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# CONVERT: A program to evaluate hardwood sawmill conversion efficiency

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# CONVERT

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## User's Manual

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### DISCLAIMER

This software develops estimates of conversion efficiency that are believed to be accurate. However, the authors are not responsible for estimates made by users of the software.

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# CONVERT

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## User's Manual

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### 1. Introduction

CONVERT is a computer program that allows users to evaluate the conversion efficiency of hardwood sawmills. Users can consider six factors that influence conversion efficiency. Four of the factors reflect characteristics of hardwood sawmill machines: headrig kerf, headrig type, resaw kerf, and rough green size. The other factors reflect characteristics of the mill's raw material inputs: average log length and average log diameter.

CONVERT is based on regression equations developed using Sawmill Improvement Program data (Wade et al., 1992). Conversion efficiency changes are calculated as percentage changes in lumber recovery factor — the board feet of lumber recovered per cubic foot of log input.

CONVERT allows a user to estimate how a hardwood sawmill's conversion efficiency will be affected by changes in the above factors. The program therefore helps determine effective methods to improve current conversion efficiency, potential benefits of improved machine characteristics, and potential effects of changes in log size.

CONVERT is PC-based and requires no prior computer knowledge. This manual provides step-by-step instructions on how to install and run the program.

### 2. Program Requirements

CONVERT will run on any IBM PC, XT, AT, PS/2, or 100 percent compatible computer running on DOS 3.0 or higher with at least one disk drive. The program is written in Microsoft BASIC version 7.1 (Microsoft Corp., 1989).

Printouts of the results may be obtained after running CONVERT. Any IBM-compatible dot matrix or laserjet printer defined as LPT1 may be used.

### 3. Installing CONVERT

CONVERT can be run directly from a floppy diskette, or it can be installed on the user's hard drive.

To install CONVERT on the hard drive, insert the CONVERT diskette in drive A.; type **COPY A:CONVERT.EXE C:**; and press the enter key. This command assumes that drive C: is the hard drive. For machines with hard drives designated other than C:, the drive letter of the hard drive should be substituted in the above command.

### 4. Program Control Commands

The screens that prompt for input data have a command line at the bottom of the screen. This command line shows the commands that are available while the screen is displayed. All possible commands are listed below:

<ENTER> - Enter Data:

Enter the previously-typed data

<Esc> - Escape to DOS:

Allows user to exit the program and return to DOS

<↑> - Up Arrow:

Moves cursor to the previous input line

<↓> - Down Arrow:

Moves cursor to the next input line

<PgDn> - Page Down:

Allows user to advance to the next input screen

<PgUp> - Page Up:

Allows user to go to the previous input screen

### 5. Data Gathering

Before running CONVERT, it may be convenient to summarize the required data on the Advance Data Worksheet shown in Appendix A. This assures that all data required to run CONVERT are available prior to program execution.

### 6. Sample Run

The following sample run uses hypothetical input

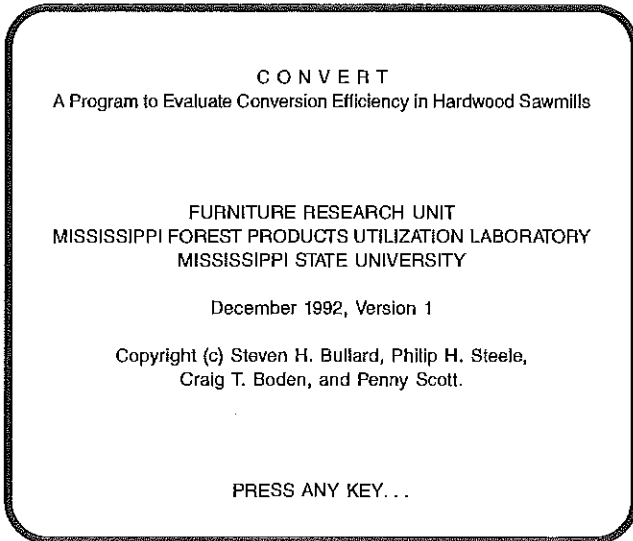


Figure 1. Title Screen.

data to show the steps for entering data and obtaining results. This sample run is based on an assumed reduction in resaw kerf from 0.201 inch to 0.160 inch and in rough green size from 1.220 to 1.125 inches for 4/4 lumber; from 1.720 to 1.625 inches for 6/4 lumber, and from 2.220 to 2.125 inches for 8/4 lumber. Other machine and raw material variables are not changed in this example.

