sites located some distance ahead and provide reliable information on distances to those destinations.

Signing Rules

1. Sign all junctions between a first destination guide sign and the destination. It is important that each successive sign along the road continue to carry a destination until it is reached. Distances shall be used when showing any destination.
2. After signing a user to a destination, exit destination should be provided at each decision point back to the starting point.
3. Identify destinations named on guide signs.
4. Use only names and numbers that appear on the most current visitor map.

Messages

1. Required:

Route identification (Route Markers) and its direction(s).

2. Optional:

Point destinations and their associated mileages. These can include recreation sites, geographic features, junctions with other roads or trails, and administrative sites. Show mileages as fractions to the nearest 1/4, 1/2 or 3/4 mile for destinations up to 1 mile. After 1 mile, round to the nearest mile.

Abbreviate where message length causes excessive sign length and where the abbreviation cannot be

misunderstood. Use standard abbreviations found in Chapter 2 of EM-7100-15.

Layout

Text lines and arrows for destinations are to be left justified first and then right justified if possible.

Sign Size

Reflectorized signs. Recommend up to 3 lines of text - do not exceed 4 lines as a maximum.

Letter Size

Letter size is dependent on the speed of the traffic type on the road or trail. Use the following *minimum* letter sizes when designing guide signs. The program will default to 4" letters for roads and 1" letters for non-motorized trails.

Maintenance Level 3, 4 and 5 roads:

More than 50 m.p.h.	6" letters
35 to 50 m.p.h.	5" letters
less than 35 m.p.h.	4" letters
20 m.p.h. and less within developed sites	3" letters

Maintenance Level 2 roads:

More than 20 m.p.h.	Same as above
20 m.p.h. and less	3" letters

Motorized trails:

More than 25 m.p.h.	3" letters
25 m.p.h. and less	2" letters

Non-Motorized trails:

All	1" letters

Arrows

Arrow placement on signs is extremely critical to the functionality of the sign. As a general rule, directional arrows should be horizontal or vertical, but at irregular intersections, an oblique arrow may convey a clearer indication of the direction to be followed. In some cases, especially trail junctions, combinations of arrows may be needed. Arrow placement controls the sequence first, then mileages.

Arrow and Mileage Sequence

Standard arrow sequence with mileages is as follows:

1. Straight ahead (vertical) arrows, lowest mileage first.
2. Left arrows, lowest mileage first.
3. Right arrows, lowest mileage first

Arrows pointing straight ahead and to the left shall be to the extreme left of the line of text, while arrows pointing to the right shall be to the extreme right of the text. These principles and guidelines are illustrated in Figure 2.1.

Figure 2.1.—Standard Arrow Placement

Special Cases

Trail signs require that the trail route identification and its direction(s) be signed first and then the destinations associated with that trail. "L" junctions will require combinations of arrows that are an exception to the standard rules. These are illustrated in Figures 2.2 and 2.3.

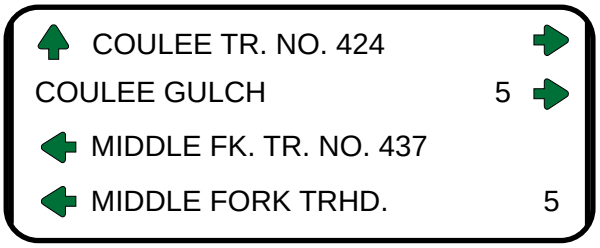


Figure 2.2. Right "L" Junction—This sign requires that the destination to the right be signed before signing the trail leg and destinations to the left (use the override left arrow in the program).

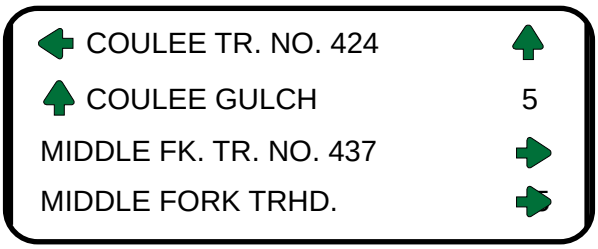
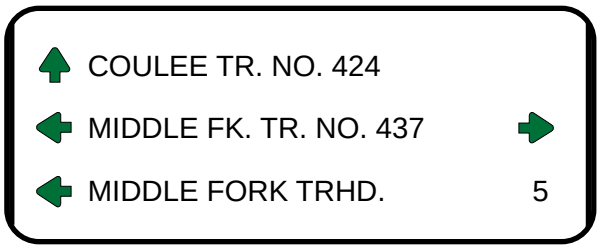


Figure 2.3. Left "L" Junction—This sign requires that the vertical arrow be placed on the right (use the override up arrow in the program) and if signing a straight ahead destination, the up arrow will be under the left arrow.

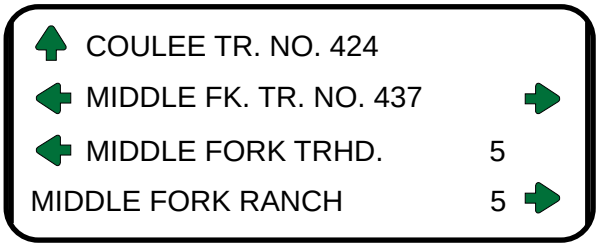
Mileage Layout

There are three options for displaying mileage on signs:

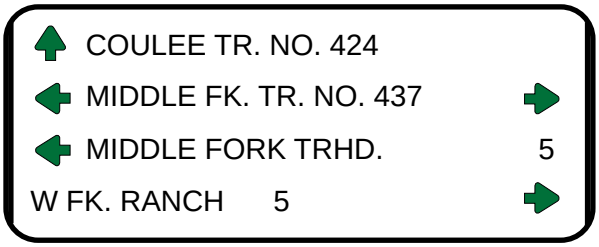
a. Mileage for up and left directions may be aligned in the same column with the right arrows as shown below. Hint - use the ***mileage right justify*** option in the Right Arrow selection.



b. All mileage may be placed in a single column before the arrows on the right - use the mileage entry boxes.



c. Mileage may be entered with the text line. Remember - on trail signs - mileage is not to be in the same column as the trail numbers.



3. Getting Started

Downloading the Program

The sign-sizing program is designed to run on the Forest Service IBM 615 using Forest Service protocols for accessing files in a predetermined directory structure.

Installation instructions and program files are available on the Region 1 Web site (Library - Software - Distribution - Engineering). The sign sizing program, a PC Windows application, is on the IBM 615 mainframe in two folders (j:/files/office/engineer/sign_siz and j:/fsapps/fsprod/engineering/sign_sizing). Executing the installation procedure from the web site requires a Database Administrator and an IBM compatible PC, not a "dumb terminal." Once the folders and data files are installed on the PC, the user can adjust settings and create a shortcut. The program is then ready to run.

Adjusting the Settings

In order for this program to be viewed properly, the computer settings may need to be adjusted.

- Go to the START button on the lower left of the pop up bar at the bottom of the screen.
- Click on SETTINGS, then click on CONTROL PANEL.
- Double click on the DISPLAY Icon.
- Select the SETTINGS folder.
- Change the FONT SIZE from large fonts to **small fonts**.
- Change the Display Area from 1280 x 1024 to **1024 x 768**.
- Click on OK. Windows will restart.

The settings may be changed back after completion of your sign sizing session or left as is. Most of the IBM operations will run with these settings, with the exception of ORACLE Forms in Exceed.

Creating the Shortcut

- Go to folder where SIGN.EXE is located using WINDOWS EXPLORER. Select START Button, then PROGRAMS. j:\fsapps\fsprod\engineering\sign_sizing
- Right click on SIGN.EXE. Select "Create Shortcut" from the menu. There will be a message: "Windows cannot create a shortcut here. Do you want shortcut to be placed on the desktop Y/N?" Select "Y". This will create a new entry "Shortcut to Sign.exe" in your DESKTOP folder.
- Still using EXPLORER go to C:\WINDOWS\DESKTOP (not all Forest Service IBMs have this - if you don't just go to the desktop). Highlight SHORTCUT TO SIGN.EXE. Right click on RENAME and change the name to "SIGN_DESIGN". Right click again and select "Cut".
- Still using EXPLORER go to C:\WINDOWS\START MENU\PROGRAMS and activate this folder. Right click on the mouse on the RIGHT side of the EXPLORER screen. Select "Paste" from the Menu. Your Sign Design shortcut should appear.
- Test that SIGN_DESIGN will appear by selecting START from your bottom task bar. Follow the menu through PROGRAMS and see if SIGN_DESIGN appears.

