FINAL REPORT

A COMPUTER BASED INFORMATION SYSTEM FOR COUNTY EQUIPMENT COST RECORDS

HR-173

Submitted to the

Iowa Department of Transportation

Highway Division

and the

Iowa Highway Research Board

by

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APPENDIX D - DATA PROCESSING USER'S GUIDE

This appendix is divided into three sections. The first section contains abstracts of each of the eight computer programs in the system, instructions for keypunching the three input documents, and computer operating instructions pertaining to each program. The second section contains system flowcharts for the entire system as well as program flowcharts for each program. The last section contains PL/1 program listings of each program.

PROGRAM ABSTRACTS, KEYPUNCH INSTRUCTIONS, AND COMPUTER OPERATING INSTRUCTIONS

Program abstracts and computer operating instructions are given in this section for the eight computer programs which make up the information system for county equipment cost records. They are presented in the order in which the programs are to be executed: DIRECT, INDCOST, STCHNGE, UPDATEM, MAIN, CTYSUMRY, MFGAGE, and UPDATE. Keypunch instructions are also included for input data associated with programs DIRECT, INDCOST and STCHNGE, which are the only programs processing county supplied data.

Abstract for Program DIRECT

1. Purpose: To sort and edit the Direct Cost Summary Cards.
2. Procedure: Program DIRECT is a two-step job. The first step is a utility sort routine which sorts the input cards by county number and equipment number. The second step performs reasonableness checks of the input cards on the county field, the month field, the year field, and the remaining data fields taken collectively. Records without errors are written to a disk output file. Input records containing errors are grouped by county and recorded on printed output.
3. Configuration: IBM 370/145
   One Card Reader
   One Printer
   Six to Eight Cylinders of IBM 3330 Disk Space
4. Source Language: PL/1
5. Limitations: None
6. Running Time: Approximately five minutes CPU time
7. Additional Remarks: After running DIRECT, a check should be made of the error report to eliminate errors associated with keypunching and local data processing. If such errors are found, corrections should be made and DIRECT should be rerun prior to running MAIN. Error listings associated with county input are return-

ed to the counties with the other output from the system.

8. Subroutines: None

Keypunch Instructions for Program DIRECT

Input Document: Direct Cost Summary Form

Card Columns	Field Name	Numeric	Alpha-numeric
1-3	County Number	X	
4-11	Equipment Number		X
12-13	Month	X	
14-15	Year	X	
16-21	Fuel Cost	X	
22-26	Lubricant Cost	X	
27-30	Antifreeze Cost	X	
31-36	Tires and Tubes Cost	X	
37-42	Expendable Parts Cost	X	
43-48	Repair Parts Cost	X	
49-54	Labor Cost	X	
55-59	Mileage or Hours	X	
60-63	Down Time in Hours	X	
64-65	Number of Times Repaired	X	

Special Instructions: Use left zero capability on all numeric fields when setting up drum card. A sample Direct Cost Summary Form appears on the next page.

DIRECT COST SUMMARY FORM

COUNTY NAME _____

DATE _____

COUNTY NUMBER 1	EQUIPMENT NUMBER 4	DATE MM 12	DATE YY 14	FUEL COST 16	LUBR. COST 22	ANTI-FREEZE 27	TIRES, TUBES 31	EXPENDABLE PARTS 37	REPAIR PARTS 43	LABOR COST 49	MILES/ HOURS 55	DOWN TIME 60	TIMES REPAIRED 64

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Computer Operating Instructions for Program DIRECT

Frequency of Run: Annually

Region: 100K

Source Language: PL/1

Run Time: Approximately five minutes CPU time

Job Description: Sorts and edits Direct Cost Summary Cards, prints list of invalid input cards, writes correct input data to disk file.

Printer Used: Yes Punch Used: No

Printer Forms: Wide stock forms with standard alignment and standard carriage control tape.

Sort Sequence: Card Positions 1-11, CH, A

Data Sets:

	DDNAME	DSNAME	T/D/C/P	I/O	DISP	LRECL
Step 1	SORTIN	*	C	I		
	SORTOUT	&&DCOST	D	O	NEW,PASS	80
Step 2	DCOST	DCOST1	D	O	NEW,KEEP	65
	SDCOST	*.STEP1.SORT.SORTOUT	D	I	OLD,DELETE	80
	SYSIN					
	SYSPRINT					

Abstract for Program INDCOST

1. Purpose: To sort and edit the Indirect Cost Cards.
2. Procedure: Program INDCOST is a two-step job. The first step is a utility sort routine which sorts the input cards by county number. The second step performs reasonableness checks of the input cards on the county field and the remaining data fields taken collectively. Records without errors are written to a disk output file. Input records containing errors are listed on printed output.
3. Configuration: IBM 370/145
   One Card Reader
   One Printer
   One to Two Tracks of IBM 3330 Disk Space
4. Source Language: Pl/1
5. Limitations: None
6. Running Time: Approximately one minute CPU time
7. Additional Remarks: After running INDCOST, a check should be made of the error report to eliminate errors associated with keypunching and local data processing. If such errors are found, corrections should be made and INDCOST should be rerun prior to running MAIN. Error listings associated with county input are returned to the counties with the other output from the system.
8. Subroutines: None

Keypunch Instructions for Program INDCOST

Input Document: Indirect Cost Form

Card Columns	Field Name	Numeric	Alpha-numeric
1-3	County Number	X	
4-10	Salaries-Supervisory Employees	X	
11-17	Salaries-Clerical Employees	X	
18-24	Utilities	X	
25-31	Building Depreciation, Maintenance, Rental	X	
32-37	Shop Equipment Depreciation	X	
38-43	Replacement of Expendable Shop Tools	X	
44-49	Offices Supplies	X	
50-56	Cost of Moving Equipment	X	
57-63	Equipment Insurance	X	

Special Instructions: Use left zero capability on all numeric fields when setting up drum card. A sample Indirect Cost Form appears on the next page.

INDIRECT COST FORM

COUNTY NAME _____

DATE _____

1 COUNTY NUMBER

4 SALARIES AND EXPENSES OF SUPERVISORY EMPLOYEES NOT DIRECTLY EMPLOYED IN SERVICING OR REPAIRING EQUIPMENT

11 SALARIES OF CLERICAL EMPLOYEES ENGAGED IN ACCOUNTING AND PREPARING REPORTS FOR EQUIPMENT.

SHOP STORAGE AND MISCELLANEOUS OVERHEAD COSTS RELATING TO EQUIPMENT CARE AND HANDLING:

18 a) UTILITIES

25 b) SHOP AND OFFICE BUILDING DEPRECIATION, MAINTENANCE AND/OR RENTAL

32 c) DEPRECIATION OF SHOP EQUIPMENT

38 d) REPLACEMENT COST OF EXPENDABLE SHOP TOOLS

44 e) OFFICE SUPPLIES

50 f) COST OF MOVING EQUIPMENT

57 g) EQUIPMENT INSURANCE

Computer Operating Instructions for Program INDCOST

Frequency of Run: Annually

Region: 100K

Source Language: PL/1

Run Time: Approximately one minute CPU time

Job Description: Sorts and edits Indirect Cost Cards, prints list of invalid input cards, writes correct data to disk file.

Printer Used: Yes Punch Used: No

Printer Forms: Wide stock forms with standard alignment and standard carriage control tape.

Sort Sequence: Card Positions 1-3, CH, A

Data Sets:

	DDNAME	DSNAME	T/D/C/P	I/O	DISP	LRECL
Step 1	SORTIN	*	C	I		
	SORTOUT	&&ICOST	D	O	NEW,PASS	80
Step 2	ICOST	ICOST1	D	O	NEW,KEEP	63
	SICOST	*.STEP1.SORT.SORTOUT	D	I	OLD,DELETE	80
	SYSIN					
	SYSPRINT					

Abstract for Program STCHNGE

1. Purpose: To sort and edit the Equipment Status Change Cards.

2. Procedure: Program STCHNGE is a two-step job. The first step is a utility sort routine which sorts the input cards by county number, equipment number, and card type. The second step first reads in from cards the 55 equipment class codes and descriptions. It then performs reasonableness checks on all three cards of each equipment status change record. Input records containing errors are grouped by county and listed on printed output. Input records without errors have the appropriate district number and equipment class description inserted in the record with the record then written to a disk output file.

3. Configuration: IBM 370/145
   One Card Reader
   One Printer
   Three to Four Cylinders of IBM 3330 Disk Space

4. Source Language: PL/1

5. Limitations: None

6. Running Time: Approximately two minutes CPU time

7. Additional Remarks: After running STCHNGE, a check should be made of the error report to eliminate errors

associated with keypunching and local data processing. If such errors are found, corrections should be made and STCHNGE should be rerun prior to running UPDATEM. Error listings associated with county input are returned to the counties with other output from the system.

