TIMBER PACK 1
For The HP-41

TIMBER   PACK   I

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CONTENTS

This Timber Pack has been developed to aid foresters in both the tally and board-foot volume computation of timber. This manual provides a description of the programs, revelant equations, user instructions, and a sample with a list of keystrokes required to run the programs.

The pack contains four programs. The first program aids you in storing your selected volume table. The second program allows you to use the HP 41 as a talley register. The third program computes board-foot volume automatically using a tally file and a volume table file. The fourth program computes board-foot volume using a volume table file as you enter a tally from tally sheets. Before using a program take time to read User Instructions Defined, and Program Usage.

The program pack requires the use of extended memory. The 41C requires a quad memory module, extra functions module, and one extended memory module. The 41CV requires extra functions module, and one extended memory module. The 41CX requires one extended memory module. An additional extended memory module is helpful, but not required. A printer is recommended, but not necessary.

The user should become familiar with the 41 Owner's Manual to gain a basic understanding of the 41 and its capacity as a handheld computer. It would be helpful for the user to also note the Owner's Manual on extended memory use and functions.

We hope The Timber Pack will be of assistance to you. We would appreciate your reactions to The Timber Pack and have provided a questionaire with a self-addressed envelope. Please take a few minutes to give your opinion on this program material. Your comments can increase the usefulness of our programs.

N O T E   N O T E   N O T E   N O T E   N O T E   N O T E

WHEN NO PRINTER IS ATTACHED, THE PROGRAM WILL PAUSE ABOUT TEN SECONDS FOR EACH DISPLAY. TO STOP OUTPUTS KEY (R/S). TO RE -START OUTPUTS KEY (R/S) AGAIN. TO SPEED UP OUTPUTS KEY ANY KEY EXCEPT (R/S).

TO ELIMINATE SINGLE TONES WHICH SOUND DURING VOLUME TABLE STORAGE AND PROGRAM OUTPUTS WITH NO PRINTER CLEAR FLAG 08

This program pack is large. We recommend you clear all programs
from the 41 before loading this program pack. The pack is
divided into two programs. The two are the control program and
the process program. The control program contains the file
management routine and executes the process program automatically.
The process program contains the four programs in the pack and
re-executes the control program after a volume table storage to
allow for a recall and after the recall to allow for any corrections
to the table.

Clear any key assignments you have made to keys which will be
used in running this program pack. The program pack operates in
the user mode and such key assignments will interfere in the
proper operation of the program pack.

The program pack uses 33 data storage registers. The program
automatically determines if at least 33 data storage registers
are available. If less than 33 data storage registers exist, the
program sets data storage register size to 33.

An attempt has been made in the programing of this pack to make
errors easy to correct without having to re-execute the program
pack. When the program recognizes an error keyed, a re-prompt
will appear. If an odd DBH was keyed, then the D? prompt would
appear again. If the wrong LOG for a particular DBH, then the
L? prompt would appear again. When you key a tally, the display
will show data keyed before it is entered. You can key (E) to
not enter and repeat the prompts or (R/S) to enter and continue.
Should the wrong file name be keyed for a name prompt, you can
re-key the file name and key (R/S) again. An error message will
appear in the display, when the wrong file name is keyed. The
program will not continue until a name which is valid is keyed.
The alpha keyboard does not go off immediately after a prompt
to allow for such a correction.

Two display choice prompts exist. The first is the program
choice prompt and the second is the file management choice
prompt. Press the (E) key to roll the display from one to the
other. Flag numbers 1 - 4 in the display indicate which
program is in use. Flag 0 indicates the conversion factor is
in use. The conversion factor "C/F" enables the use of a
representative sample plot cruise of a timber tract to estimate
the tract in its entirety.

Before using the program pack, you must store a volume table.
Use the Store Volume Table program to store a table. You will
then be ready to use the program pack. We recommend you use the
sample cruise made available to familiarize yourself with the
program pack.

The User Instructions are your step by step guide to running each program.

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY

STEP - gives the instruction step number.

INSTRUCTIONS - instructions and comments on running the program.

INPUT - specifies input data if required or alpha responses to question prompts.

FUNCTION - specifies the keys to be pressed after any needed input data has been keyed.

DISPLAY - specifies what will appear in the display as you run the program.

When the program prompts for an alpha response, the alpha keyboard is activated by the program. Refer to the back of the 41 for alpha key identifications. Always limit any alpha name prompts to 6 characters. You can key more than 6 characters but only the first 6 characters keyed will be used by the program.

(shift) signifies the gold shift key. When this appears, the gold shift key must be pressed before the next key is pressed.

To begin the program, press (XEQ) then press (ALPHA) then key in the program name and press (ALPHA) again. The program has now been initialized and is ready to be used.