Accessing the Program

To access the executable program on your PC, press the START button on the lower left of the pop up bar at the bottom of the screen. Go to PROGRAMS and select the program name from the list of available applications. Click on the name and the program will open to the main Sign Design Screen.

Using the Sign Sizing Program

Screen Layout

The sign sizing program consists of the following four screens:

- The Sign Design Screen
- The Calculation Screen
- The View Screen
- The Info Screen

The Sign Design Screen

The Sign Design Screen is the main entry screen for the program. It contains menu bars, text and mileage entry blocks, arrow select buttons, and other miscellaneous buttons needed for the operation of the program. These are shown below.

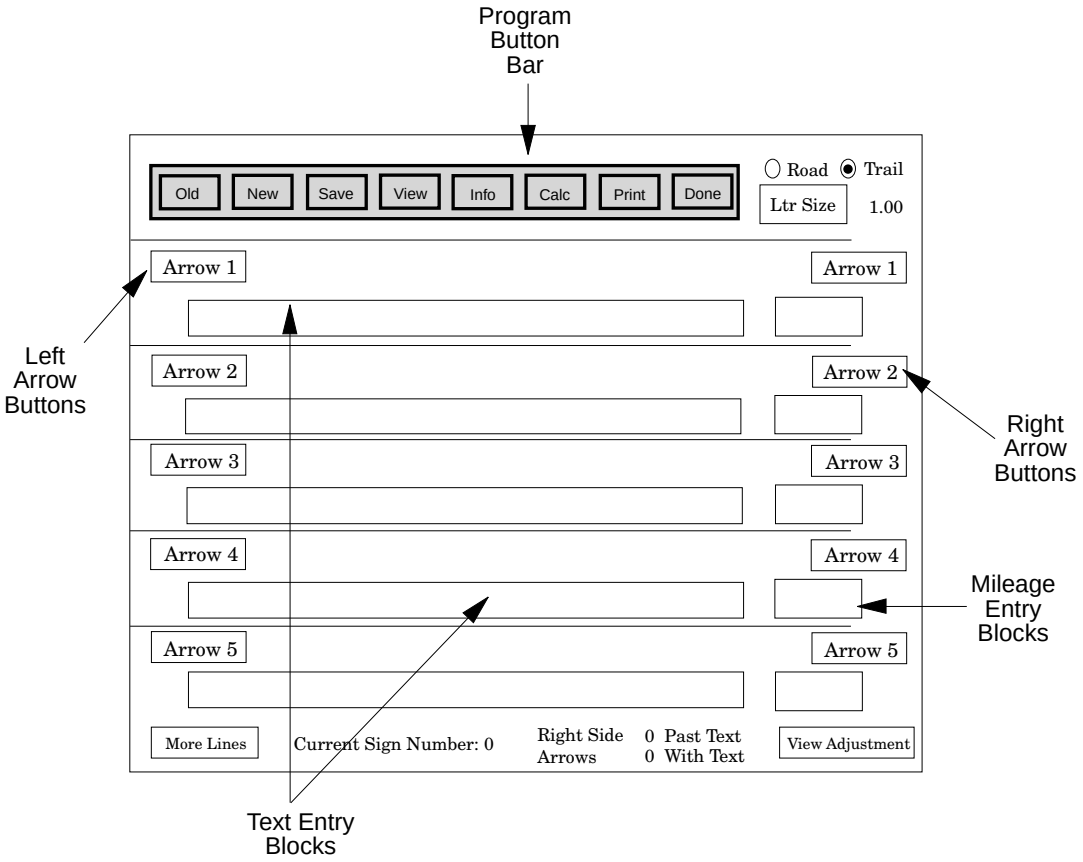
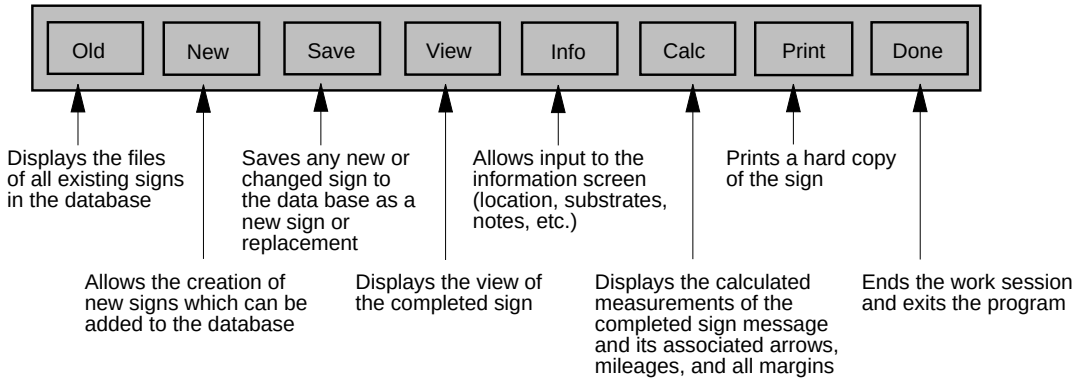


Figure 3.1—The Sign Design Screen

Program Button Bar

The Program Button Bar contains buttons which provide specific program functions. Some of these buttons will move to the view or calculation screens that are related to the Sign Design Screen.



Text Entry Blocks

This area allows the user to enter the lines of text with the appropriate messages for the sign.

Mileage Entry Blocks

This area allows the user to enter mileage with the appropriate text for the sign.

Left and Right Arrow Buttons

The Left and Right Arrow Buttons allow the user to select the placement of arrows with the appropriate lines of text. The selection of arrows is dependent on the correct arrow sequence and on any arrows previously selected. Depending on the choices made, the available sequence of arrows will change. In addition, on the right side, a choice is available for mileages to be entered in the same column as the right arrows. (Note: When using the override arrows, the "O" will not print on the final printout.)

Left Sequence		*Right Sequence*	
	None		None
<^	Up/Left Combination	^>	Up/Right Combination
^	Up Arrow	O^	Override Up Arrow ("L" Junction only)
\	Angled Left Arrow	/	Angled Right Arrow
<	Left Arrow	>	Right Arrow
O<	Override Left Arrow		Mileage Right Justify

Calculation Screen

The calculation screen displays all the measurements for the sign message and the final dimensions including all margins. These measurements are explained in detail in Exercise 1.

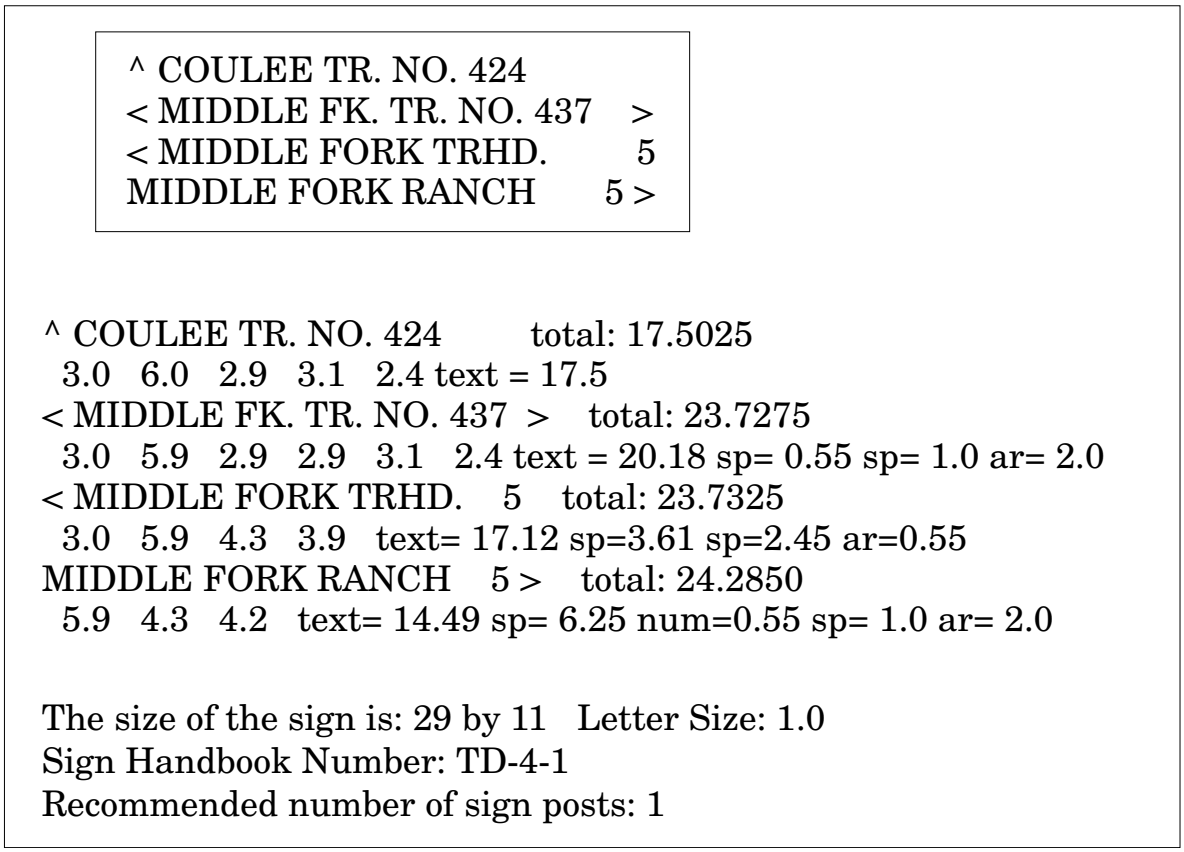


Figure 3.2—The Calculation Screen

View Screen

The View Screen shows a precise view of the final layout, including columns for mileages and arrows.