8. Subroutines: None

Keypunch Instructions for Program STCHNGE

Card 1

Input Document: Equipment Status Change Form

Card Columns	Field Name	Numeric	Alpha-numeric
1-3	County Number	X	
4-11	Equipment Number		X
12	Card Type	X	
13-14	District	X	
15-16	Class Code	X	
17-36	Class Description		X
37-39	Manufacturer Code Number	X	
40-41	Year Equipment Manufactured	X	
42-55	Make and Model Description		X
56-69	Manufacturer's Serial Number		X
70-72	Wheelbase	X	
73-78	Date Purchased	X	

Keypunch Instructions for Program STCHNGE

Card 2

Input Document: Equipment Status Change Form

Card Columns	Field Name	Numeric	Alpha-numeric
1-3	County Number	X	
4-11	Equipment Number		X
12	Card Type	X	
13	Type of Engine		X
14-27	Engine Make & Model Description		X
28-29	Engine Manufacturer Code	X	
30-32	Rated Horsepower	X	
33-34	Number of Cylinders in Engine	X	
35	Transmission Type		X
36-47	Dealer Purchased From		X
48-55	Original Purchase Cost	X	
56-62	Salvage Value	X	
63-70	Book Value	X	
71	Sold, Junked or Traded Code		X
72-77	Date Sold, Junked or Traded	X	

Keypunch Instructions for Program STCHNGE

Card 3

Input Document: Equipment Status Change Form

Card Columns	Field Name	Numeric	Alpha-numeric
1-3	County Number	X	
4-11	Equipment Number		X
12	Card Type	X	
13-18	Miles or Hours-Life	X	
19-25	Fuel Cost-Life	X	
26-31	Lubricant Cost-Life	X	
32-37	Tires and Tubes Cost-Life	X	
38-43	Expendable Parts Cost-Life	X	
44-48	Antifreeze Cost-Life	X	
49-55	Parts Cost-Life	X	
56-62	Labor Cost-Life	X	
63-69	Indirect Cost-Life	X	

Special Instructions: All three cards must be keypunched. Use left zero capability on all numeric fields when setting up drum card. Blank numeric fields may be skipped, rather than filled with all zeros. A sample Equipment Status Change Form appears on the next page.

EQUIPMENT STATUS CHANGE FORM

1 [ ] COUNTY NUMBER
4 [ ] EQUIPMENT NUMBER

COUNTY NAME _____
DATE _____

12 [1] CARD TYPE 1
13 [ ] DISTRICT
15 [ ] CLASS CODE
17 [ ] CLASS DESCRIPTION
37 [ ] MANUFACTURER CODE NUMBER
40 [ ] YEAR EQUIPMENT MANUFACTURED
42 [ ] MAKE AND MODEL DESCRIPTION
56 [ ] MANUFACTURER'S SERIAL NUMBER
70 [ ] WHEELBASE IN INCHES
73 [ ] DATE PURCHASED-MMDDYY

12 [2] CARD TYPE 2
13 [ ] TYPE OF ENGINE - GAS (G) OR DIESEL (D)
14 [ ] ENGINE MAKE AND MODEL DESCRIPTION
28 [ ] ENGINE MANUFACTURER CODE
30 [ ] RATED HORSEPOWER
33 [ ] NUMBER OF CYLINDERS IN ENGINE
35 [ ] TRANSMISSION TYPE - AUTOMATIC (A) OR STANDARD (S)
36 [ ] DEALER PURCHASED FROM
48 [ ] ORIGINAL PURCHASE COST
56 [ ] SALVAGE VALUE
63 [ ] BOOK VALUE
71 [ ] SOLD, JUNKED, OR TRADED CODE - (S) (J) (T)
72 [ ] DATE SOLD, JUNKED OR TRADED - MMDDYY

12 [3] CARD TYPE 3
13 [ ] MILES OR HOURS - LIFE
19 [ ] FUEL COST
26 [ ] LUBRICANT COST - LIFE
32 [ ] TIRES AND TUBES COST - LIFE
38 [ ] EXPENDABLE PARTS COST - LIFE
44 [ ] ANTIFREEZE COST - LIFE
49 [ ] REPAIR PARTS COST - LIFE
56 [ ] LABOR COST - LIFE
63 [ ] INDIRECT COST - LIFE

Computer Operating Instructions for Program STCHNGE

Frequency of Run: Annually

Region: 100K

Source Language: PL/1

Run Time: Approximately two minutes CPU time

Job Description: Sorts and edits Equipment Status Change Cards, prints list of invalid input cards, combines the three input cards per piece of equipment into one logical record, and writes correct input data to disk file. Also reads in list of class codes and descriptions from cards and places proper description in each equipment status change record.

Printer Used: Yes Punch Used: No

Printer Forms: Wide stock forms with standard alignment and standard carriage control tape.

Sort Sequence: Card Positions 1-12, CH, A

Data Sets:

	DDNAME	DSNAME	T/D/C/P	I/O	DISP	LRECL
Step 1	SORTIN	*	C	I		
	SORTOUT	&&CHANGE	D	O	NEW,PASS	80
Step 2	TSC	*.STEP1.SORT.SORTOUT	D	I	OLD,DELETE	80
	SCHANGE	SCHANGE1	D	O	NEW,KEEP	199
	SYSIN					
	SYSPRINT					

Abstract for Program UPDATEM

1. Purpose: To add new equipment records to the equipment master file, to correct master file records which have been found to contain incorrect data, to flag records of equipment disposed of, to calculate the total book value of all equipment for each county, and to print out an inventory listing of all equipment in each county.
2. Procedure: Records are read from the equipment master file (a tape file saved from the previous year's processing) and from the equipment status change record file created in program STCHNGE. Equipment status change records which do not match any master file record are added to the master file while matching records are corrected or flagged for later deletion.

   While the program is adding records to the master file and updating others, it also calculates the total book value of all equipment for each county. A disk output file is constructed containing records for each county. These records contain the county number and the total book value of all county equipment recorded in the master file.

   Printed output is also provided giving an inventory listing by county of each piece of equipment held in the master file.
3. Configuration: IBM 370/145

   One Printer

One Tape Drive

Approximately Eight Cylinders of IBM 3330 Disk Space

4. Source Language: PL/1

5. Limitations: Cannot be run until after STCHNGE has been run. The first time the system is run, a dummy equipment master file with only an EOF marker must have been created.

6. Running Time: Approximately five minutes CPU time.

7. Additional Remarks: Two copies of the printed output are to be produced for county use.

8. Subroutines: No external procedures.

Computer Operating Instructions for Program UPDATEM

Frequency of Run: Annually

Region: 100K

Source Language: PL/1

Run Time: Approximately five minutes CPU time

Job Description: Reads master file and equipment status change record file. Attempts to match records from these files by county number and equipment number. Matching records cause master file to be updated. Non-matching equipment status change records are added to master file. Total equipment book value is calculated by county and written to disk output file. A printed inventory listing of all equipment by county is produced.

Printer Used: Yes Punch Used: No

Printer Forms: Wide stock forms with standard alignment and standard carriage control tape. Make two copies of printed output.

Data Sets:

DDNAME	DSNAME	T/D/C/P	I/O	DISP	LRECL
EQMAST	EQMAST1	T	I	OLD,KEEP	300
NEQMAST	EQMAST2	D	O	NEW,KEEP	300
STCHNG	SCHANGE1	D	I	OLD,DELETE	199
BKVALU	BKVALU1	D	O	NEW,KEEP	13
SYSPRINT					

Abstract for Program MAIN

1. Purpose: To update all master file records with the past year's direct and indirect cost data, to calculate cost data, to calculate the past year's and lifetime costs per mile/hour for each piece of equipment, and to produce a detailed printed output for all equipment by county and equipment classes showing direct costs, indirect costs, and cost per mile/hour figures for the past year and for the equipment's lifetime.
2. Procedure: MAIN is a three step job. The first step updates the master file, the second step is a utility sort to sort the master file into the appropriate sequence for the printed output, which is then produced in the third step.

   The first step reads the records from the indirect cost record file and the total book value file created by INDCOST and UPDATEM, respectively, and places the contents of the records read into arrays. Next, records are read from the master file created in UPDATEM and the direct cost summary records file created in DIRECT. The program logic attempts to match records from these two files by county number and equipment number. All master file records which are matched by a corresponding direct cost summary record are updated. The past year's direct costs from the direct cost summary record are entered in-

to the master file record and the lifetime direct costs are updated. A portion of the county's total indirect equipment costs are allocated to each piece of equipment based upon the ratio of each piece's book value to the county's total equipment book value. The current book value of each piece of equipment is then updated through an appropriate depreciation calculation.