KEYBOARD

DISPLAY		PRESS KEY
ST	STORE TALLY	A
	STORE VOLUME TABLE	a
RT	RECALL TALLY	B
	RECALL VOLUME TABLE	b
V	TALLY SHEETS TO VOLUME	C
	CORRECT TABLE ERRORS	c
TV	TALLY FILE TO VOLUME	D
↗	ROLL DISPLAY	E
	EX-MEM CONTENTS	e
S	SAVE FILE (cards)	A
	SAVE FILE (cassette)	a
L	LOAD FILE (cards)	B
	LOAD FILE (cassette)	b
P	PURGE FILE (ex-mem)	C
	PURGE FILE (cassette)	c
NC	CREATE NEW TALLY FILE	D
	CLEAR TALLY FILE	d
↗+	ROLL DISPLAY	E
	ADD 2 TALLY FILES	e
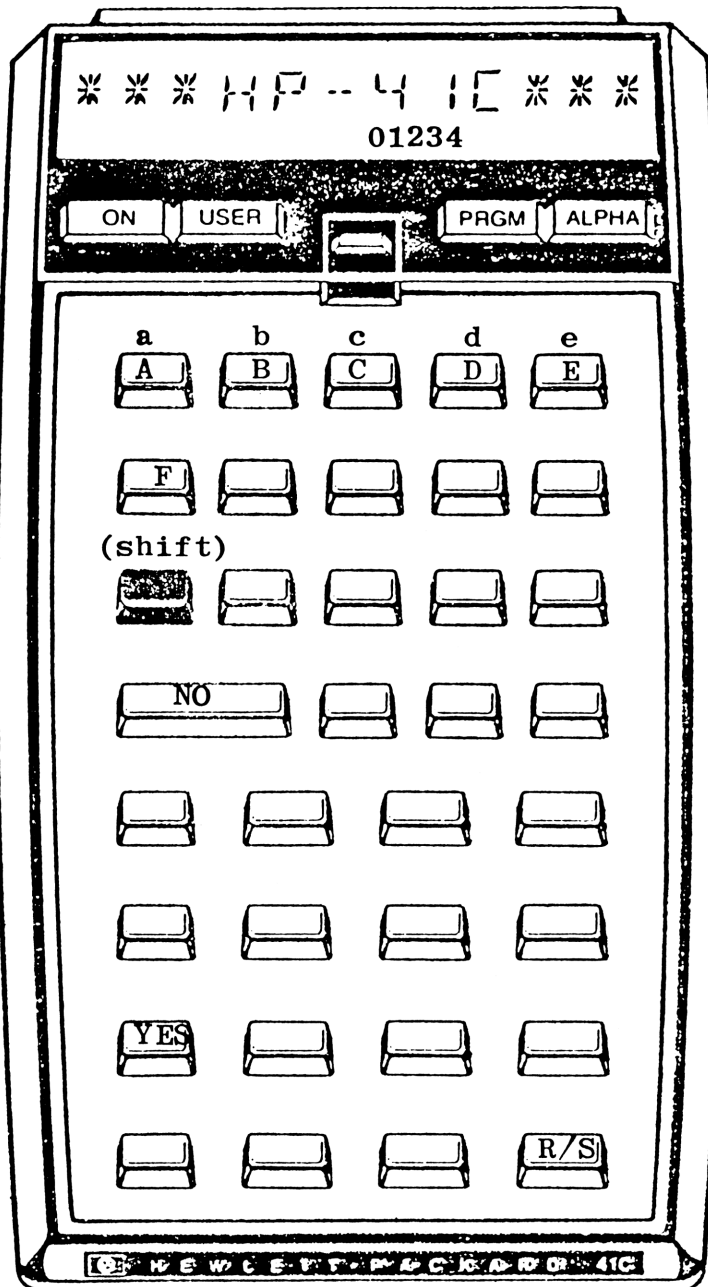
FLAGS

0 - conversion factor
1 - store tally
2 - recall tally
3 - tally sheets to volume
4 - tally file to volume

```
*** HP-41C ***
       01234
```

ON USER   PRGM ALPHA

a b c d e
A B C D E

F   (shift)

NO

YES

R/S

NEWLETT PACKARD 41C

SYSTEM CONFIGURATION

| 1QUAD | 2XFUNCT |
| 3XMEM | 4 |
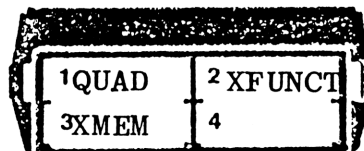
QUAD   - 41C
XFUNCT - 41C/CV
XMEM   - 41C/CV/CX

NOTE: "TPKC" executes "TPKP"

CARD

1 "TPKC" CONTROL PROGRAM 3 cards

"TPKP" PROCESS PROGRAM 5 cards 2
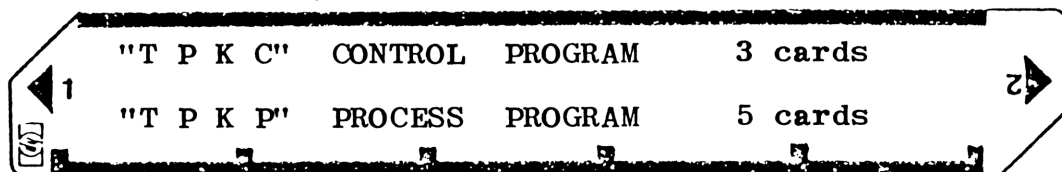
The File Management Routine allows the user to perform extended
memory functions and storage medium functions. The different
functions can be used any number of times to arrange files to
fit the user's need. Extended memory contents can be viewed
by rolling the display to program choices and keying (shift)(E).
The user can then return to the File Management Routine by
rolling the display back to File Management Routine. To roll
the display key (E).

SAVE FILE - transfers a file from extended memory to a medium.

LOAD FILE - transfers a file from a medium into extended memory.

PURGE FILE - removes a file from extended memory or medium. file
contents are lost. cards erase when used to store a file again,
unless the corners have been clipped.

CREATE NEW TALLY FILE - only tally files must be created. other
files, such as a volume table file, are created automatically
when needed. The same tally file can be used for more than one
cruise by being cleared after each use.

CLEAR TALLY FILE - clears the file. places '0' in all 147
registers. clear a tally file before using the same file again
unless you want the two tallies cumulative.

ADD TWO TALLY FILES - permits tally files to be totaled one at
a time to a total tally file. you can add several tally files,
you wish kept separate, to a total tally file for a total volume
computation. tally files can be moved in and out of extended
memory for this purpose.