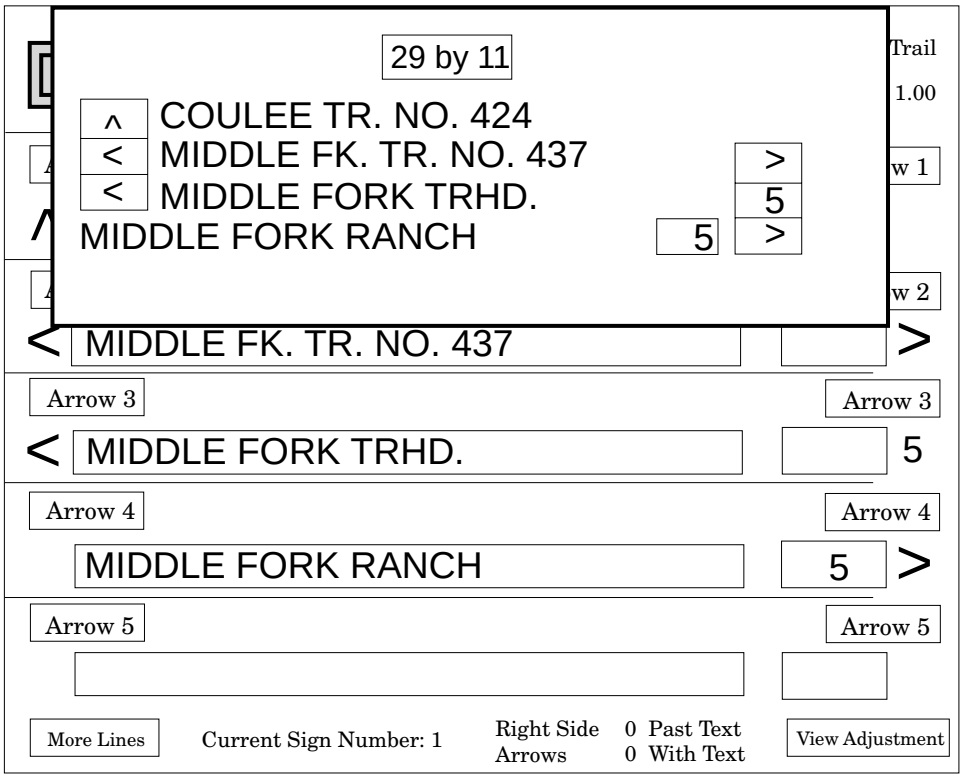


Figure 3.3—The View Screen

Info Screen

Additional information may be added about the sign, its location, color, material, cost, etc., on the Info Screen. This information is optional, however, the screen should be viewed in order for the print routine to work correctly.

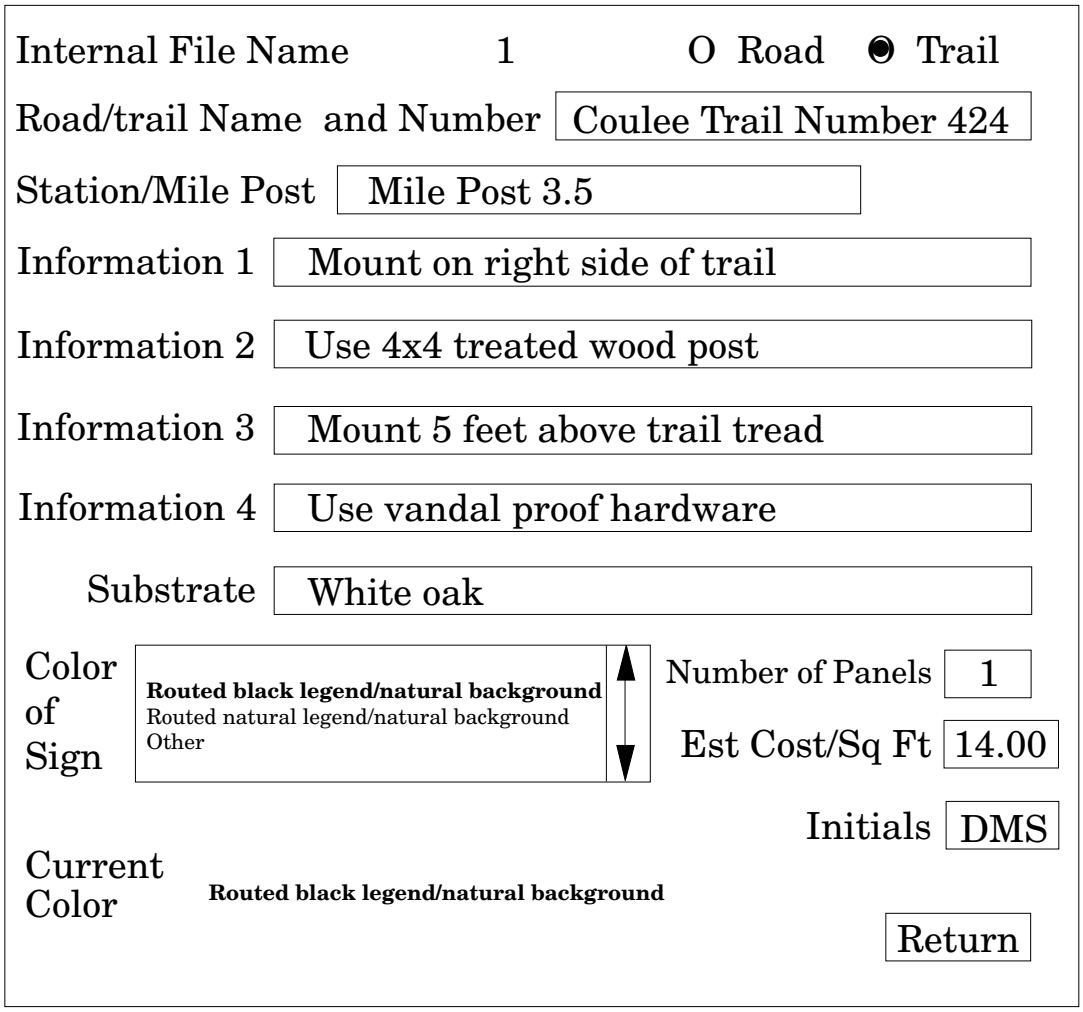
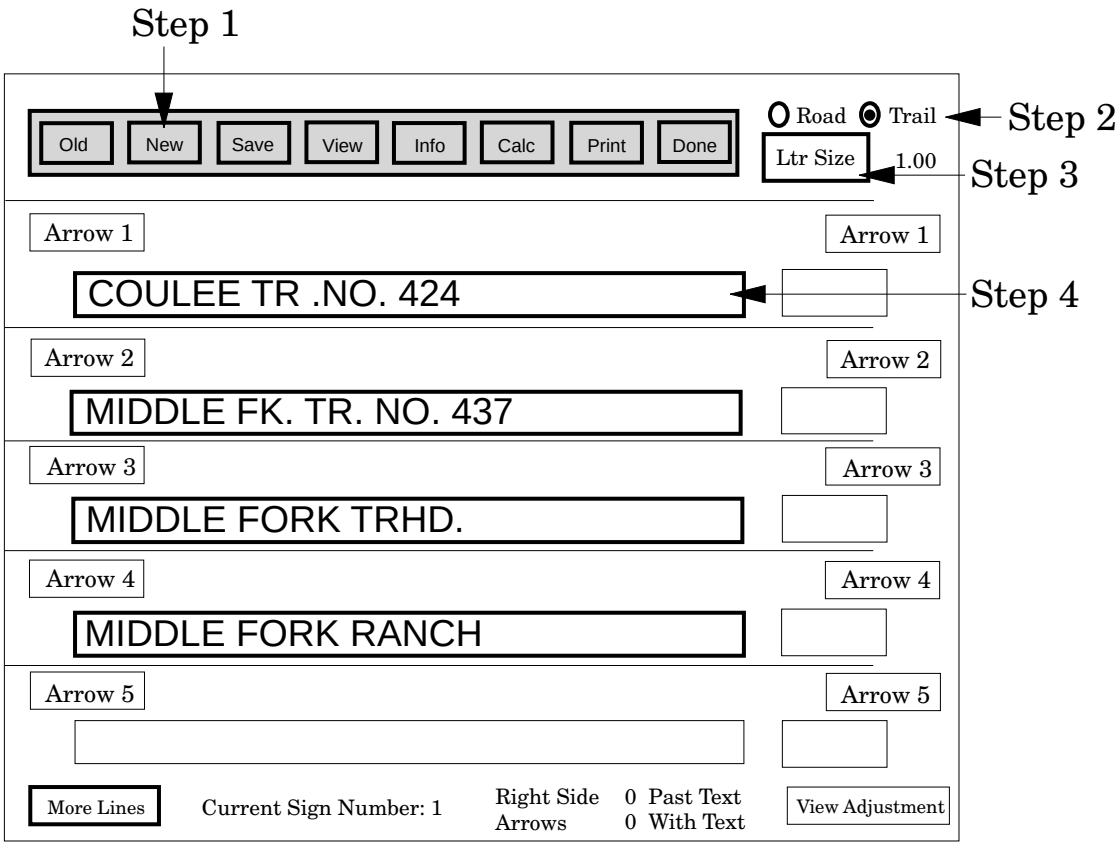