If a match does not occur between the master file record and the direct cost summary record, a printed listing of the nonmatching record is produced. Most of the listings in this output will stem from using an incorrect equipment number or county number on the direct cost summary form, or not submitting a direct cost summary form for a piece of equipment currently on the master file.

The second step of MAIN is a utility sort routine. The existing master file is sorted by county number and equipment number within the county number. The output desired from MAIN is classified by county, equipment class, and the equipment number. Therefore, the sort is necessary to get all pieces of equipment for each county into their proper equipment class so class totals can be calculated and printed along with the individual listings for each piece of equipment in each equipment class.

The third step of MAIN calculates total direct cost for each record for the past year and for the equipment's lifetime. Cost per mile/hour figures are then calculated.

Equipment class and county totals are accummulated, both for the past year's costs as well as for lifetime costs. Output is produced by county and equipment class showing detailed cost breakdowns for each piece of equipment for the past year's costs as well as for lifetime costs. Equipment class and county totals are also shown.

3. Configuration: IBM 370/145
   One Printer
   Six to Eight Cylinders of IBM 3330 Disk Space
4. Source Language: PL/1
5. Limitations: Cannot be run until DIRECT, INDCOST, and UPDATEM have been run.
6. Running Time: Approximately 30 minutes CPU time.
7. Additional Remarks: Two copies of the printed output are to be produced for county use.
8. Subroutines: No external procedures.

Computer Operating Instructions for Program MAIN

Frequency of Run: Annually

Region: 100K

Source Language: PL/1

Run Time: Approximately 30 minutes CPU time

Job Description: Reads equipment master file, direct cost summary file, indirect cost record file, total book value file, and updates master file records from matching direct cost summary records producing updated equipment master file. Sorts updated equipment master file, produces detailed printed cost figures on all equipment records in master file by county and equipment class.

Printer Used: Yes Punch Used: No

Printed Forms: Wide stock forms with standard alignment and standard carriage control tape. Make two copies of printed output.

Sort Sequence: Record Positions 1-3, CH, A; 14-15, CH, A; 6-13, CH, A

Data Sets:

	DDNAME	DSNAME	T/D/C/P	I/O	DISP	LRECL
Step 1	SEQMAST	EQMAST2	D	I	OLD,DELETE	300
	TEQMAST	EQMAST3	D	O	NEW,PASS	300
	BKVALU	BKVALU1	D	I	OLD,DELETE	13
	INDCOST	ICOST1	D	I	OLD,DELETE	63
	DIRCOST	DCOST1	D	I	OLD,DELETE	65
	SYSPRINT					
Step 2	SORTIN	*STEP1.GO.TEQMAST	D	I	OLD,KEEP	300
	SORTOUT	&&SMAST	D	O	NEW,PASS	300
Step 3	FEQMAST	*.STEP2.SORT.SORTOUT	D	I	OLD,DELETE	300
	YRDIR		P	O		132
	YRTOT		P	O		132
	LIFEDIR		P	O		132
	LIFETOT		P	O		132

Abstract for Program CTYSUMRY

1. Purpose: To produce past year and lifetime cost per mile/hour averages for each equipment class by districts and counties.
2. Procedure: Program CTYSUMRY is a two-step job. The first step sorts the master file produced in MAIN by equipment class, district, and county number. The second step reads records from the sorted file produced in step one. It keeps running totals of total direct costs, pieces of equipment, and miles/hours. When the equipment class, district number, or county number of the record just read differs from the previous record, the appropriate average cost per mile/hour calculations are made, the averages are printed, and appropriate running totals are reset to zero.
3. Configuration: IBM 370/145
   One Printer
   Six to Eight Cylinders of IBM 3330 Disk Space
4. Source Language: PL/1
5. Limitations: Cannot be run until MAIN has produced an appropriate master file. One hundred copies must be produced if all counties are to receive output.
6. Running Time: Approximately 10 minutes CPU time.

7. Additional Remarks: Make 100 copies of printed output.

8. Subroutines: None

Computer Operating Instructions for Program CTYSUMRY

Frequency of Run: Annually

Region: 100K

Source Language: PL/1

Run Time: Approximately 10 minutes CPU time.

Job Description: Sorts master file, produces past year and lifetime cost per mile/hour averages for each equipment class by districts and counties.

Printer Used: Yes Punch Used: No

Printer Forms: Wide stock forms with standard alignment and standard carriage control tape. Make 100 copies.

Sort Sequence: Record positions 14-15, CH, A; 4-5, CH, A; 1-3, CH, A

Data Sets:

	DDNAME	DSNAME	T/D/C/P	I/O	DISP	LRECL
Step 1	SORTIN	EQMAST3	D	I	OLD,KEEP	300
	SORTOUT	&&COUNTY	D	O	NEW,PASS	300
Step 2	UEMF	*.STEP1.SORT.SORTOUT	D	I	OLD,DELETE	300
	OUT		P	O		132

Abstract for Program MFGAGE

1. Purpose: To produce past year and lifetime cost per mile/hour averages for five age groups in each equipment class by manufacturer.
2. Procedure: Program MFGAGE is a two-step job. The first step sorts the master file produced in MAIN by equipment class and manufacturer. The second step reads records from the sorted file produced in step one. This step keeps running totals of total direct costs, pieces of equipment, and miles/hours. After each record is read, the age of the piece of equipment contained on that record is calculated, and the direct costs and miles/hours on the record are added to the appropriate age grouping. Cost per mile/hour calculations are made and output produced whenever the current and past records have differing equipment class codes or manufacturer codes.
3. Configuration: IBM 370/145

   One Printer

   Six to Eight Cylinders of IBM 3330 Disk Space
4. Source Language: PL/1
5. Limitations: Cannot be run until MAIN has produced an appropriate master file. One hundred copies must be produced if all counties are to receive output.

6. Running Time: Approximately 12 minutes CPU time.
7. Additional Remarks: Make 100 copies of printed output.
8. Subroutines: None

Computer Operating Instructions for Program MFGAGE

Frequency of Run: Annually

Region: 100K

Source Language: PL/1

Run Time: Approximately 12 minutes CPU time

Job Description: Sorts master file, produces past year and lifetime averages cost per mile/hour for five groups in each equipment class by manufacturer.

Printer Used: Yes Punch Used: No

Printer Forms: Wide stock forms with standard alignment and standard carriage control tape. Make 100 copies.

Sort Sequence: Record Positions 14-15, CH, A; 18-20, CH, A

Data Sets:

	DDNAME	DSNAME	T/D/C/P	I/O	DISP	LRECL
Step 1	SORTIN	EQMAST3	D	I	OLD,KEEP	300
	SORTOUT	&&MFGAGE	D	O	NEW,PASS	300
Step 2	UEMF	*.STEP1.SORT.SORTOUT	D	I	OLD,DELETE	300
	OUT		P	O		132

Abstract for Program UPDATE

1. Purpose: To delete records of equipment disposed of in the past year from the master file and to produce a printed listing by county of the deleted records.
2. Procedure: Program UPDATE reads the master file created in MAIN. All records to be deleted were flagged for deletion by program UPDATEM by setting a flag in the disposal method field. All records with the disposal method field set to S, J, or T are removed from the master file and listed by county on the printer. The master file produced is written on magnetic tape and will be used as input in the year to follow.
3. Configuration: IBM 370/145
   One Printer
   One Tape Drive
   Three to Four Cylinders of IBM 3330 Disk Space
4. Source Language: PL/1
5. Limitations: Cannot be run until MAIN, CTYSUMRY, and MFGAGE have been run.
6. Running Time: Approximately two minutes CPU time.
7. Additional Remarks: The new master tape file produced must be labeled with the current year to avoid confusing it with the previous year's master file. Make a back up magnetic tape copy of the new master file.
8. Subroutines: None

Computer Operating Instructions for Program UPDATE

Frequency of Run: Annually

Region: 100K

Source Language: PL/1

Run Time: Approximately two minutes CPU time

Job Description: Deletes records of equipment disposed of in the past year from the master file, produces printed output of deleted records, and writes new equipment master file to magnetic tape.

Printer Used: Yes Punch Used: No

Printer Forms: Wide stock forms with standard alignment and standard carriage control tape.