The same file name is maintained when transferred into and from
extended memory. Files of the same name can exist in different
mediums but not in the same medium. The 'DUP FILE' error will
appear in the display and the existing file must be purged
before the new file of the same name can be transferred.

149 registers must exist in extended memory for each different
file to be placed in extended memory. 147 data registers and
2 registers for a file header used by the computer. The maximum
number of extended memory registers that can exist is 600.
Therefore only 4 different files can exist in extended memory, if
you have maximum extended memory capability.

Refer to the 'Error Messages' section of the Owner's Manual for
the extended memory and selected storage medium used for explanation
of error messages that appear in the display. To try and cover
all possible errors which might occur, would be to re-write the
manual.

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	LOAD "TPKC" CONTROL PROGRAM		(GOTO)(.)(.)	PACKING
2	LOAD "TPKP" PROCESS PROGRAM		(GOTO)(.)(.)	PACKING
3	INITIALIZE PROGRAM		(XEQ) "TPKC"	ST RT V TV ⤴
4	FOR EX-MEM CONTENTS & # EMPTY REGS		(shift)(E)	(files list) RM= ??? ST RT V TV ⤴
5	ROLL DISPLAY TO FILE MANAGEMENT		(E)	S L P NC ⤴+
6	PERFORM ANY NEEDED FILE FUNCTIONS			
a	SAVE FILE IN EX-MEM ON CARDS KEY IN FILE NAME FEED SIDES 1 & 2 OF 5 CARDS (write order # on each card)	NAME	(A) (R/S)	SV FL NM? RDY 1 OF 2 S L P NC ⤴+
b	SAVE FILE IN EX-MEM ON CASSETTE KEY IN FILE NAME	NAME	(shift)(A) (R/S)	SV FL NM? S L P NC ⤴+
c	LOAD FILE FROM CARDS INTO EX-MEM KEY IN FILE NAME FEED SIDES 1 & 2 OF 5 CARDS (feed in order by # on cards)	NAME	(B) (R/S)	LD FL NM? CARD S L P NC ⤴+
d	LOAD FILE FROM CASSETTE INTO EX-MEM KEY IN FILE NAME	NAME	(shift)(B) (R/S)	LD FL NM? S L P NC ⤴+
e	PURGE FILE FROM EX-MEM KEY IN FILE NAME	NAME	(C) (R/S)	PG FL NM? S L P NC ⤴+
f	PURGE FILE FROM CASSETTE KEY IN FILE NAME	NAME	(shift)(C) (R/S)	PG FL NM? S L P NC ⤴+
g	CREATE NEW TALLY FILE IN EX-MEM KEY IN FILE NAME	NAME	(D) (R/S)	NW TL FL NM? S L P NC ⤴+
h	CLEAR TALLY FILE IN EX-MEM KEY IN FILE NAME	NAME	(shift)(D) (R/S)	CL TL FL NM? S L P NC ⤴+
i	ADD TWO TALLY FILES IN EX-MEM KEY IN TOTAL FILE NAME KEY IN FILE NAME TO BE ADDED	NAME NAME	(shift)(E) (R/S) (R/S)	TOT FL NM? + FL NM? S L P NC ⤴+
7	ROLL DISPLAY TO PROGRAM CHOICES (go to the instruction steps for the selected program)		(E)	ST RT V TV ⤴

DISPLAY	KEYSTROKES
·XEQ ··TPKC··	(XEQ)(ALPHA) TPKC (ALPHA)
ST RT V TV ↑	PROGRAM CHOICES
XEQ ε	(shift)(E) VIEW EX-MEM CONTENTS
	EX-MEM FILE CONTENTS LISTED
RM= 64	NUMBER OF REGISTERS AVAILABLE IN EX-MEM
ST RT V TV ↑	PROGRAM CHOICES
XEQ E	(E) ROLL DISPLAY TO FILE MANAGEMENT CHOICES
S L P NC ↑+	FILE MANAGEMENT CHOICES
XEQ A	(A) SAVE FILE IN EX-MEM ON CARDS
SV FL NM?	FILE NAME PROMPT
VVV	(V)(V)(V)
RUN	(R/S)
RDY 1 OF 2	FEED CARDS PROMPT -sides 1 & 2 of 5 cards-
RDY 2 OF 2	
S L P NC ↑+	
XEQ B	(B) LOAD FILE INTO EX-MEM FROM CARDS
LD FL NM?	FILE NAME PROMPT
VVV	(V)(V)(V)
RUN	(R/S)
CARD	FEED CARDS PROMPT -sides 1 & 2 of 5 cards-
S L P NC ↑+	
XEQ C	(C) PURGE FILE FROM EX-MEM
PG FL NM?	FILE NAME PROMPT
DDD	(D)(D)(D)
RUN	(R/S)
S L P NC ↑+	
XEQ D	(D) CREATE A NEW TALLY FILE IN EX-MEM
NW TL FL NM?	FILE NAME PROMPT
CCC	(C)(C)(C)
RUN	(R/S)
S L P NC ↑+	
XEQ d	(shift)(D) CLEAR A TALLY FILE IN EX-MEM
CL TL FL NM?	FILE NAME PROMPT
CCC	(C)(C)(C)
RUN	(R/S)
S L P NC ↑+	
XEQ ε	(shift)(E) ADD TWO TALLY FILES
TOT FL NM?	FILE NAME PROMPT -total file or sum file-
DDD	(D)(D)(D)
RUN	(R/S)
+ FL NM?	FILE NAME PROMPT -file to be added -
CCC	
RUN	(R/S)
S L P NC ↑+	
XEQ E	(E) ROLL DISPLAY TO PROGRAM CHOICES
ST RT V TV ↑	

The Store Volume Table Program aids the user to quickly store a
selected volume table in extended memory. A volume table file
must exist in extended memory before any volume computations can
be made by the Tally Sheets To Volume or Tally File To Volume
Program.