Figure 3.4—The Information Screen

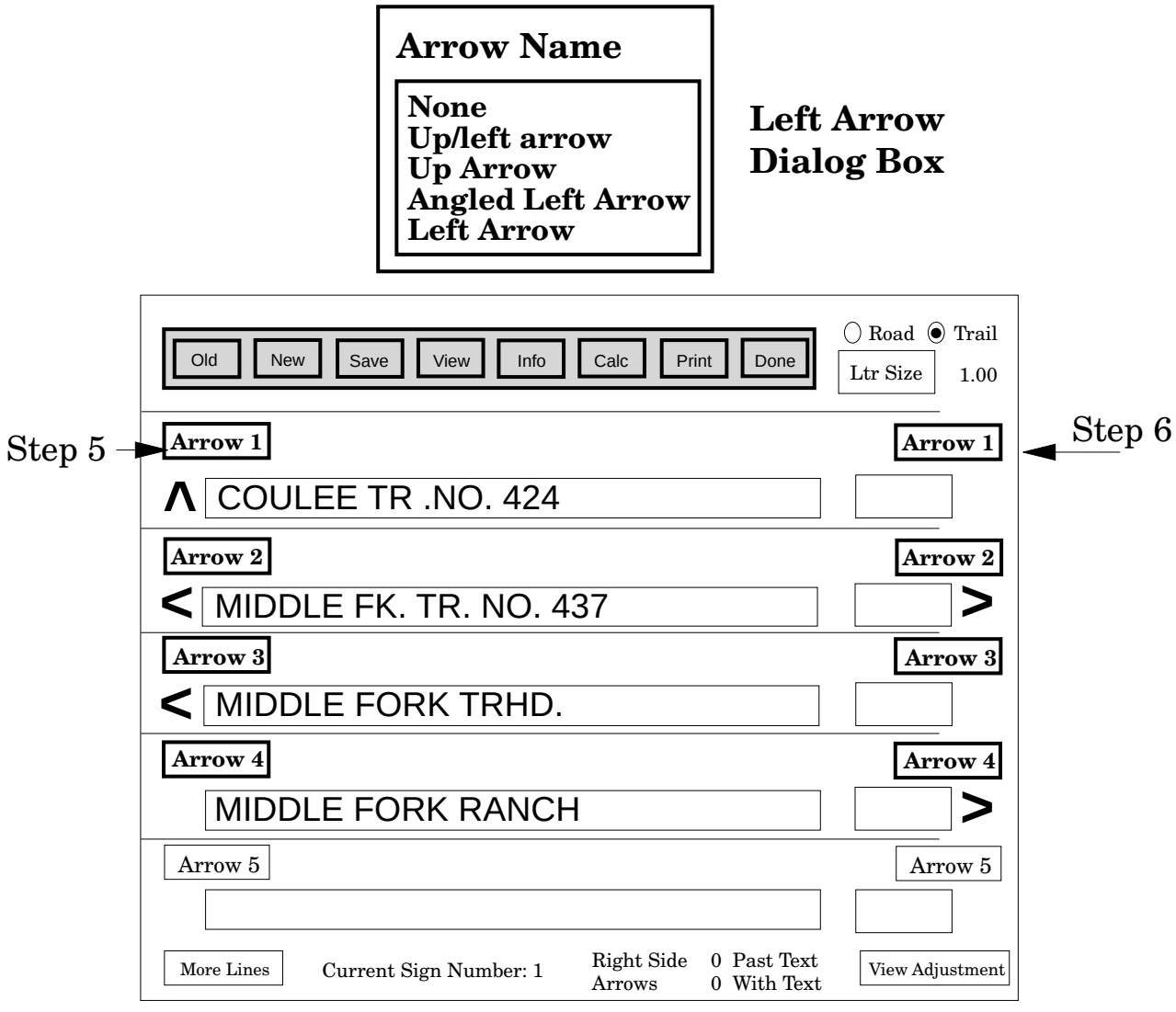
4. Exercises

Exercise 1—Designing a New Sign

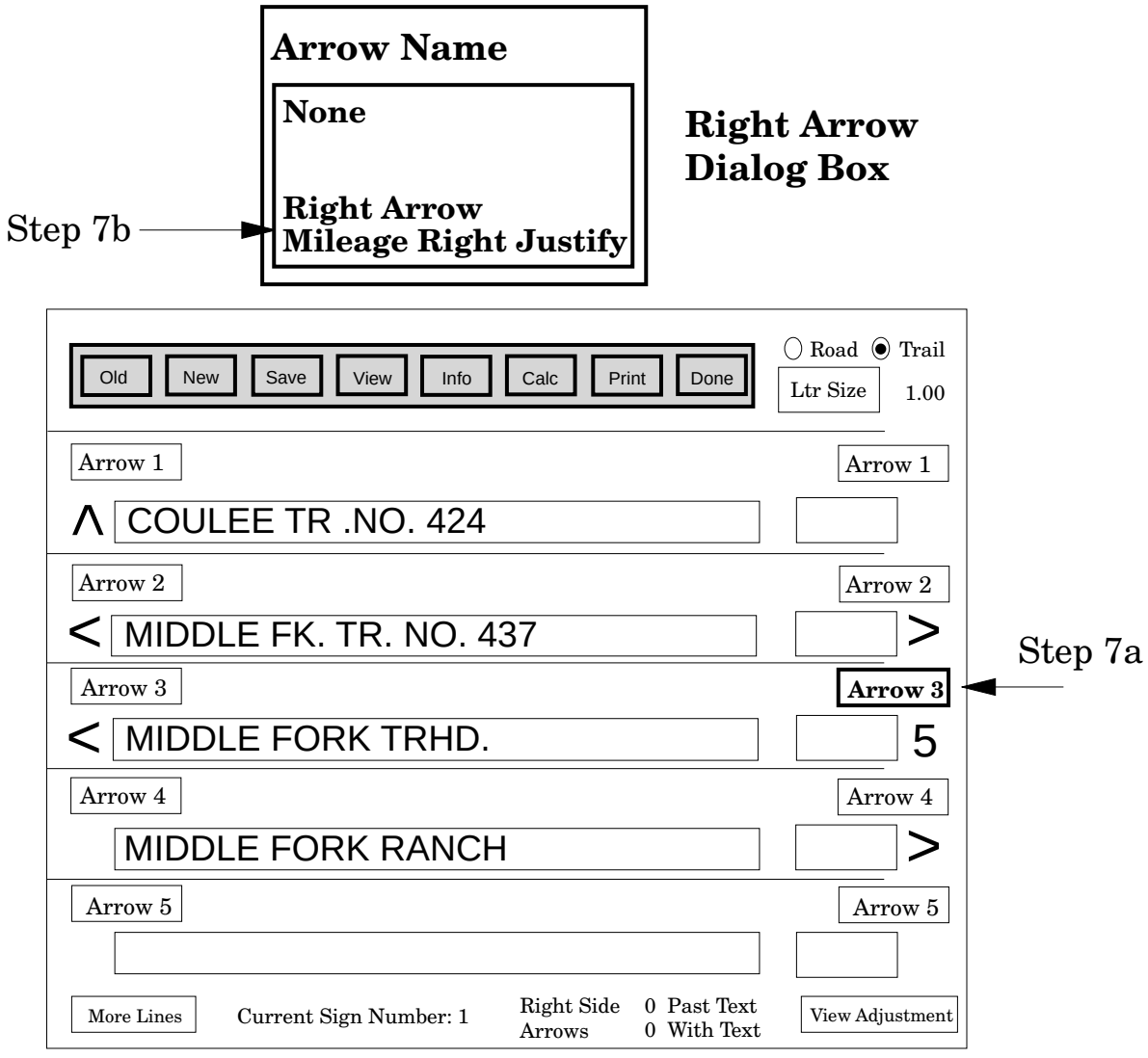
Step 1	From the Sign Design Screen, select the **NEW Button** from the **Program Button Bar**. The program will assign a sequential sign number to the sign being designed. The current sign number is displayed at the bottom of the Sign Design Screen.
Step 2	Select **ROAD or TRAIL Button**. Road sign will default to 4 inch letters. Trail sign will default to 1 inch letters. Letter size is shown in inches to the right of the LETTER SIZE Button. Road or Trail selection will default to the one last used.
Step 3	Select **LETTER SIZE Button** if desired size is different from default value. Double click to make selection from scrolling numbers.
Step 4	Begin at first line of text entry blocks. Type in sign messages - capital letters only. Press ENTER after typing each line of text on the sign. The screen allows for 5 lines of text. If additional lines of text are needed, press ENTER after the fifth line to activate the **MORE LINES Button** in the lower left of the screen. Press button and enter text. Press Done to return to main screen. A total of 10 lines can be designed on a sign.