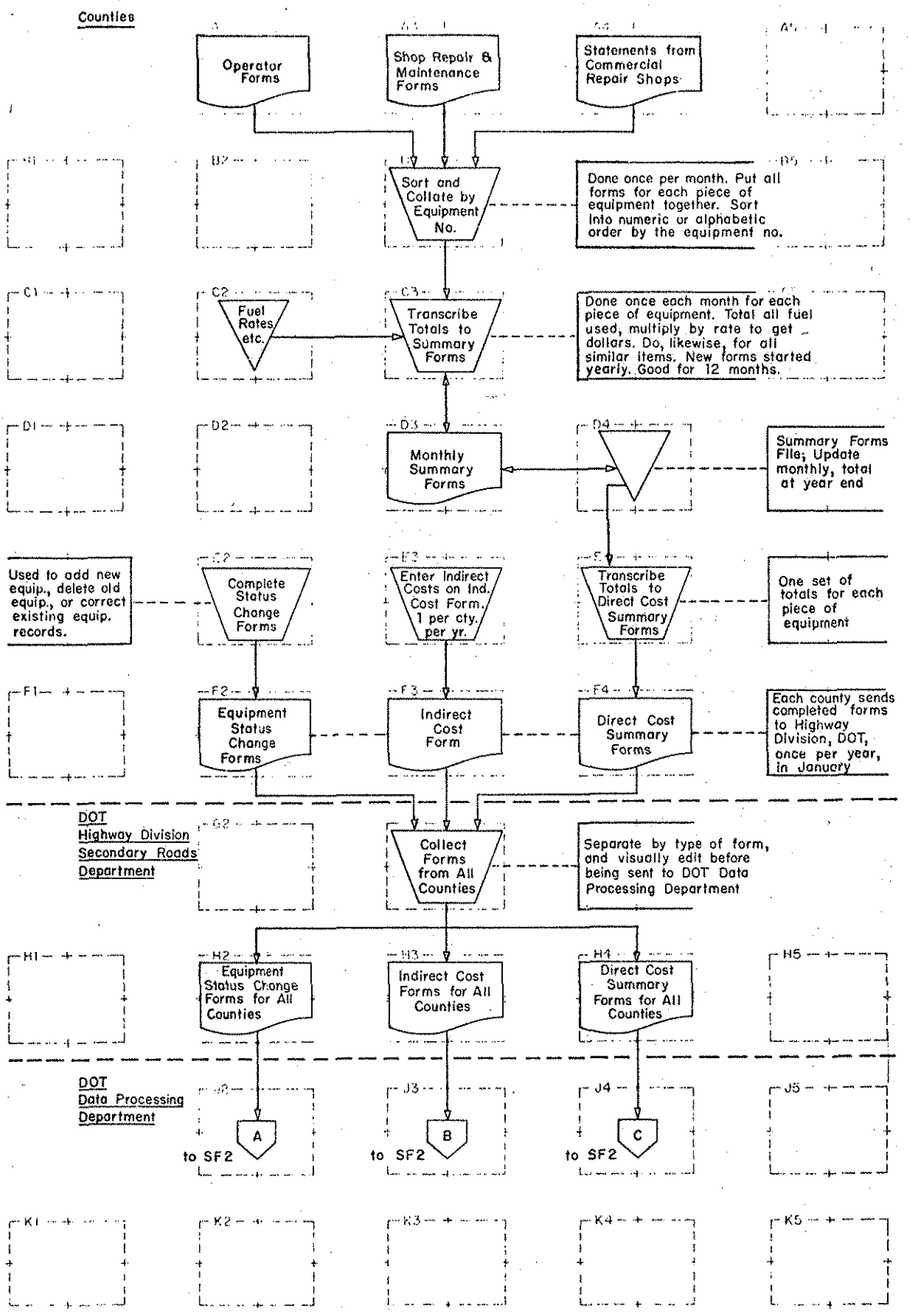
Data Sets:

DDNAME	DSNAME	T/D/C/P	I/O	DISP	LRECL
OLDMST	EQMAST3	D	I	OLD,DELETE	300
NEWMST	EQMAST1	T	O	NEW,KEEP	300
SYSPRINT					

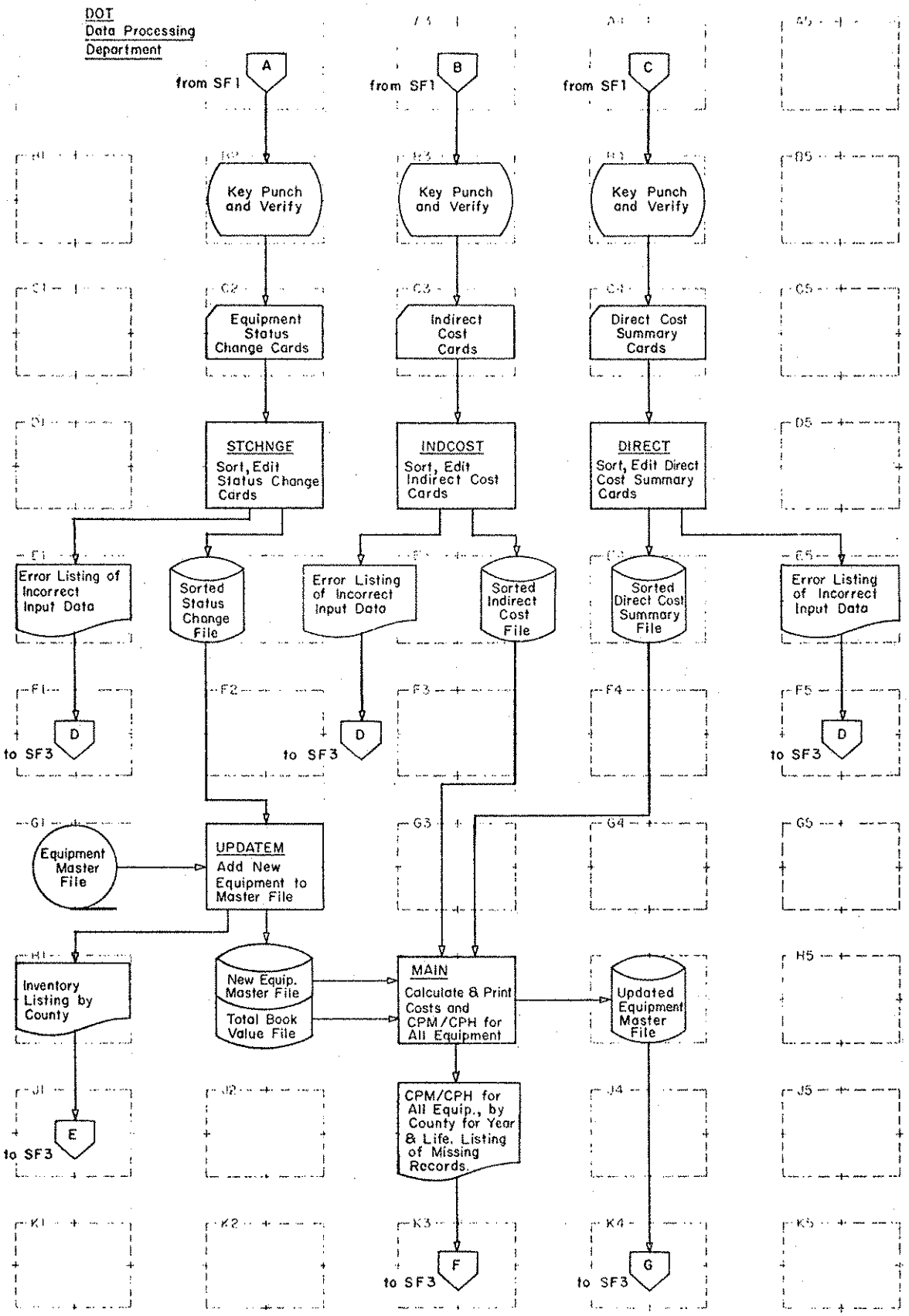
FLOWCHARTS

This section of Appendix D contains the system flowcharts and the eight computer program flowcharts. The system flowcharts give the general system information flow. The computer program flowcharts show the specific flow of data processing in each computer program. These program flowcharts correspond to the PL/1 listings given in the next section.