Any volume table, listing board-foot volume by DBH and LOG, can
be stored. The program pack is designed to use even DBH with
both whole and half LOGS from 10"DBH-1 LOG to 40"DBH-6 LOG.

The volume table file requires 149 registers in extended memory.
If the registers do not exist in extended memory, sufficient
number of current files in extended memory must be purged to
create at least 149 registers for one volume table file. Use
file management step 6e to purge files and steps 6a or 6b to
save any current files before purged. The user will not create
a file with the file management routine. The program will
create the file when the selected file name is entered for the
volume table file.

The 41 sounds a tone for the volume prompts. The display shows
the storage register number and DBH-LOG class for each prompt.
Key in the volume for the same DBH-LOG class from your selected
table. Continue until storage is complete. Do not halt the
program, if you enter a volume in error. A correction routine
is available at the end of the program.

When the table is stored, the program returns to the control
program. The user can now correct any known errors, if storage
register number was noted, or make any and all corrections
after the volume table file is recalled for a complete check.

Use this program anytime you wish to store a volume table.
Several volume tables can be stored and maintained on a medium
for later use with the program pack. The file management routine
will allow you to save and load volume tables when needed.

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	LOAD "TPKC" CONTROL PROGRAM		(GOTO)(.)(.)	PACKING
2	LOAD "TPKP" PROCESS PROGRAM		(GOTO)(.)(.)	PACKING
3	INITIALIZE PROGRAM		(XEQ) "TPKC"	ST RT V TV↗
4	SELECT STORE VOLUME TABLE PROGRAM		(shift)(A)	VL TB FL NM?
5	KEY IN FILE NAME	NAME	(R/S)	R0 10-1.0=
6	KEY VOLUME FOR TREE SIZE DISPLAYED (if a volume does not exist in the table being stored for a tree size displayed key zero) (if a volume is keyed in error continue. a correction routine is available upon completion)	VOLUME	(R/S)	R1 10-1.5=
	REPEAT STEP 6 TO COMPLETE STORAGE			ST RT V TV↗
7	RECALL STORED TABLE TO VERIFY		(shift)(B)	VL TB FL NM?
8	KEY IN FILE NAME (program continues until entire table is recalled)	NAME	(R/S)	VL TB ?????? R0 10-1.0= ???? R1 10-1.5= ???? ST RT V TV↗
9	TO CORRECT ERRORS		(shift)(C)	R=
	KEY REGISTER # OF ERROR	REG. #	(R/S)	CR VL=
	KEY CORRECT VOLUME	VOLUME	(R/S)	ST RT V TV↗
	REPEAT THIS STEP FOR EACH CORRECTION (perform this step for volume table corrections only after storage and/or recall of a volume table)			

DISPLAY	KEYSTROKES
XEQ "TPKC"	(XEQ)(ALPHA) TPKC (ALPHA)
ST RT V TV ↑	PROGRAM CHOICES
XEQ a	(shift)(A)
VL TB FL NM?	FILE NAME PROMPT
VVV	(V)(V)(V)
RUN	(R/S)
R0 10-1.0=	VOLUME PROMPT
28 RUN	28 (R/S)
R1 10-1.5=	VOLUME PROMPT
36 RUN	36 (R/S)
R2 10-2.0=	
44 RUN	(continue until
R3 10-2.5=	table is stored)
48 RUN	
R4 10-3.0=	
52 RUN	
R5 12-1.0=	
47 RUN	
R6 12-1.5=	

DISPLAY	KEYSTROKES
ST RT V TV ↑	VOLUME TABLE STORED
XEQ b	(shift)(B)
VL TB FL NM?	FILE NAME PROMPT
VVV	(V)(V)(V)
RUN	(R/S)
VL TB	
VVV	(all table registers in
	file recalled)
R0	
10-1.0= 28	
R1	
10-1.5= 36	
R2	
10-2.0= 44	
R3	
10-2.5= 48	
R4	
10-3.0= 52	
R5	
12-1.0= 47	
R6	
	RECALL COMPLETE
ST RT V TV ↑	CORRECTIONS IF NEEDED
XEQ c	(shift)(C)
R=	REGISTER # OF ERROR PROMPT
0 RUN	0 (R/S)
CR VL=	CORRECT VOLUME PROMPT
82 RUN	82 (R/S)
ST RT V TV ↑	

The Talley Register Program allows the 41 to be used as a tally register in the woods. The 41 can take the place of cruise sheets, retaining the tally in a tally file in the extended memory module of the 41. The 41, after the tally is complete, can automatically compute the volume with totals and averages using a stored volume table.

Each tally file requires 149 registers in the 41's extended memory. If sufficient registers do not exist, use file management routine step 6e to make the registers available. You might want to save a file on cards or cassette, before you purge the file, with the save file steps 6a or 6b.

New tally files must first be created, using file management step 6g, before a tally can be stored. Tally files are the only files the user will create. Room is created in extended memory for other file operations by the program, when file names are entered. This occurs when a volume table is stored and when any file is transferred into extended memory from a storage medium. If registers do not exist in extended memory for a file operation, the program will not execute the function until sufficient number of files are purged from the extended memory to create the room. Always limit file names to 6 characters.

The same named tally file can be used any number of times, without creating a new tally file. Remember the tree totals are cumulative with each use, unless the file is cleared before each successive use. The file can be cleared with file management step 6h.