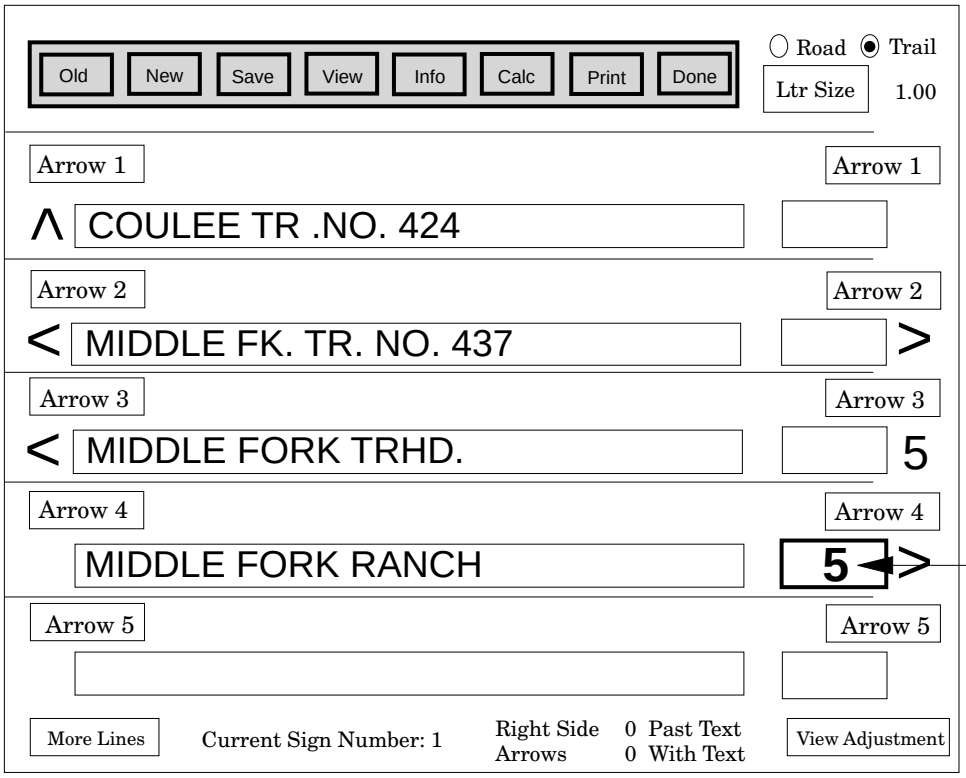
Step 5	**Left Arrow Selections:** First select the **LEFT ARROW Buttons** on the left side of the entry screen for each line of text needing a left arrow. An Arrow Dialog box will appear. Double Click on the appropriate selection. Arrow symbols will be displayed below the Arrow Buttons.
Step 6	**Right Arrow Selections:** After entering the left arrows, select the **RIGHT ARROW Buttons** on the right side of the entry screen using the mouse. Exception: when at trail "L" junctions as described in Chapter 2, select both left and right arrows on the first line before proceeding with next line. Depending on the sign design, right arrows may be aligned under the text of the longest line or past the text of the longest line. Select the **Right Side Arrows PAST TEXT or WITH TEXT** option at the bottom right of the screen.



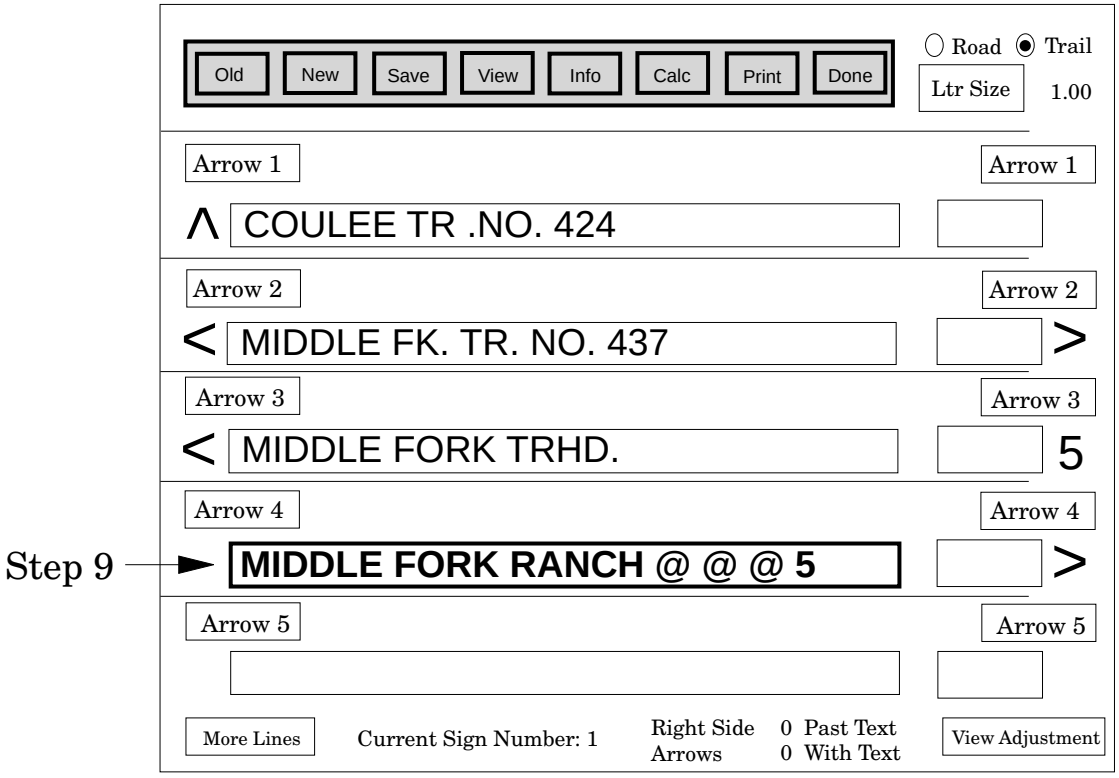
Step 7a	**Mileages with Right Arrows:** Mileages for up and left destinations may be aligned in the same column with the right arrows. Select the **RIGHT ARROW Button** on the right side of the entry screen for line 3 using the mouse. (Notice that when the Right Arrow Dialog box appears, there are limited arrow options due to the fact that the right arrow was selected in line 2. This selection eliminated the Up/Right , Override Up and Slanted Arrows from further selection as this would violate the arrow sequence rules.)
Step 7b	Select the **Mileage Right Justify** option from the Right Arrow Dialog Box. The user is asked to "Enter the mileage you wish to right justify." Press ENTER after inputting the mileage figure. The number will appear in the space below the Right Arrow Button.