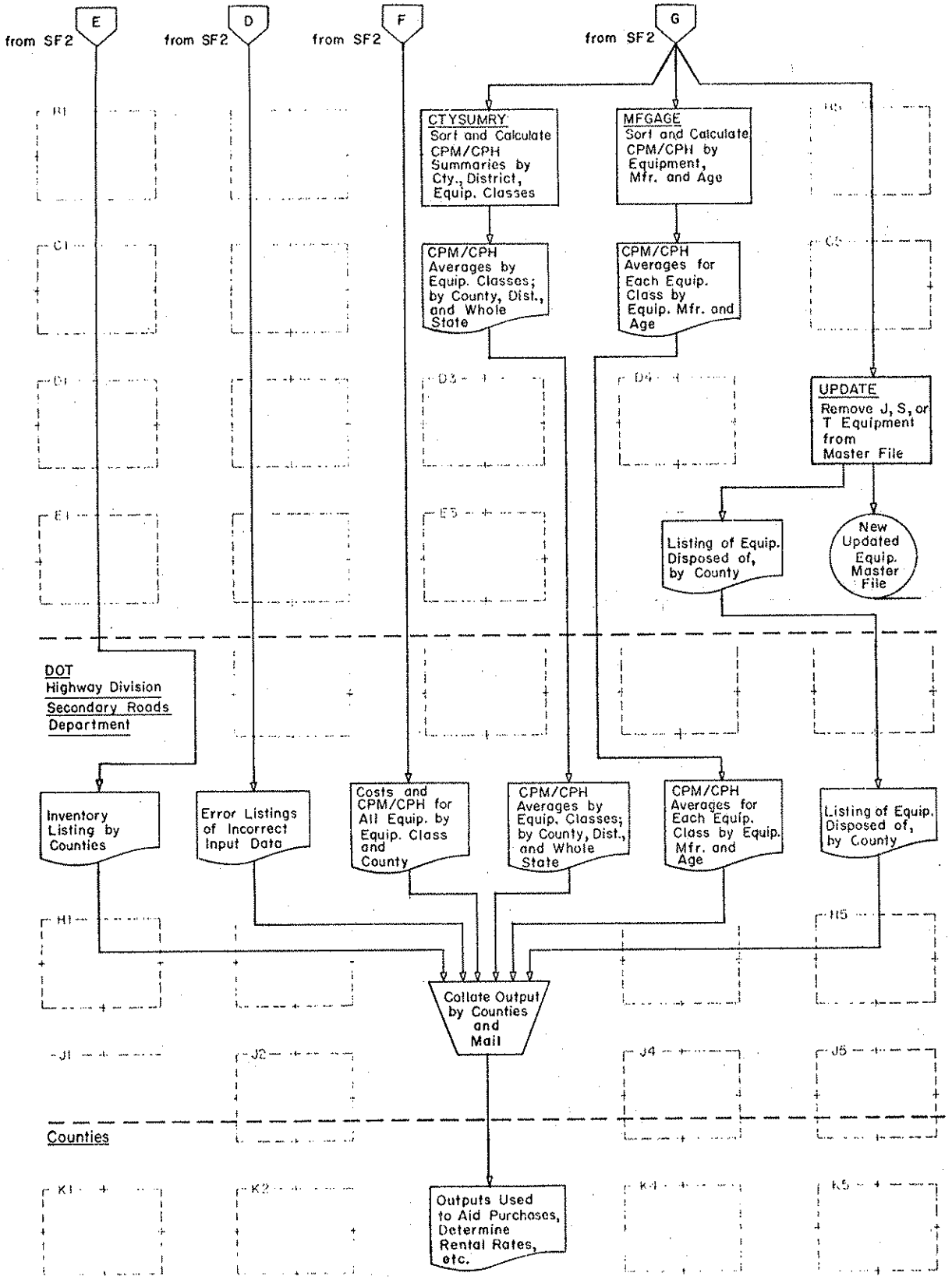
Programmer: _____ Program No.: _____ Date: _____ Page: _____
Chart ID: SF1 Chart Name: System Flowchart Program Name: _____



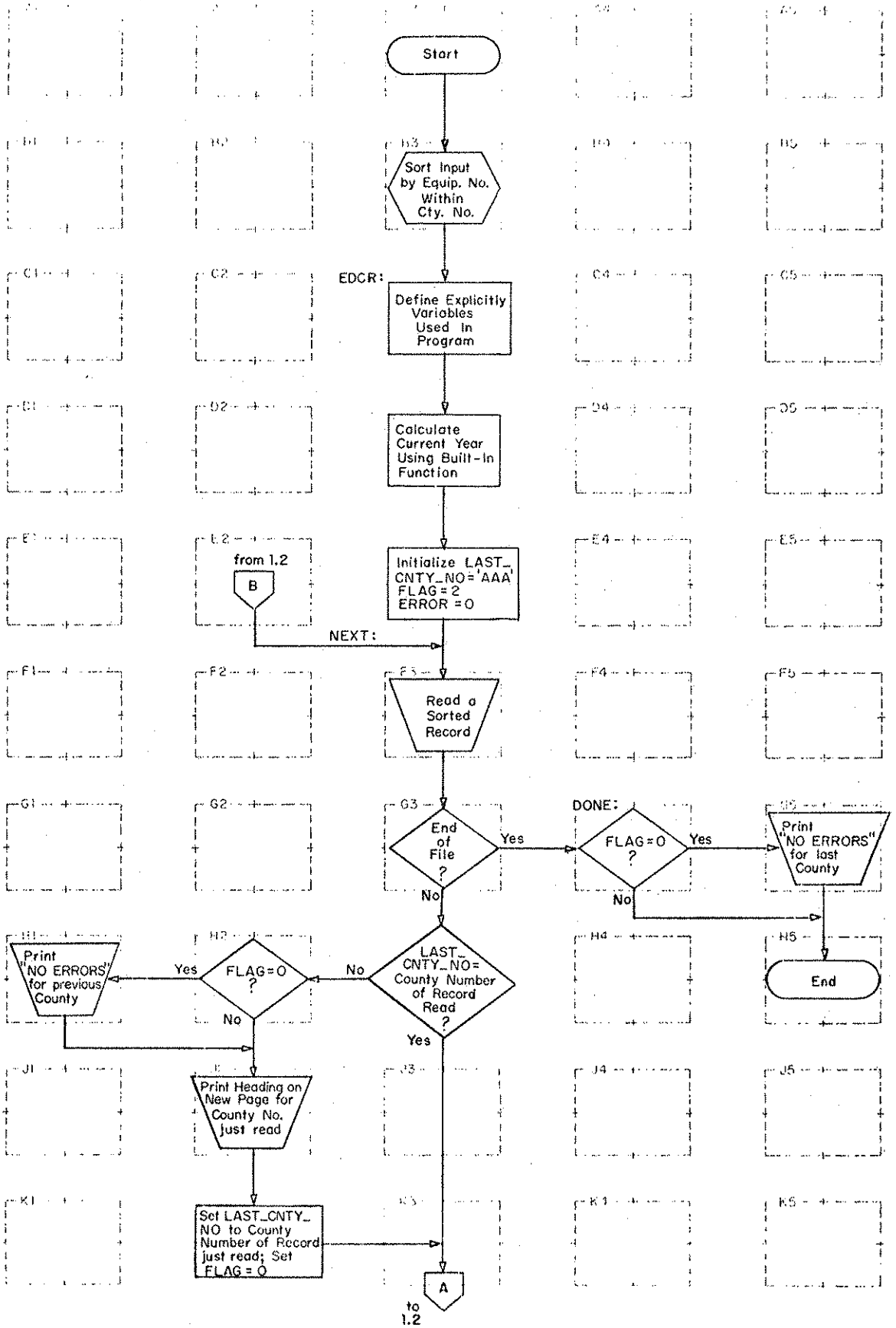
Programmer: _____ Program No.: _____ Date: _____ Page: _____
Chart ID: SF2 Chart Name: _____ Program Name: _____