The program prompts first for the tally working file name. This is the tally file you intend to use to store a tally. This file must exist in extended memory. The program then prompts for DBH, LOG, and NUMBER of trees for this DBH-LOG class. Continue to enter the cruise until the tally is complete. You do not have to follow any order, with regard to DBH-LOG class. Each DBH-LOG class is treated separate, with like DBH-LOG classes totaled in same register. Several tally files can be maintained and later totaled using file management step 6i. Any number of tally files can be combined, with the addition of one file at a time to a separate total file. Step 6i must be repeated for each file added.

The 41 can be turned off and on during tally storage to save batteries. The display of D?, L?, and N? is maintained. This is unlike some programs which display of alpha data is lost.

The Tally Recall part of this program recalls a tally file with only tree totals and no volume computation.

To compute the volume of a tally file go to the Tally File To Volume Program.

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	LOAD "TPKC" CONTROL PROGRAM		(GOTO) (.) (.)	PACKING
2	LOAD "TPKP" PROCESS PROGRAM		(GOTO) (.) (.)	PACKING
3	INITIALIZE PROGRAM		(XEQ) "TPKC"	ST RT V TV↗
*4	SELECT TALLY REGISTER PROGRAM (go to step 5)		(A)	TL WK FL NM?
	OR SELECT TALLY RECALL PROGRAM (go to step 10)		(B)	TL FL NM?
5	KEY IN FILE NAME	NAME	(R/S)	D?
6	KEY DIAMETER OF TREE	DBH	(R/S)	L?
7	KEY # OF LOGS	LOGS	(R/S)	N?
8	KEY # OF TREES FOR THIS CLASS	TREES	(R/S)	??-?.?= ?
9	IF DISPLAY OF ENTERED DATA CORRECT (repeat steps 6-9 to store tally)		(R/S)	D?
	OR IF DISPLAY IS INCORRECT (go to step 6 and re-enter)		(E)	D?
10	KEY IN FILE NAME (program continues until entire tally file is recalled)	NAME	(R/S)	TL FL ??????
				D-L= ??.? T= ?
				T/T= ?
				FINALS
				F/T= ?
	* a data file must exist in extended memory. refer to the file management section and instruction steps			

DISPLAY				KEYSTROKES
	XEQ "TPKC"			(XEQ)(ALPHA) TPKC (ALPHA)
ST RT V TV ↑				PROGRAM CHOICES
		XEQ A		(A)
TL WK FL NM?				FILE NAME PROMPT
CCC				(C)(C)(C)
		RUN		(R/S)
D?				DBH PROMPT
	10.	RUN		10 (R/S)
L?				LOG PROMPT
	2.	RUN		2 (R/S)
N?				# TREES PROMPT
	33.	RUN		33 (R/S)
10-2.0= 33 ↑				ENTERED DATA
		RUN		(R/S)
D?				

TALLY RECALL

DISPLAY				KEYSTROKES
	XEQ "TPKC"			(XEQ)(ALPHA) TPKC (ALPHA)
ST RT V TV ↑				PROGRAM CHOICES
		XEQ B		(B)
TL FL NM?				FILE NAME PROMPT
CCC				(C)(C)(C)
		RUN		(R/S)
TL FL				
CCC				
D-L= 10-2.0				
T= 33.0				

ERRORS & CORRECTIONS

DISPLAY				KEYSTROKES
D?				
	10.	RUN		
L?				
	2.	RUN		
N?				
	53.	RUN		
10-2.0= 53 ↑				DISPLAY INCORRECT
		XEQ E		(E)
D?				RE-ENTER
D?				
	11.	RUN		DBH IN ERROR
D?				RE-PROMPT
	10.	RUN		
L?				
	5.	RUN		LOG IN ERROR
L?				RE-PROMPT
	2.	RUN		
N?				

The Tally Sheets To Volume Program computes the volume as the cruise is entered from tally sheets. Ouputs are generated as data is entered. No files are created.

Enter all LOG classes for each DBH class before going to the next DBH class. Entering the cruise in this order, the DBH class totals will reflect true data.

Key in DBH, LOG, and NUMBER of trees for the DBH-LOG class when prompted by the program. The program remains with the same DBH class until changed by keying (D). DBH class totals are printed for each DBH class change. When last DBH class is entered, key (F) for a final total output to include averages. Do not key (D) for last DBH class totals, as they are printed before the final totals and averages.

This program contains a conversion factor 'C/F'. The feature enables the user to estimate the volume of a entire timber tract by using a representative sample plot cruise. Note the example cruise where 8 acres were used to estimate timber volume for the entire 80 acres.

A volume table must exist in a volume table file in extended memory before this program can be used. Refer to the Store Volume Table Program.