To begin the program, type CONVERT and press <ENTER> at a DOS prompt on the drive in which CONVERT.EXE resides. The first screen to appear is the title screen (Figure 1) which gives the title of the program and other relevant information. To advance

the program to the PLANT IDENTIFICATION MENU screen (Figure 2), press any key.

**PLANT IDENTIFICATION MENU.** The PLANT IDENTIFICATION MENU (Figure 2) allows the user to enter information that identifies the plant. Although not required, it is recommended that this information be given. For this sample run, enter the plant information shown in Figure 2. After the data have been entered, press the <PgDn> key to advance to the VARIABLE INPUT MENU screen.

**VARIABLE INPUT MENU.** The VARIABLE INPUT MENU screen (Figure 3) allows the user to enter both *current* and *new* values for the following variables: (1) headrig kerf, (2) headrig type, (3) average log diameter, and (4) average log length.

**Headrig kerf.** Headrig kerf is measured in inches. To enter a value for headrig kerf, type the value and press <ENTER>. If the value is valid (see valid variable ranges in Appendix A), CONVERT will advance to the next variable.

**Headrig type.** To specify headrig type, enter **b** for band headrig or **c** for circular headrig.

**Log diameter.** Average log diameter is measured in inches at the log's small end.

**Log length.** Average log length is measured in feet.

For each of the variables above, enter the example data shown in Figure 3. After the data have been entered, press the <PgDn> key to advance to the RESAW KERF screen.

**RESAW KERF.** The first RESAW KERF screen (Figure 4) asks the user if he or she wishes to change the current resaw kerf. If the user's response is "y," the program will advance to the second RESAW

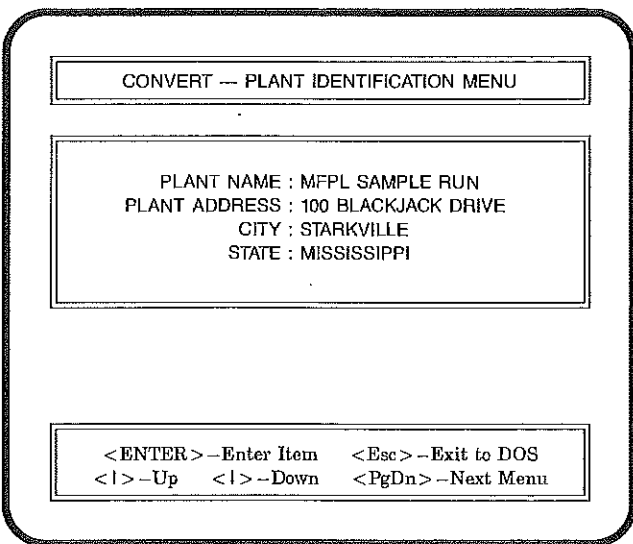


Figure 2. PLANT IDENTIFICATION MENU Screen.

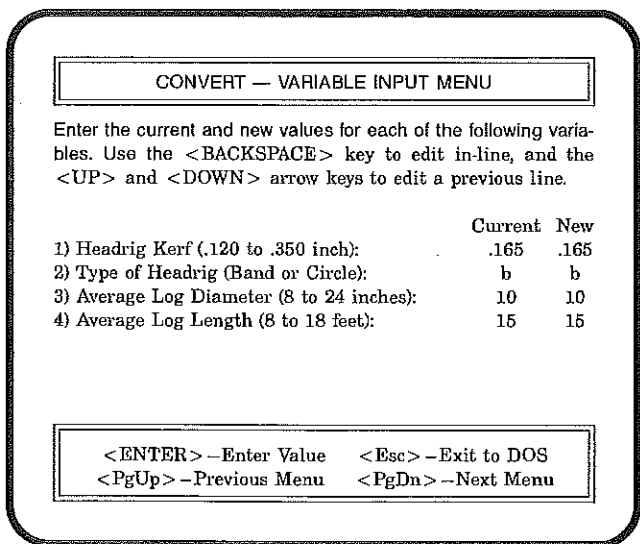


Figure 3. VARIABLE INPUT MENU Screen.