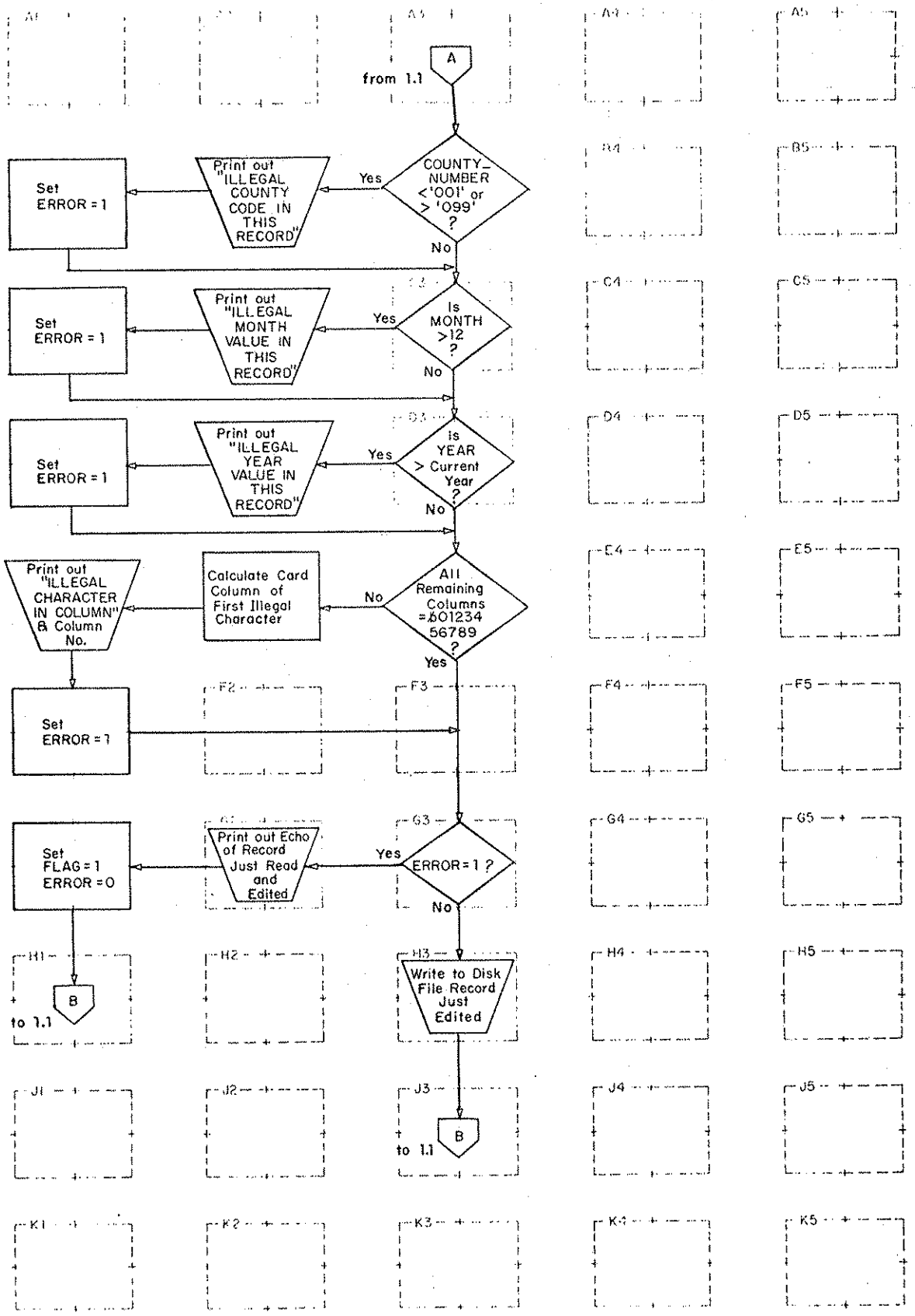
Programmer: _____ Program No.: _____ Date: _____ Page: _____
Chart ID: SF3 Chart Name: _____ Program Name: _____



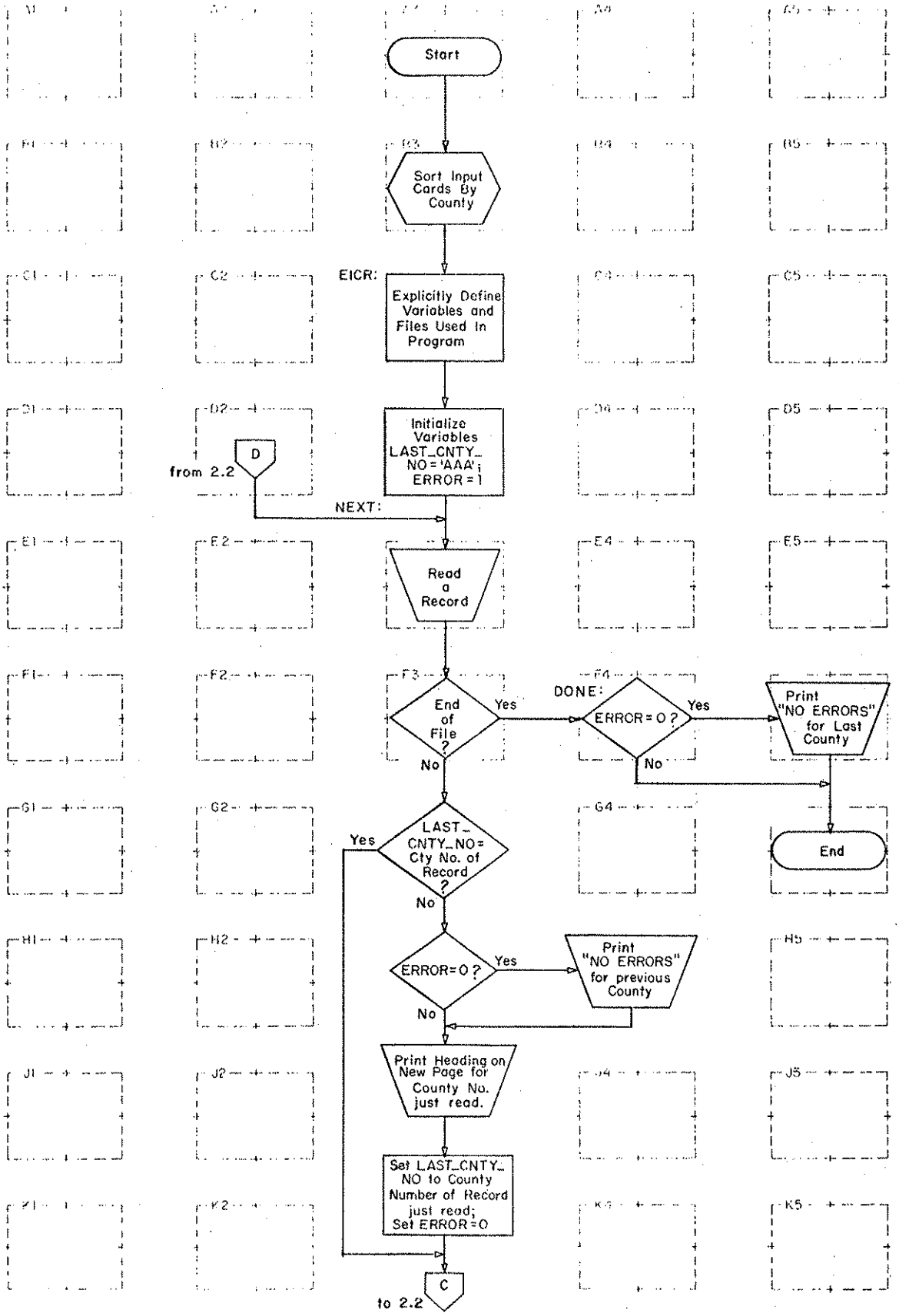
Programmer: Rolf McHenry Program No.: 1 Date: July 1975 Page:
Chart ID: 1.1 Chart Name: Sort and Edit Direct Cost Records Program Name: DIRECT



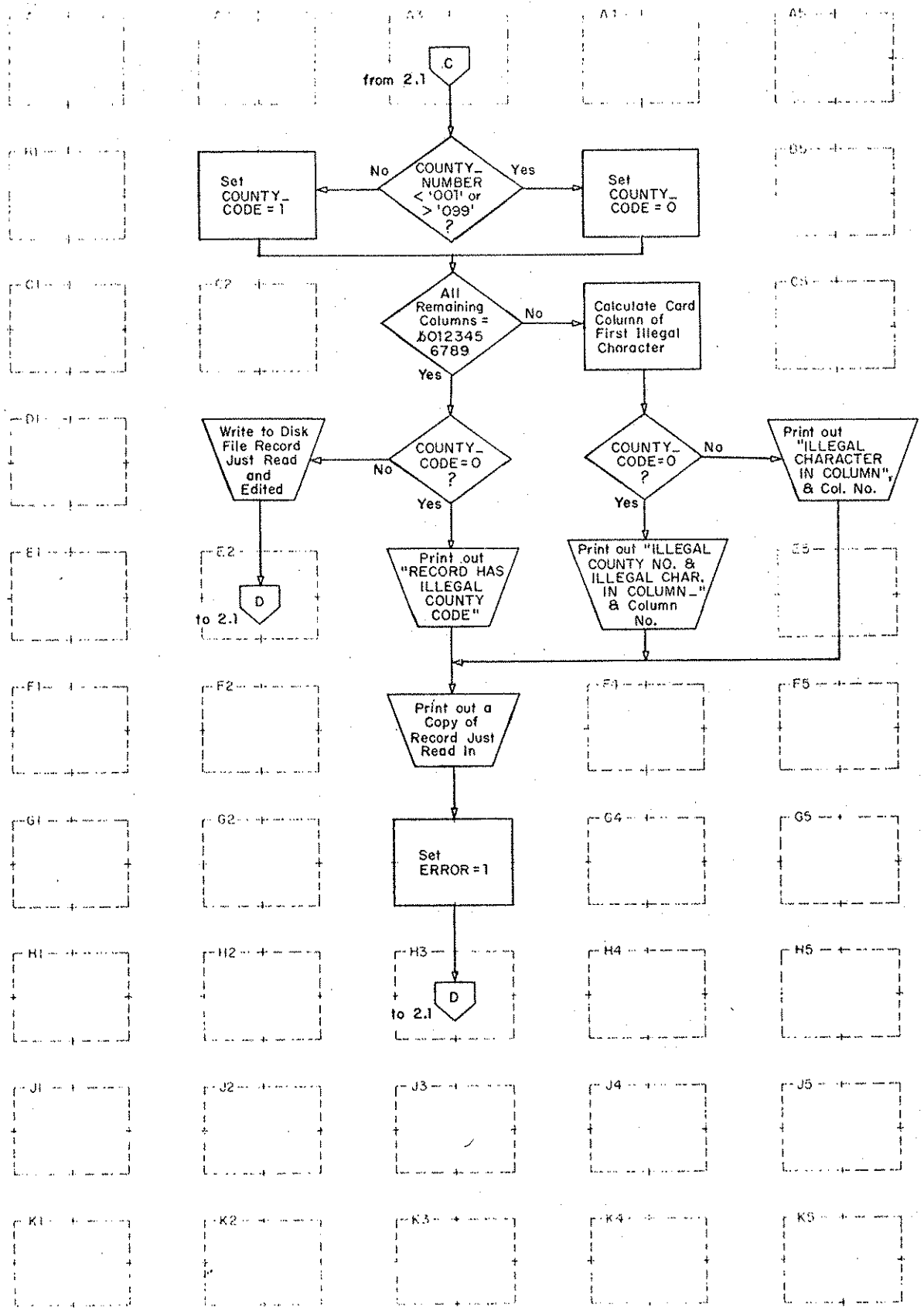
Programmer: Rolf McHenry Program No.: 1 Date: Page:
Chart ID: 1.2 Chart Name: Program Name: DIRECT