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	LOAD "TPKC" CONTROL PROGRAM		(GOTO)(.)(.)	PACKING
2	LOAD "TPKP" PROCESS PROGRAM		(GOTO)(.)(.)	PACKING
3	INITIALIZE PROGRAM		(XEQ) "TPKC"	ST RT V TV ↗
*4	SELECT TALLY SHEETS TO VOLUME		(C)	C/F?
5	TO USE A CONVERSION FACTOR	Y	(R/S)	T/A?
	KEY TOTAL ACRES	ACRES	(R/S)	A/P?
	KEY ACRES PLOTTED	ACRES	(R/S)	VL TB FL NM?
	OR NO CONVERSION FACTOR	N	(R/S)	T/A?
	KEY TOTAL ACRES OR ZERO	ACRES	(R/S)	VL TB FL NM?
6	KEY IN FILE NAME	NAME	(R/S)	D?
7	KEY DIAMETER OF TREE	DBH	(R/S)	L?
8	KEY # OF LOGS	LOGS	(R/S)	N?
9	KEY # OF TREES FOR THIS CLASS	TREES	(R/S)	??-?.?= ?
10	IF DISPLAY OF ENTERED DATA CORRECT		(R/S)	D-L= ??-?.?
				L= ?.?
				T= ?
				C/F= ? **
				V= ?
				C/F= ? **
				L?
	OR IF DISPLAY IS INCORRECT		(E)	D?
	(go to step 7 and re-enter)			
11	FOR NEW DBH & DBH CLASS TOTALS		(D)	+++++++++++
				?? DBH TOTS
				T/L= ?.?
				T/T= ?
				C/F= ? **
				T/V= ?
				C/F= ? **
				============
	REPEAT STEPS 7-11 TO COMPUTE VOLUME			D?
12	FOR FINAL TOTALS & LAST DBH TOTALS		(F)	+++++++++++
				?? DBH TOTS
				(last dbh
				totals)
	* volume table must exist in extended memory. refer to store volume table section			FINALS
				F/L= ?.?
				F/T= ?
				C/F= ? **
	** will not display if no conversion factor is used			F/V= ?
				C/F= ? **
				%/C= ? **
	*** will not display if zero entered for total acres @ the (or) part of step 5			C/F= ? **
				A/L= ?.?
				A/D= ?
				A/V= ?
				A/V/A= ? ***
				L/TH/BF= ?

DISPLAY	KEYSTROKES
XEQ "TPKC"	(XEQ)(ALPHA) TPKC (ALPHA)
ST RT V TV ↑	PROGRAM CHOICES
XEQ C	(C)
C/F?	CONVERSION FACTOR
Y	(Y)
RUN	(R/S)
T/A?	TOTAL ACRES PROMPT
80. RUN	80 (R/S)
A/P?	ACRES PLOTTED PROMPT
8. RUN	8 (R/S)
VL TB FL NM?	FILE NAME PROMPT
VVV	(V)(V)(V)
RUN	(R/S)
D?	DBH PROMPT
10. RUN	10 (R/S)
L?	LOG PROMPT
2. RUN	2 (R/S)
N?	# OF TREES PROMPT
33. RUN	33 (R/S)
10-2.0= 33 ↑	ENTERED DATA
RUN	(R/S)
D-L= 10-2.0	DBH-LOGS CLASS
L= 66.0	LOGS
T= 33.0	TREES
C/F= 330.0	CONVERSION FACTOR
V= 1,452.0	VOLUME
C/F= 14,520.	CONVERSION FACTOR
0	
L?	LOG PROMPT SAME DBH
3.0 RUN	
N?	
5.0 RUN	
10-3.0= 5 ↑	
RUN	
D-L= 10-3.0	
L= 15.0	
T= 5.0	
C/F= 50.0	
V= 260.0	
C/F= 2,600.0	
L?	
XEQ D	NEW DBH
+++++++++++	
10 DBH TOTS	DBH CLASS TOTALS
T/L= 81.0	
T/T= 38.0	
C/F= 380.0	
T/V= 1,712.0	
C/F= 17,120.	
0	
============	
D?	NEW DBH PROMPT

The Tally File To Volume Program computes the volume of a tally
stored in a tally file in extended memory using a volume table
stored in extended memory. This program allows volume computation
of a tally stored, with the Tally Register Program, in the field
without re-entry.

Outputs are generated automatically after the tally file name
and volume table file name have been entered. The process
continues until the volume of the stored tally is computed to
include final totals and averages. A beep sounds as the final
outputs are being generated.

This program also contains a conversion factor "C/F" as explained
in the Tally Sheets To Volume Program.

A tally file and volume table file must exist in extended memory
before this program can be used. Refer to both the Store Volume
Table Program and the Tally Register Program.

The user may prefer storing a tally from tally sheets into a
tally file, using the Tally Register Program, then using this
program for volume computation instead of the Tally Sheets
To Volume Program.

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	LOAD "TPKC" CONTROL PROGRAM		(GOTO)(.)(.)	PACKING
2	LOAD "TPKP" PROCESS PROGRAM		(GOTO)(.)(.)	PACKING
3	INITIALIZE PROGRAM		(XEQ) "TPKC"	ST RT V TV⤴
*4	SELECT TALLY FILE TO VOLUME		(D)	C/F?
5	TO USE A CONVERSION FACTOR	Y	(R/S)	T/A?
	KEY TOTAL ACRES	ACRES	(R/S)	A/P?
	KEY ACRES PLOTTED	ACRES	(R/S)	VL TB FL NM?
	OR NO CONVERSION FACTOR	N	(R/S)	T/A?
	KEY TOTAL ACRES OR ZERO	ACRES	(R/S)	VL TB FL NM?
6	KEY IN FILE NAME	NAME	(R/S)	TL FL NM?
7	KEY IN FILE NAME	NAME	(R/S)	FILES
				VL TB
				?????
				TL FL
				?????
				D-L= ??-?.?
				L= ?
				T= ?
				C/F= ? **
				V= ?
				C/F= ? **
				+++++++++++
				?? DBH TOTS
				T/L= ?.?
				T/T= ?
				C/F= ? **
				T/V= ?
				C/F= ? **
				════════════
	* both a volume table file and a tally file must exist in extended memory. refer to volume table and tally storage sections			FINALS
				F/L= ?.?
				F/T= ?
				C/F= ? **
	** will not display if no conversion factor is used			F/V= ?
				C/F= ? **
				%/C= ? **
				C/F= ? **
	*** will not display if zero entered for total acres @ the (or) part of step 5			A/L= ?.?
				A/D= ?
				A/V= ?
				A/V/A= ? ***
				L/TH/BF= ?