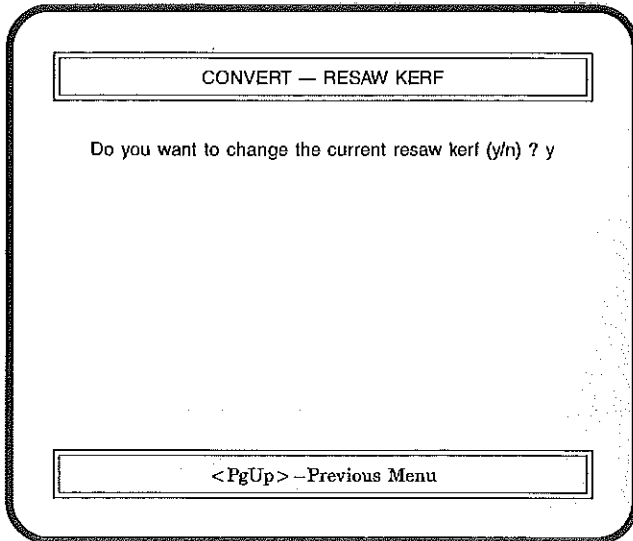


Figure 4. First RESAW KERF Screen.

KERF screen. If the user's response is "n," the program will advance to the ROUGH GREEN SIZE OPTION screen. For this sample run, enter "y."

The second RESAW KERF screen (Figure 5) allows the user to enter both current and new resaw kerf values. This screen also allows the user to enter the percentage of total production, the current rough green size, and the percentage of production processed through the resaw for each of the following standard thicknesses of hardwood lumber: 4/4, 5/4, 6/4, 7/4, and 8/4.

The percentage of total production by lumber thickness must add to 100%. The percentages of total production processed at the resaw can total to more

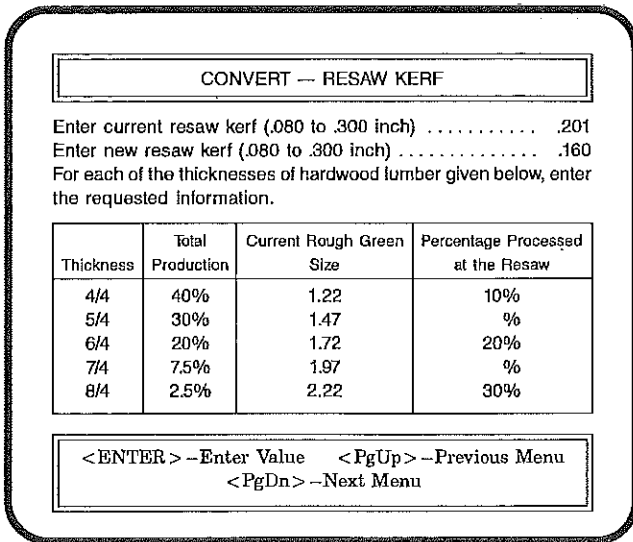


Figure 5. Second RESAW KERF Screen.

or less than 100%. For example, if 40% of the 4/4 and the 20% of the 6/4 lumber produced by the sawmill were both produced 100% at the resaw, the percentage would add to 200%. For this sample run, enter the data shown in Figure 5. After the data have been entered, press the <PgDn> key to advance to the ROUGH GREEN SIZE OPTION screen.

**ROUGH GREEN SIZE OPTION.** There are four options on the ROUGH GREEN SIZE OPTION screen (Figure 6). The first option allows the user to change the current rough green size for the resaw only. The second option allows the user to change the current rough green size for the headrig only. The third option allows the user to change the current rough green size for both the resaw and the headrig. The fourth option should be chosen if the user does not wish to change the current rough green size.