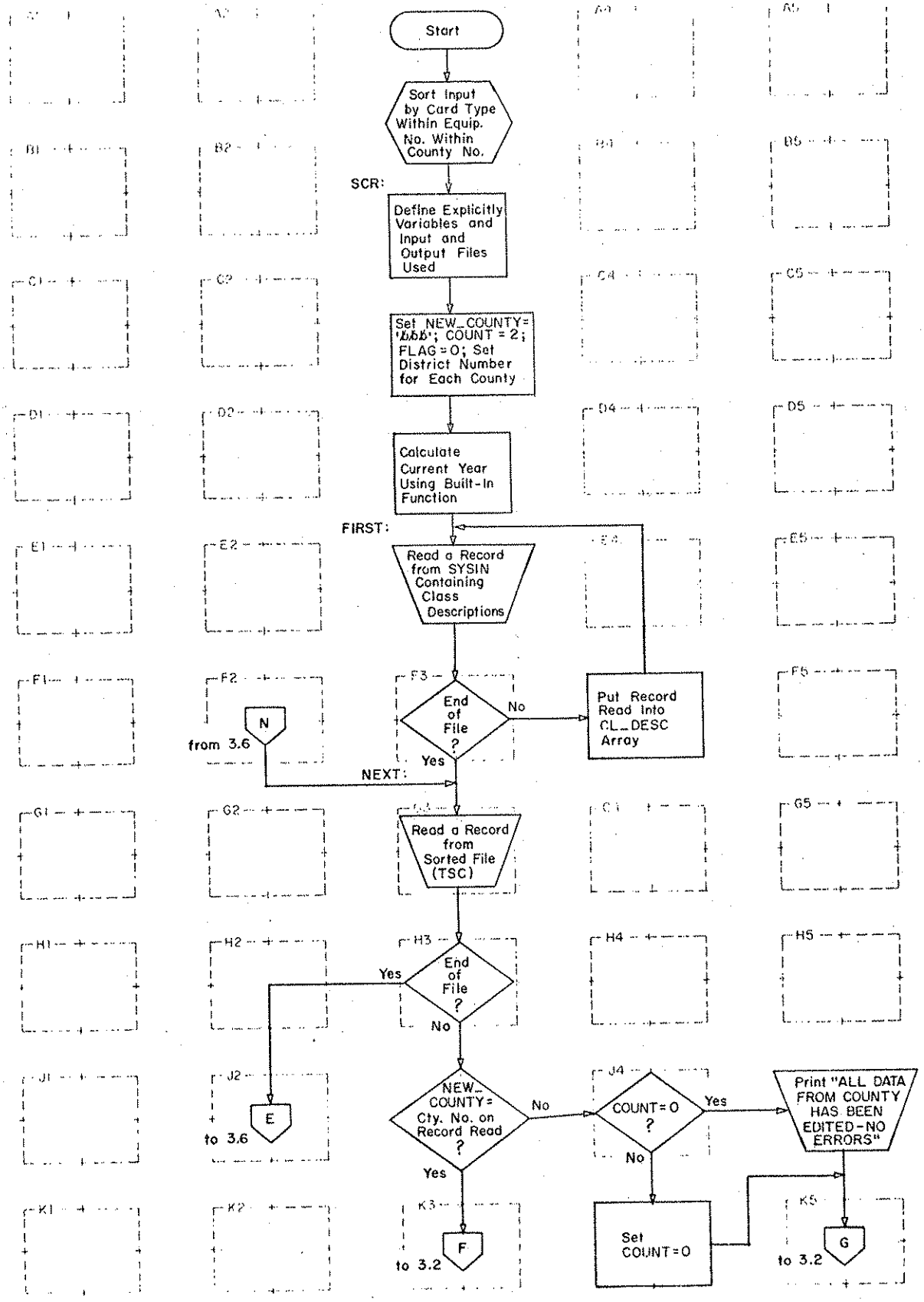
Programmer: Rolf McHenry Program No.: 2 Date: Page:
Chart ID: 2.1 Chart Name: Sort and Edit Indirect Cost Records Program Name: INDCOST



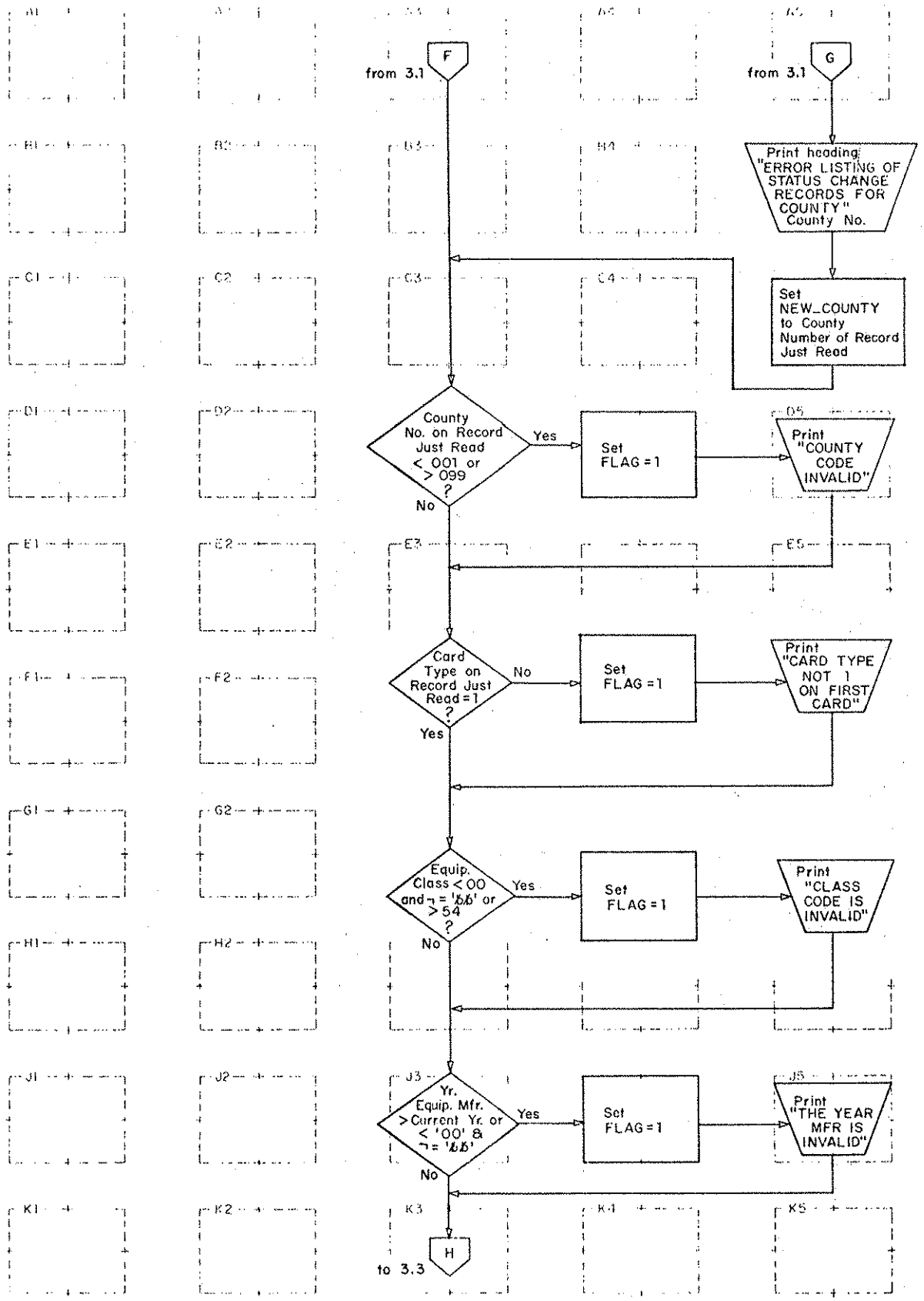
Programmer: Rolf McHenry Program No.: 2 Date: Page:
Chart ID: 2.2 Chart Name: Program Name: INDCOST