DISPLAY	KEYSTROKES	23

```
    XEQ "TPKC"          (XEQ)(ALPHA) TPKC (ALPHA)
ST RT V TV ↑            PROGRAM CHOICES
          XEQ D         (D)
C/F?                    CONVERSION FACTOR
Y                       (Y)
           RUN          (R/S)
T/A?                    TOTAL ACRES PROMPT
   80.      RUN         80      (R/S)
A/P?                    ACRES PLOTTED PROMPT
    8.      RUN         8       (R/S)
VL TB FL NM?            FILE NAME PROMPT
VVV                     (V) (V) (V)
           RUN          (R/S)
TL FL NM?               FILE NAME PROMPT
CCC        ,            (C) (C) (C)
           RUN          (R/S)


FILES

VL TB                   VOLUME TABLE FILE NAME
VVV


TL FL                   TALLY FILE NAME
CCC


D-L= 10-2.0             DBH-LOG CLASS
L= 66.0                 LOGS
T= 33.0                 TREES
C/F= 330.0              CONVERSION FACTOR
V= 1,452.0              VOLUME
C/F= 14,520.            CONVERSION FACTOR
0

D-L= 10-3.0
L= 15.0
T= 5.0
C/F= 50.0
V= 260.0
C/F= 2,600.0

+++++++++++++
10 DBH TOTS             DBH CLASS TOTALS

T/L= 81.0
T/T= 38.0
C/F= 380.0
T/V= 1,712.0
C/F= 17,120.
0
=============
```

APPENDIX A

A/D	-average DBH
A/L	-average LOG
A/P	-acres plotted
A/V	-average volume
A/V/A	-average volume per acre
C/F	-conversion factor
CL TL FL NM	-clear tally file name
CR VL	-correct volume
D	-DBH
D-L	-DBH-LOG
F/L	-final logs
F/T	-final trees
F/V	-final volume
L	-LOGS
LD FL NM	-load file name
L/TH/BF	-logs per thousand board-feet
NW TL FL NM	-new tally file name
PG FL NM	-purge file name
R	-register
RM	-room
SV FL NM	-save file name
T	-trees
T/A	-total acres
T/L	-total logs
T/T	-total trees
T/V	-total volume
TL FL	-tally file
TL FL NM	-tally file name
TL WK FL NM	-tally working file name
TOT FL NM	-total file name
V	-volume
VL TB	-volume table
VL TB FL NM	-volume table file name
%/C	-percent cruise
+ FL NM	-plus file name

APPENDIX B

L	logs= # 16' logs X # trees in DBH-LOG class
T	trees= #trees in DBH-LOG class
V	volume= # trees in DBH-LOG class X volume
T/L	total logs= # 16' logs in DBH class
T/T	total trees= # trees in DBH class
T/V	total volume= total volume in DBH class
F/L	final logs= # 16' logs in all DBH classes
F/T	final trees= # trees in all DBH classes
F/V	final volume= total volume in all classes
%/C	percent cruise= acres plotted / total acres
C/F	conversion factor= $\dfrac{\text{total acres}}{\text{acres plotted}}$
A/L	average log= $\dfrac{\text{\# 16' logs in all DBH classes}}{\text{\# trees in all DBH classes}}$
A/D	average DBH= $\dfrac{\text{DBH X \# trees in each DBH class all classes totaled}}{\text{\# trees in all DBH classes}}$
A/V	average volume= $\dfrac{\text{total volume in all classes}}{\text{\# trees in all DBH classes}}$
A/V/A	average volume per acre= $\dfrac{\text{total volume}}{\text{total acres}}$
L/TH/BF	logs per 1,000 board-feet= $\dfrac{\text{total \# 16' logs}}{\text{toal volume}} / 1000$

TALLY CARD FOR ESTIMATING STANDING TIMBER

Date: April 17, 19 80   Species: Pine

Length = (feet)

DBH		1	2	3	totals
10	trees		33	5	38
10	volume		1452	260	1712
12	trees		16	53	69
12	volume		1200	5035	6235
14	trees		22	36	58
14	volume		2508	5256	7764
16	trees	1	14	28	43
16	volume	95	2226	5908	8229
18	trees		6	7	13
18	volume		1254	1960	3214
20	trees		1	1	2
20	volume		270	364	634
22	trees			1	1
22	volume			458	458