Step 8	**Mileages before Right Arrows:** Mileages for all destinations may be aligned in a single column before the right arrows. Select the **MILEAGE ENTRY BLOCK** on the right side of the entry screen for line 4. Type in the mileage figure and press ENTER.



Step 9	**Mileages with text:** Mileages for any destination may be entered with the line of text. Use the character "@" for spacing the mileage number over to its placement in the line of text. These characters will not show when printing. Remember - on trail signs - mileage is not to be in the same column as the trail numbers. Note that in this example, line 4 does not have a left arrow and will be left justified under the arrows in the previous lines. Therefore additional space was required to avoid placing the mileage figure under the trail numbers. The View Screen will show this adjustment.



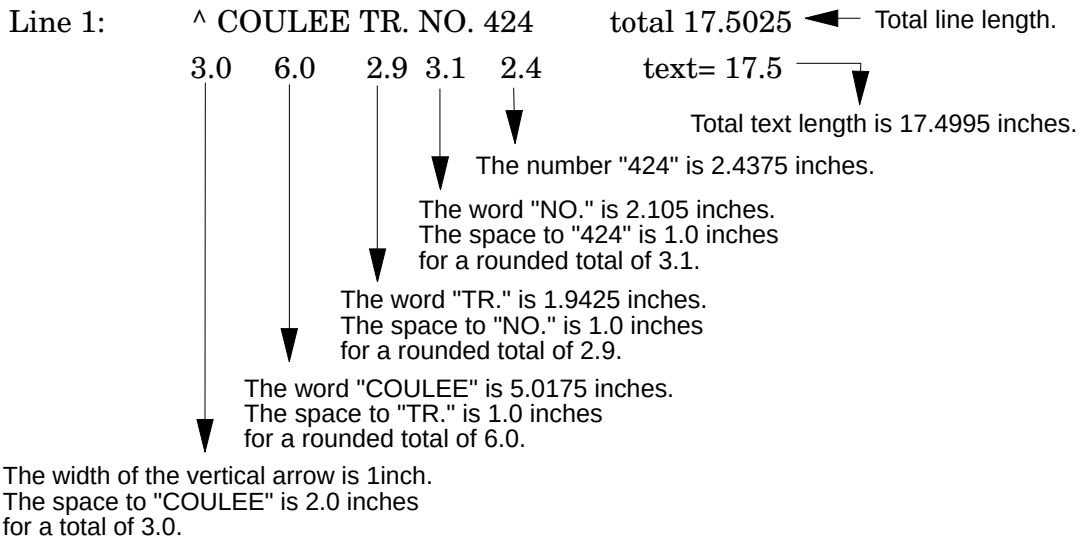
Step 10	**Calculation Screen:** After completing the sign message, arrows and mileages, select the **CALC Button** from the **Program Button Bar**. This will calculate all the measurements for the sign message and determine the final dimensions with all margins. Calculations are carried out to four decimal places although only the first is shown on the dimension lines. Therefore, the total may be higher than the sum of the individual numbers using only the one decimal place. Click anywhere on the Calculation Screen to return to the Sign Design Screen. **The calculation must be performed before printing.**

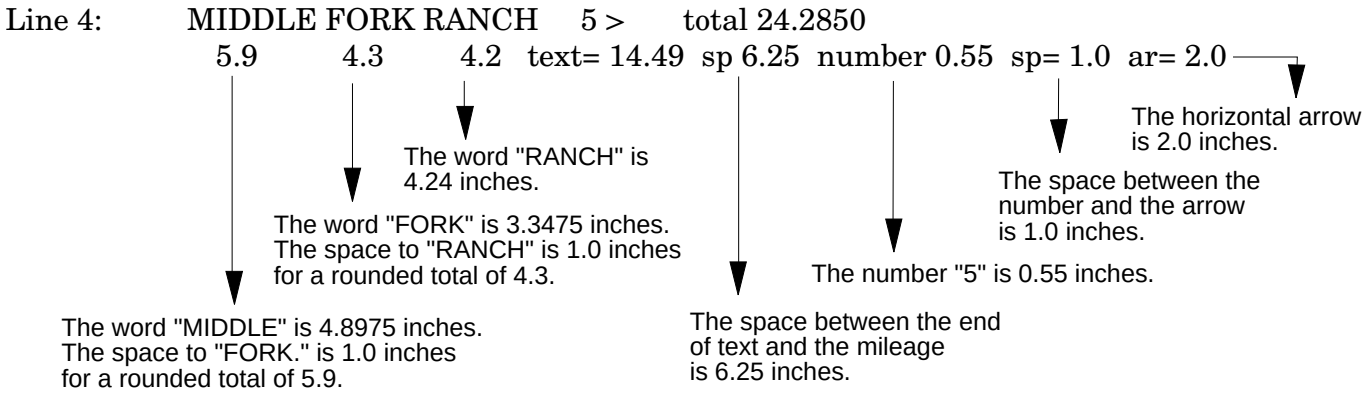
```
^ COULEE TR. NO. 424
< MIDDLE FK. TR. NO. 437   >
< MIDDLE FORK TRHD.         5
MIDDLE FORK RANCH       5 >
```

```
^ COULEE TR. NO. 424         total: 17.5025
  3.0   6.0   2.9   3.1   2.4 text = 17.5
< MIDDLE FK. TR. NO. 437  >    total: 23.7275
  3.0   5.9   2.9   2.9   3.1   2.4 text = 20.18  sp= 0.55 sp= 1.0 ar= 2.0
< MIDDLE FORK TRHD.    5    total: 23.7325
  3.0   5.9   4.3   3.9   text= 17.12 sp=3.61 sp=2.45 ar=0.55
MIDDLE FORK RANCH    5 >    total: 24.2850
  5.9   4.3   4.2   text= 14.49 sp= 6.25 num=0.55 sp= 1.0 ar= 2.0

The size of the sign is: 29 by 11   Letter Size: 1.0
Sign Handbook Number: TD-4-1
Recommended number of sign posts: 1
```

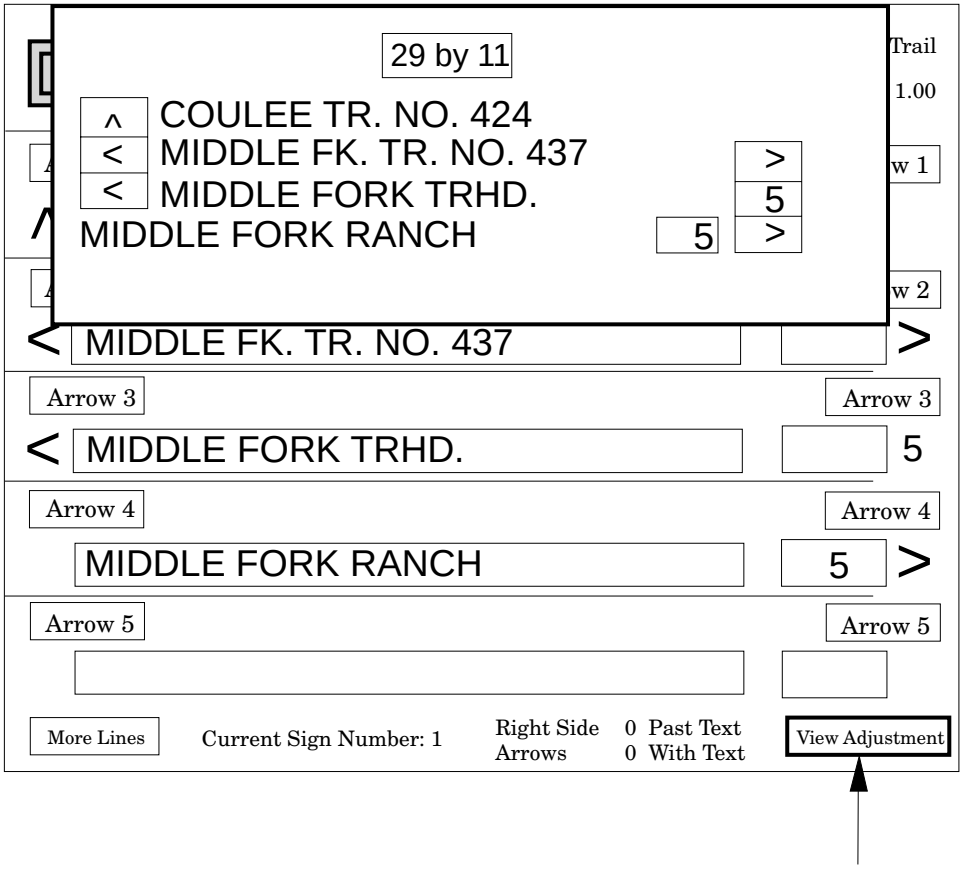
Understanding dimensioning is important in designing signs. Using the Program Conventions in Chapter 1, lets look at some of the line measurements in detail. This sign has 1-inch letters so all calculations are based on trail conventions for 1-inch letters.