If the first, second, or third option is chosen, the program will advance to the ROUGH GREEN SIZE screen. If the fourth option is chosen, the program will advance to the END OF DATA ENTRY screen. For this sample run, choose the third option.

**ROUGH GREEN SIZE.** The ROUGH GREEN SIZE screen (Figure 7) asks the user for the new rough green size values. For this sample run, enter the new rough green size values given in Figure 7. After the data have been entered, press the <Pg Dn> key to advance to the END OF DATA ENTRY screen.

**END OF DATA ENTRY.** The END OF DATA ENTRY screen (Figure 8) allows the user to choose from three options: (1) compute conversion efficiency improvement, (2) go to the previous menu, or (3) view a summary of the changes made. For this sample run,

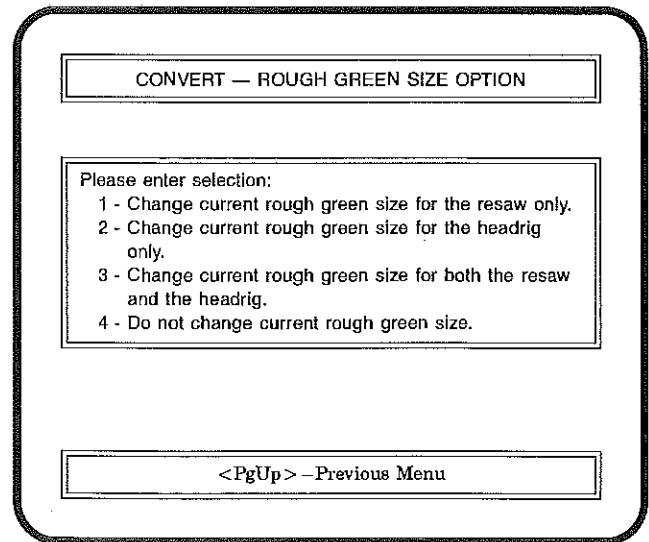


Figure 6. ROUGH GREEN SIZE OPTION Screen.

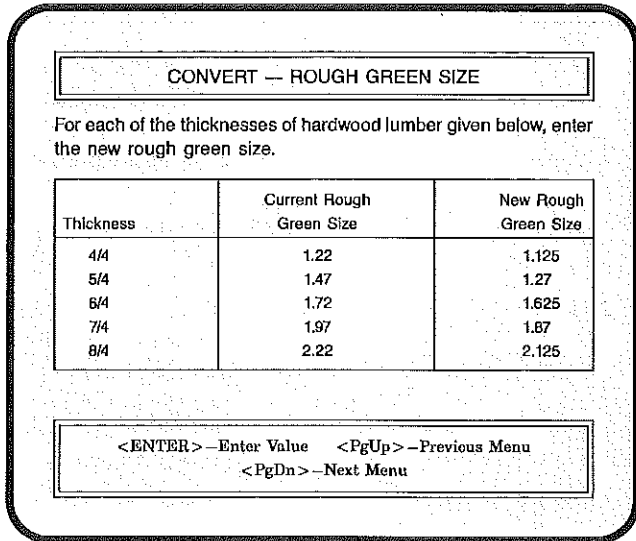


Figure 7. ROUGH GREEN SIZE Screen.

compute the conversion efficiency improvement by pressing the <PgDn> key. After the <PgDn> key is pressed the CONVERSION EFFICIENCY IMPROVEMENT RESULTS screen will appear.

**CONVERSION EFFICIENCY IMPROVEMENT RESULTS.** The CONVERSION EFFICIENCY IMPROVEMENT RESULTS (Figure 9) screen will give an estimate of the conversion efficiency improvement and a table summarizing the changes made throughout the program. As can be seen from Figure 9, the conversion efficiency improvement for this sample run is 8.90%.