trees 224
volume 28246
logs 578
avg DBH 13.4
avg log 2.58
avg volume 126.10

Form Class: Scribner log rule form class 78
Landowner: Johnson Estate

---

5 CHAINS — 10 CHAINS — 5 CHAINS

1 CHAIN
2 CHAINS

N

40 CHAINS

80 ACRES

20 CHAINS

10 PERCENT CRUISE
1/5 ACRE PLOTS

FORM CLASS 78   56

TABLE 47.—*Gross volume of tree, Scribner log rule*

Tree diameter (inches)	VOLUME (board feet) BY NUMBER OF USABLE 16-FOOT LOGS										
	1	1½	2	2½	3	3½	4	4½	5	5½	6
10	28	36	44	48	52						
11	38	49	60	67	74						
12	47	61	75	85	95	100	106				
13	58	76	94	107	120	128	136				
14	69	92	114	130	146	156	166				
15	82	109	136	157	178	192	206				
16	95	127	159	185	211	229	247				
17	109	146	184	215	246	268	289				
18	123	166	209	244	280	306	331				
19	140	190	240	281	322	352	382				
20	157	214	270	317	364	396	432	459	486		
21	176	240	304	358	411	450	490	523	556		
22	194	266	328	398	456	504	549	588	626		
23	214	304	374	441	508	558	607	652	698		
24	234	322	409	464	568	611	665	718	770		
25	253	355	452	584	617	678	740	799	858		
26	281	368	494	565	676	745	814	880	945		
27	304	420	536	636	736	811	886	969	1,032		
28	327	452	578	666	795	969	1,040	1,120	1,190	1,261	
29	354	491	628	746	864	963	1,042	1,132	1,222	1,306	1,389
30	382	550	678	806	933	1,098	1,124	1,224	1,325	1,421	1,517
31	411	571	731	871	1,011	1,117	1,223	1,328	1,434	1,541	1,648
32	440	612	784	936	1,089	1,205	1,322	1,432	1,543	1,661	1,779
33	469	654	838	1,001	1,164	1,289	1,414	1,534	1,654	1,783	1,912
34	498	695	892	1,066	1,239	1,373	1,507	1,636	1,766	1,906	2,046
35	530	742	954	1,141	1,328	1,478	1,618	1,757	1,896	2,044	2,192
36	563	789	1,015	1,216	1,416	1,572	1,728	1,877	2,026	2,182	2,338
37	596	836	1,075	1,290	1,506	1,670	1,835	1,998	2,160	2,324	2,488
38	629	882	1,135	1,366	1,596	1,769	1,942	2,118	2,295	2,466	2,637
39	666	935	1,204	1,449	1,694	1,881	2,068	2,251	2,434	2,616	2,799
40	708	986	1,274	1,532	1,791	1,998	2,195	2,384	2,574	2,768	2,961

D-L= 10-2.0
L= 66.0
T= 33.0
C/F= 330.0
V= 1,452.0
C/F= 14,520.0

D-L= 10-3.0
L= 15.0
T= 5.0
C/F= 50.0
V= 260.0
C/F= 2,600.0

++++++++++++
10 DBH TOTS

T/L= 81.0
T/T= 38.0
C/F= 380.0
T/V= 1,712.0
C/F= 17,120.0
============

D-L= 12-2.0
L= 32.0
T= 16.0
C/F= 160.0
V= 1,200.0
C/F= 12,000.0

D-L= 12-3.0
L= 159.0
T= 53.0
C/F= 530.0
V= 5,035.0
C/F= 50,350.0

++++++++++++
12 DBH TOTS

T/L= 191.0
T/T= 69.0
C/F= 690.0
T/V= 6,235.0
C/F= 62,350.0
============

D-L= 14-2.0
L= 44.0
T= 22.0
C/F= 220.0
V= 2,508.0
C/F= 25,080.0

D-L= 14-3.0
L= 108.0
T= 36.0
C/F= 360.0
V= 5,256.0
C/F= 52,560.0

++++++++++++
14 DBH TOTS

T/L= 152.0
T/T= 58.0
C/F= 580.0
T/V= 7,764.0
C/F= 77,640.0
============

D-L= 16-1.0
L= 1.0
T= 1.0
C/F= 10.0
V= 95.0
C/F= 950.0

D-L= 16-2.0
L= 28.0
T= 14.0
C/F= 140.0
V= 2,226.0
C/F= 22,260.0

D-L= 16-3.0
L= 84.0
T= 28.0
C/F= 280.0
V= 5,908.0
C/F= 59,080.0

++++++++++++
16 DBH TOTS

T/L= 113.0
T/T= 43.0
C/F= 430.0
T/V= 8,229.0
C/F= 82,290.0
============

D-L= 18-2.0
L= 12.0
T= 6.0
C/F= 60.0
V= 1,254.0
C/F= 12,540.0

D-L= 18-3.0
L= 21.0
T= 7.0
C/F= 70.0
V= 1,960.0
C/F= 19,600.0

++++++++++++
18 DBH TOTS

T/L= 33.0
T/T= 13.0
C/F= 130.0
T/V= 3,214.0
C/F= 32,140.0
============

D-L= 20-2.0
L= 2.0
T= 1.0
C/F= 10.0
V= 270.0
C/F= 2,700.0

D-L= 20-3.0
L= 3.0
T= 1.0
C/F= 10.0
V= 364.0
C/F= 3,640.0

++++++++++++
20 DBH TOTS

T/L= 5.0
T/T= 2.0
C/F= 20.0
T/V= 634.0
C/F= 6,340.0
============

D-L= 22-3.0
L= 3.0
T= 1.0
C/F= 10.0
V= 458.0
C/F= 4,580.0

++++++++++++
22 DBH TOTS

T/L= 3.0
T/T= 1.0
C/F= 10.0
T/V= 458.0
C/F= 4,580.0
============

FINALS

F/L= 578.0
F/T= 224.0
C/F= 2,240.0
F/V= 28,246.0
C/F= 282,460.0

%/C= 10.00
C/F= 10.00

A/L= 2.58
A/D= 13.41
A/V= 126.10
A/V/A= 3,530.75

L/TH/BF= 20.46

D-L= 10-2.0
T= 33.0

D-L= 10-3.0
T= 5.0

T/T= 38.0
============

D-L= 12-2.0
T= 16.0

D-L= 12-3.0
T= 53.0

T/T= 69.0
============

D-L= 14-2.0
T= 22.0

D-L= 14-3.0
T= 36.0

T/T= 58.0
============

D-L= 16-1.0
T= 1.0

D-L= 16-2.0
T= 14.0

D-L= 16-3.0
T= 28.0

T/T= 43.0
============

D-L= 18-2.0
T= 6.0

D-L= 18-3.0
T= 7.0

T/T= 13.0
============

D-L= 20-2.0
T= 1.0

D-L= 20-3.0
T= 1.0

T/T= 2.0
============

D-L= 22-3.0
T= 1.0

T/T= 1.0
============

FINALS

F/T= 224.0