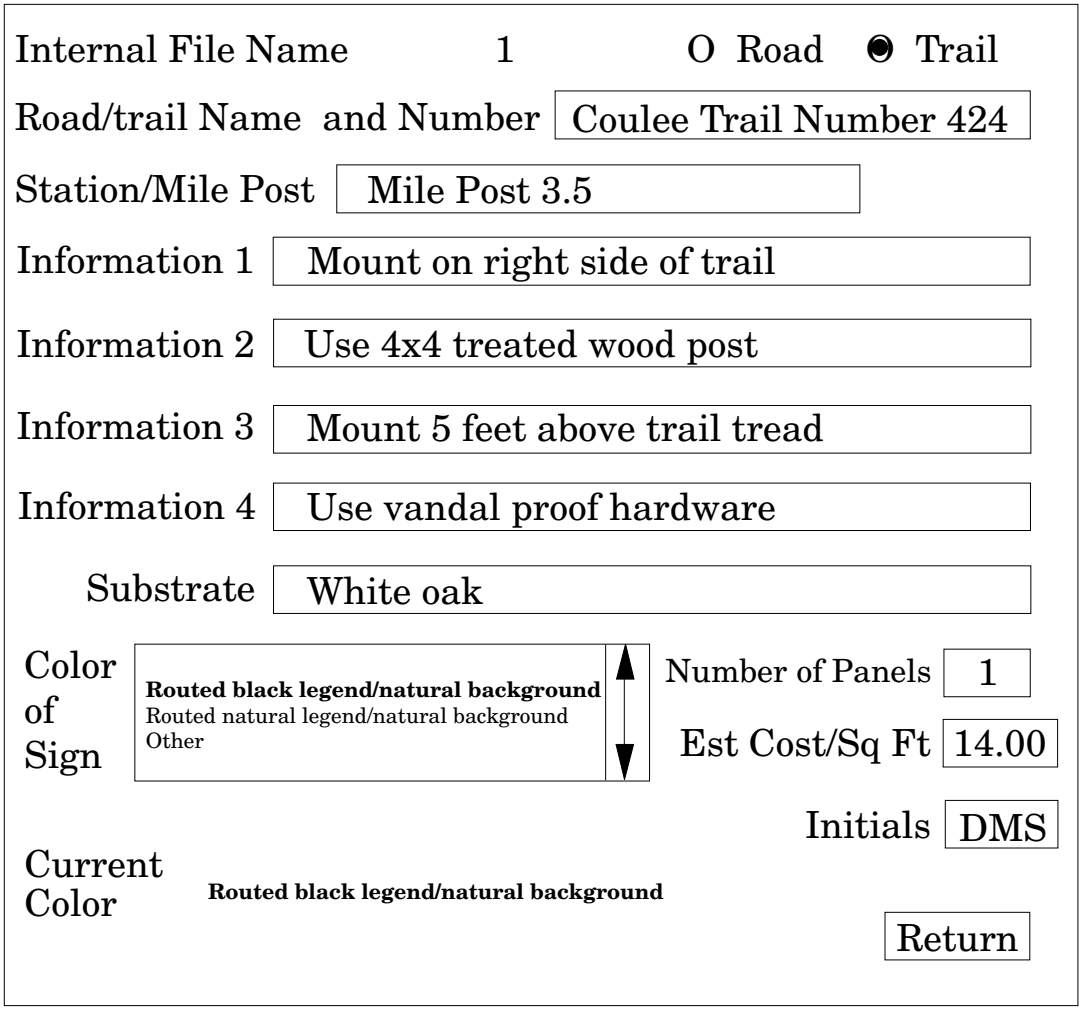


For further study, refer to the "Standard Alphabets for Highway Signs", FHWA, 1966 Edition, page 26, which lists all of the letter and numeral widths and space requirements used in the above calculations.

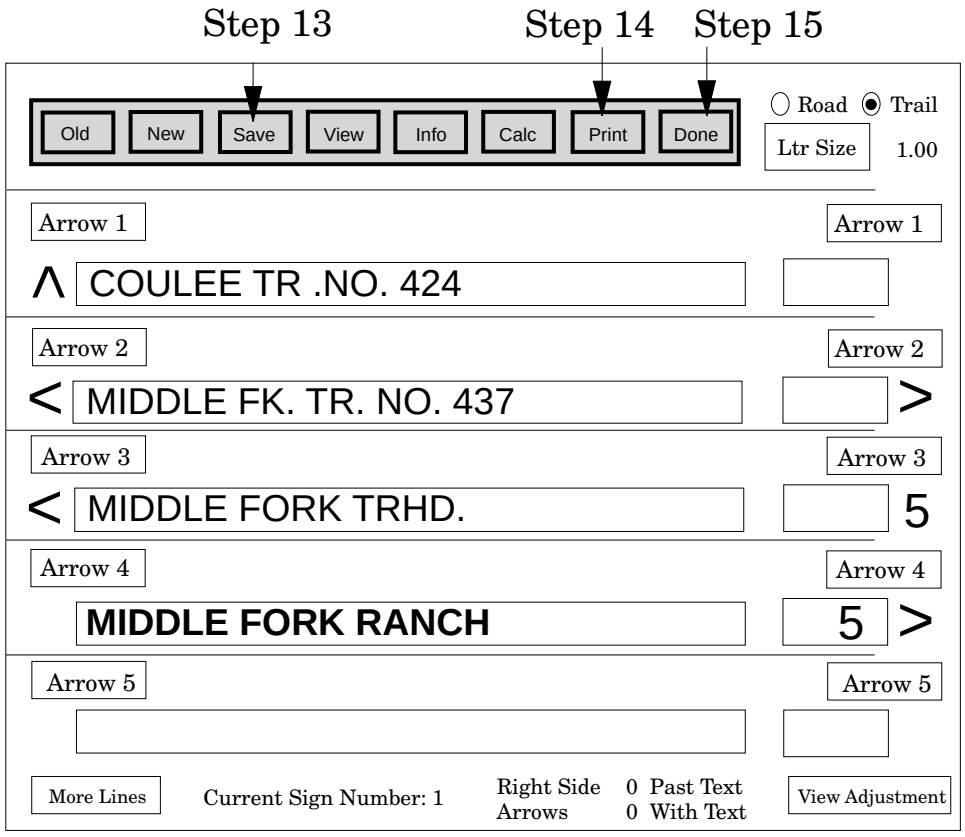
Step 11	**View Screen:** After calculating all the measurements and final dimensions for the sign, select the **VIEW button** from the **Program Button Bar** for a precise view of the final layout. Readjust or change the message as necessary until the desired result is obtained. If the right arrows or mileage column appear too close to or too far from the text, the view may be adjusted without affecting the measurements. Double click on the **VIEW ADJUSTMENT button** in the lower right side of the screen and double click on the number selected from the scrolling list of values. Minus numbers will move the mileage and arrow columns closer to the text; positive numbers will move them farther away from the text. Click on VIEW to see the results again. Click anywhere on the screen to return to the Sign Design Screen.



Step 12	**Info Screen:** After the sign is designed, additional information may be added about the sign including its location and material. Select the **INFO Button** from the **Program Button Bar** and enter any of the desired optional information. Use ENTER to move through the fields. Sign Color has a list of values. Use ENTER or single click on the ".f."to activate the list and double click on the selected color. Click on the **RETURN Button** to move back to the Sign Design Screen. **The Info Screen must be activated to print.**



Step 13	After completing the sign design, select the **SAVE Button** from the **Program Button Bar**. This will commit the sign to the file and make it available for future use.
Step 14	To print the sign, select the **PRINT Button** from the **Program Button Bar**. A sample print layout is shown in Figure 4.1 on page 20. **Remember - Info and Calculation Screens must have been activated in order to print.**
Step 15	If all sign designs are completed, select the **DONE button** from the **Program Button Bar** to exit the program.
Step 16	To do another sign, go back to Step 1. Road or Trail selection and letter size will default to the one used for the previous sign.