In this screen, the user is asked if he or she would like to print the results. If a printer is connected to

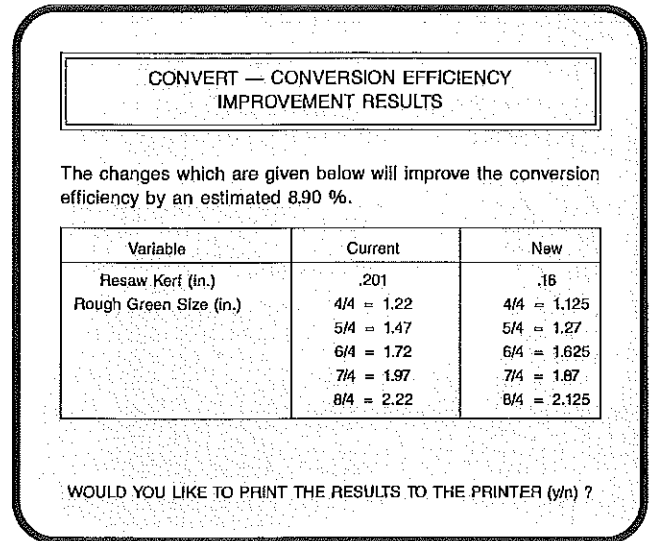


Figure 9. CONVERSION EFFICIENCY IMPROVEMENT RESULTS Screen.

your computer system, enter "y" to print the results. A sample printout of this run is given in Appendix B. If you choose not to print the results, then enter "n." Upon entering a valid response, the program will advance to the END OF PROGRAM screen.

**END OF PROGRAM.** The END OF PROGRAM screen (Figure 10) includes three options: (1) start over with new data – this choice will erase the current data and start the program over, (2) modify current data – this choice will start the program over while maintaining the current data, or (3) exit program – this choice allows the user to exit the program and return to DOS. For this run choose the option you desire.

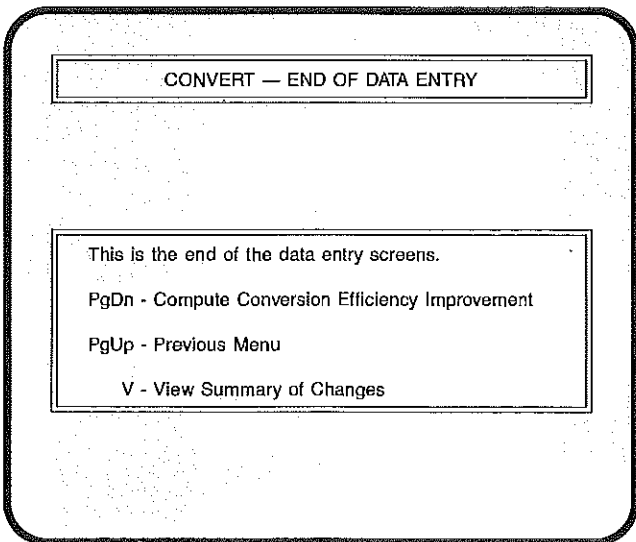


Figure 8. END OF DATA ENTRY Screen.

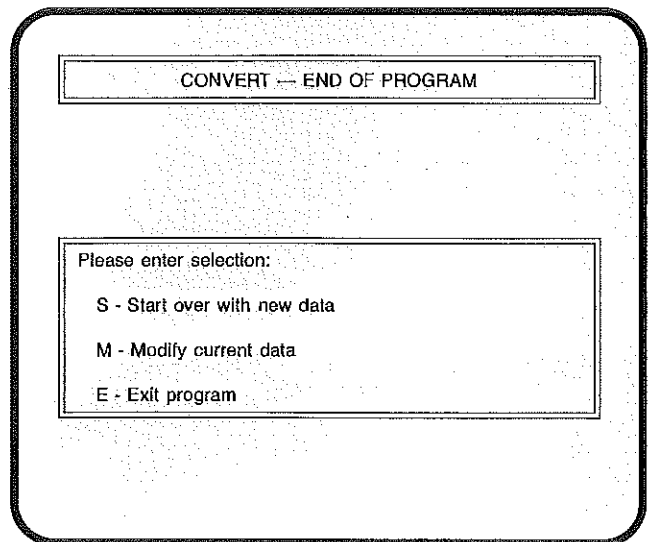


Figure 10. END OF PROGRAM Screen.