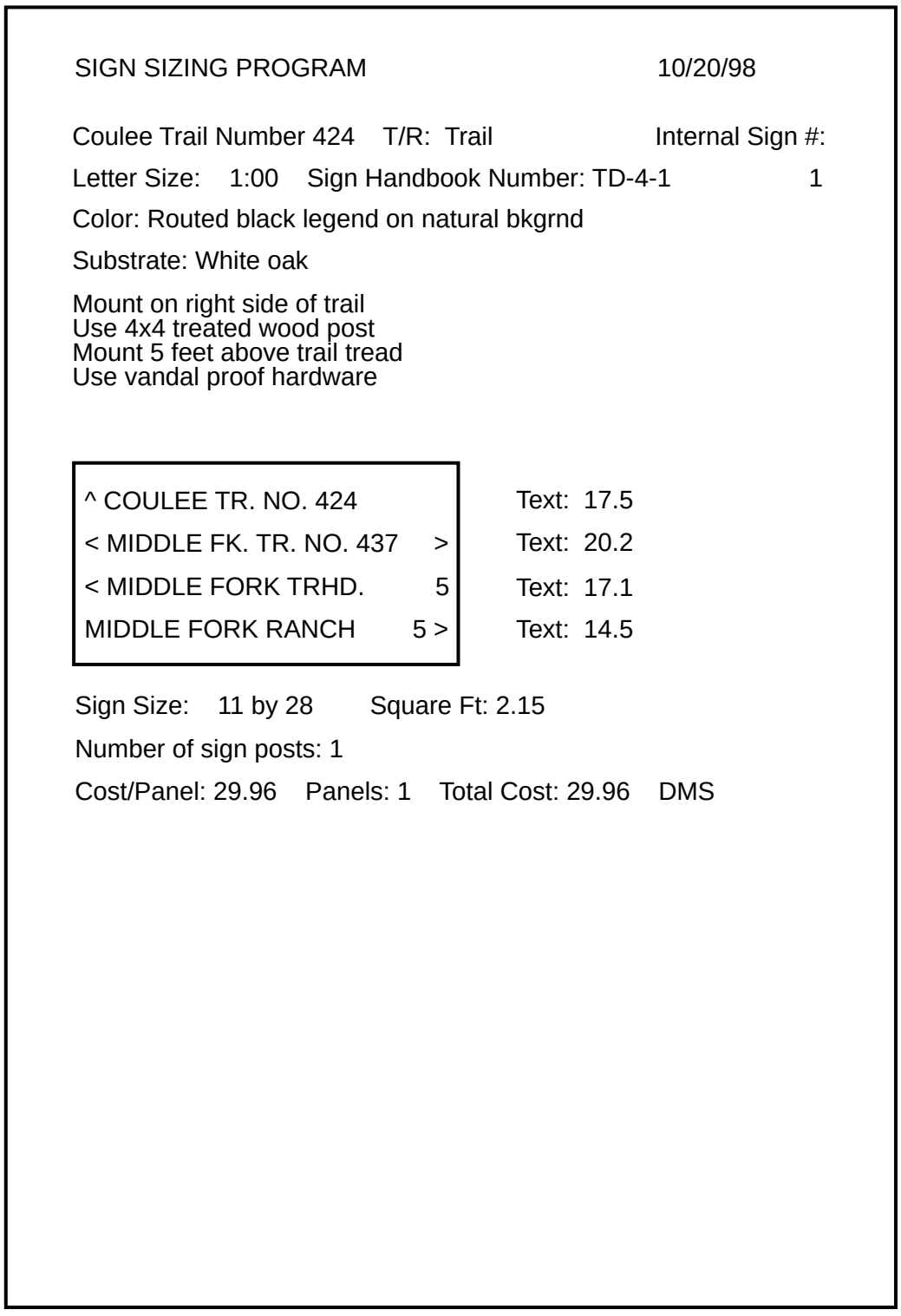
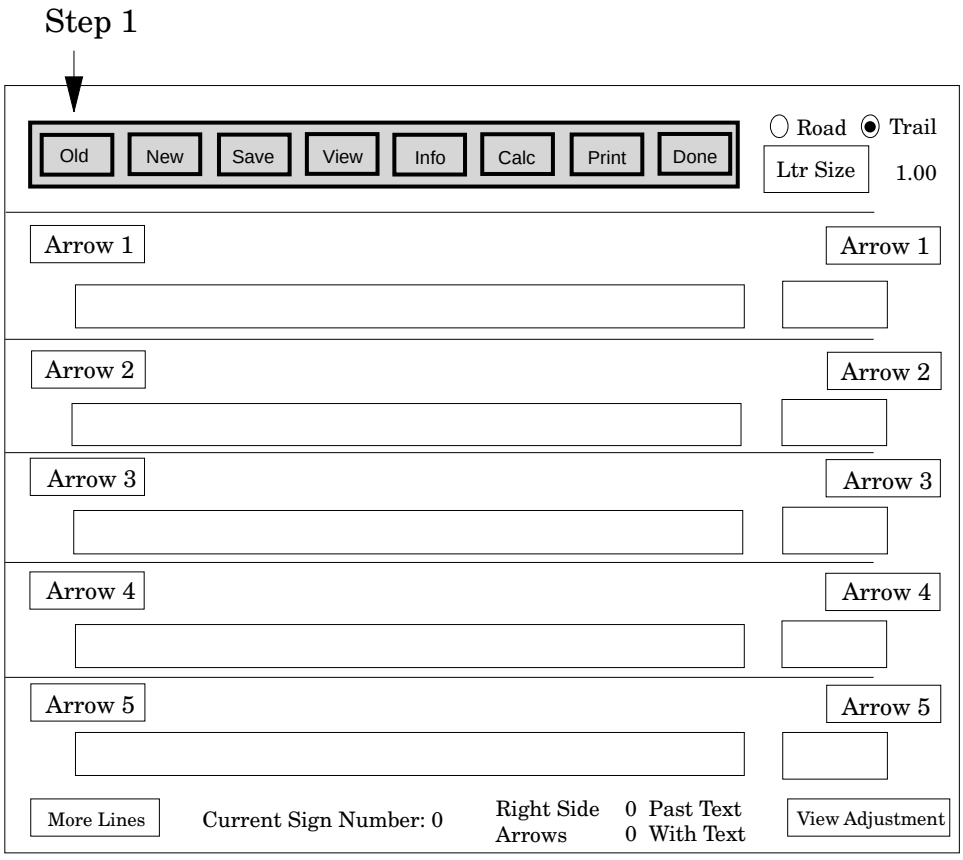
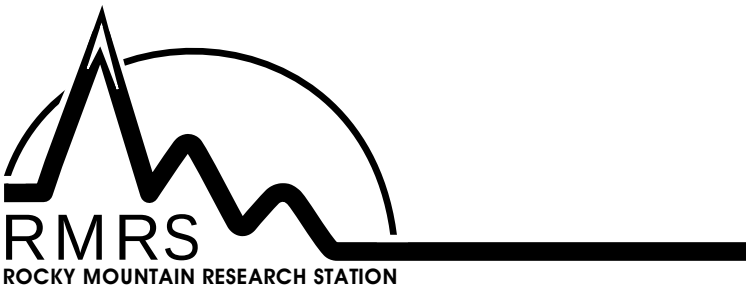


Figure 4.1—The Print Layout

Exercise 2—Modifying an Existing Sign

Step 1	Select the **OLD Button** from **Program Button Bar**. The program will search for an existing sign under three options.
Step 1a	**Option 1: Name/Number Search.** The program will search for the sign based on the information contained within the **Road/Trail Name and Number field** in the **INFO Screen**. Any number of signs may be assigned the same identifier and the search will locate all of the signs. Enter the parameters of the search criteria and press ENTER.
Step 1b	**Option 2: Internal Number.** The program provides a sequential numbered list of all the signs contained in the file along with the first line of text. Double click on the selected sign from the scrolling field.
Step 1c	**Option 3: Next Sign.** The program will select the sign that follows the existing sign being viewed.
Step 2	Make any desired changes to any of the sign fields. Use the same steps for designing a new sign. Press CALC before viewing even if no changes are made. Changes may be saved to the existing file or as a new sign.





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