## **Literature Cited**

Microsoft Corp. 1989. Microsoft BASIC Professional Development System, Version 7.1. Redmond, WA.

Wade, M.W., S.H. Bullard, P.H. Steele, and P.A. Araman, 1992. Estimating Hardwood Sawmill Conversion Efficiency Based on Sawing Machine and Log Characteristics. Forest Prod. J. 42(11/12):21-26.

# **APPENDIX A**

## **Advance Data Worksheet**



# Advance Data Worksheet

| <u>Variable</u>           | <u>Valid Input Data</u> | <u>Current Value</u> | <u>New Value</u> |
|---------------------------|-------------------------|----------------------|------------------|
| Headrig Kerf(in.)         | .100 - .350             | _____                | _____            |
| Headrig Type              | b-band, c-circle        | _____                | _____            |
| Average Log Diameter(in.) | 8 - 24                  | _____                | _____            |
| Average Log Length(ft.)   | 8 - 18                  | _____                | _____            |
| Resaw Kerf(in.)           | .080 - .300             | _____                | _____            |

| <u>Thickness</u> | <u>Total Production (%)</u> | <u>Valid Range</u> |
|------------------|-----------------------------|--------------------|
| 4/4              | _____                       | 0 - 100            |
| 5/4              | _____                       | 0 - 100            |
| 6/4              | _____                       | 0 - 100            |
| 7/4              | _____                       | 0 - 100            |
| 8/4              | _____                       | 0 - 100            |

| <u>Thickness</u> | <u>Current Rough Green Size(in.)</u> | <u>Valid Range</u> |
|------------------|--------------------------------------|--------------------|
| 4/4              | _____                                | .1 - 1.25          |
| 5/4              | _____                                | .1 - 1.50          |
| 6/4              | _____                                | .1 - 1.75          |
| 7/4              | _____                                | .1 - 2.00          |
| 8/4              | _____                                | .1 - 2.25          |

| <u>Thickness</u> | <u>Percentage Processed at the Resaw (%)</u> | <u>Valid Range</u> |
|------------------|--|--------------------|
| 4/4              | _____  | 0 - 100            |
| 5/4              | _____  | 0 - 100            |
| 6/4              | _____  | 0 - 100            |
| 7/4              | _____  | 0 - 100            |
| 8/4              | _____  | 0 - 100            |

# **APPENDIX B**

## **Printout of Sample Run**

C O N V E R T

Today's date : 09-10-1992  
 Current time : 11:33:07

PLANT NAME : MFPL SAMPLE RUN  
 PLANT ADDRESS : 100 BLACKJACK ROAD  
 CITY : STARKVILLE  
 STATE : MISSISSIPPI

| Percentage Production<br>per Nominal Thickness | Rough Green Size<br>per Nominal Thickness (in.) |
|--|---|
| 4/4 ..... 40.00 %                              | 4/4 ..... 1.220                                 |
| 5/4 ..... 30.00 %                              | 5/4 ..... 1.270                                 |
| 6/4 ..... 20.00 %                              | 6/4 ..... 1.720                                 |
| 7/4 ..... 7.50 %                               | 7/4 ..... 1.870                                 |
| 8/4 ..... 2.50 %                               | 8/4 ..... 2.220                                 |

Summary of Changes

| Variable               | Current     | New         |
|------------------------|-------------|-------------|
| Resaw Kerf (in.)       | 0.2010      | 0.1600      |
| Rough Green Size (in.) | 4/4 = 1.220 | 4/4 = 1.125 |
|                        | 5/4 = 1.470 | 4/4 = 1.270 |
|                        | 6/4 = 1.720 | 6/4 = 1.625 |
|                        | 7/4 = 1.970 | 7/4 = 1.870 |
|                        | 8/4 = 2.220 | 8/4 = 2.125 |

The improvement in Conversion Efficiency for the changes is 8.90 percent.