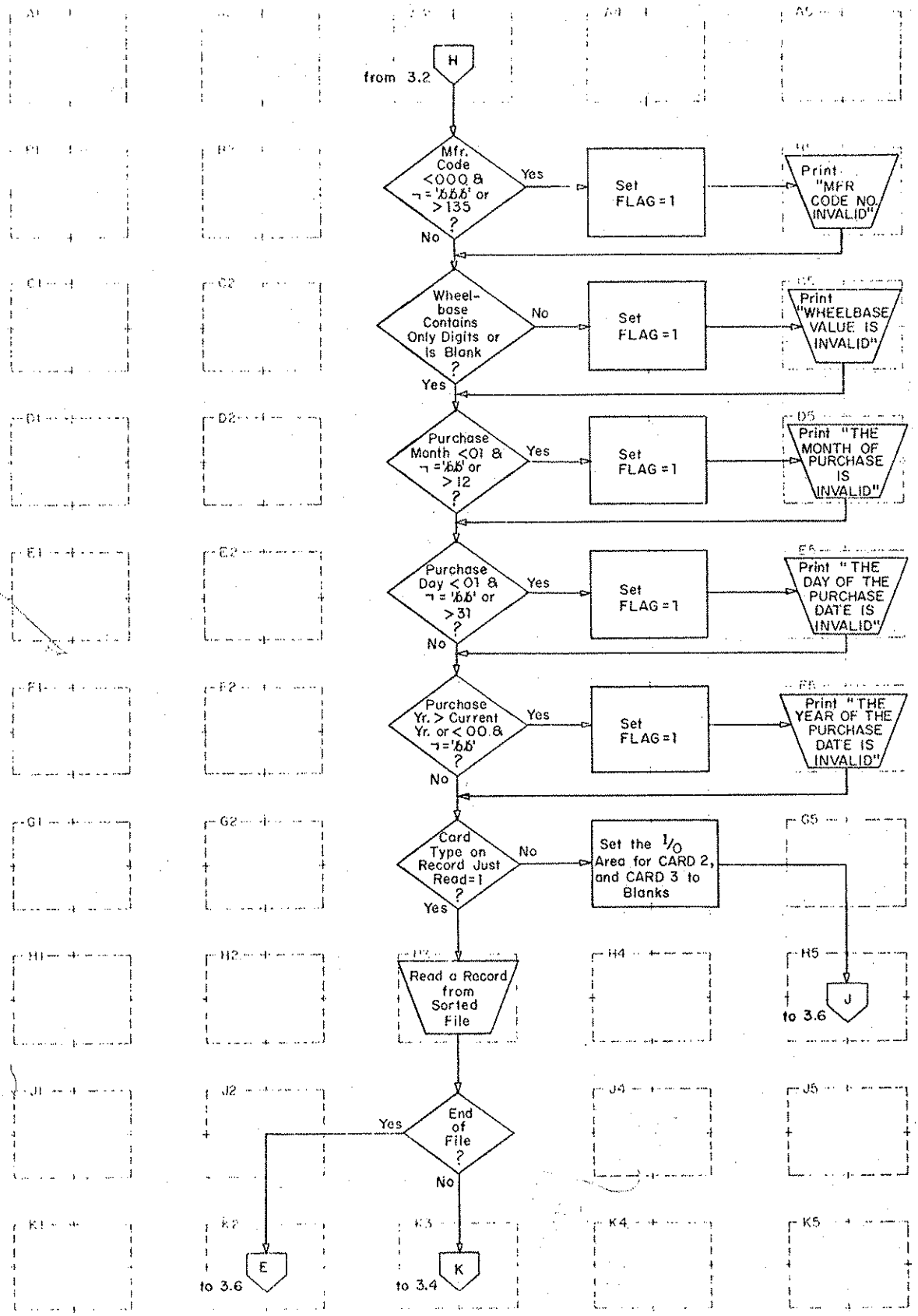
Programmer: Charles Saddoris Program No.: 3 Date: Page:
Chart ID: 3.1 Chart Name: Sort and Edit Status Change Records Program Name: STCHNGE



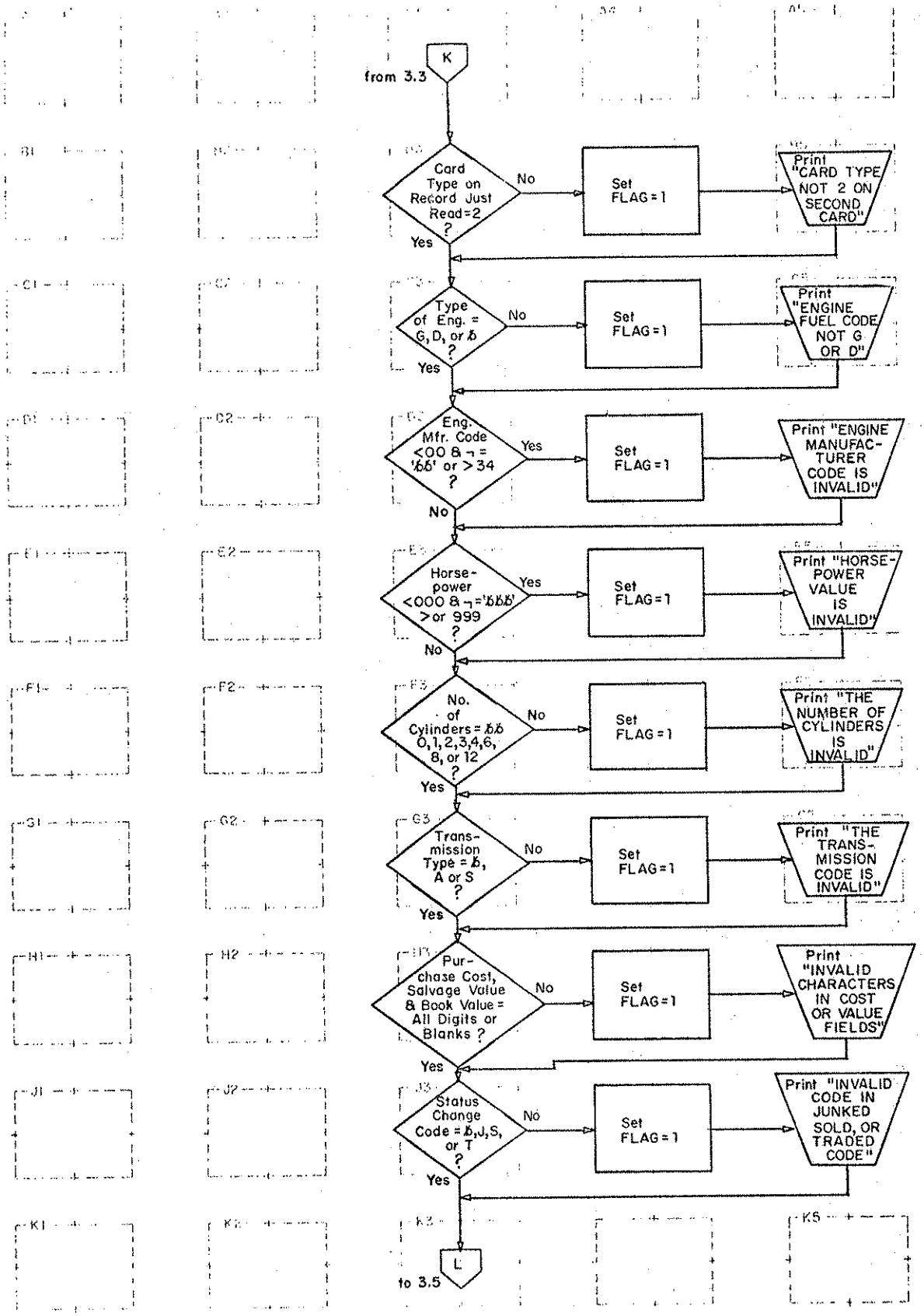
Programmer: Charles Saddoris Program No.: 3 Date: July 1975 Page:
Chart ID: 3.2 Chart Name: Program Name: STCHNGE



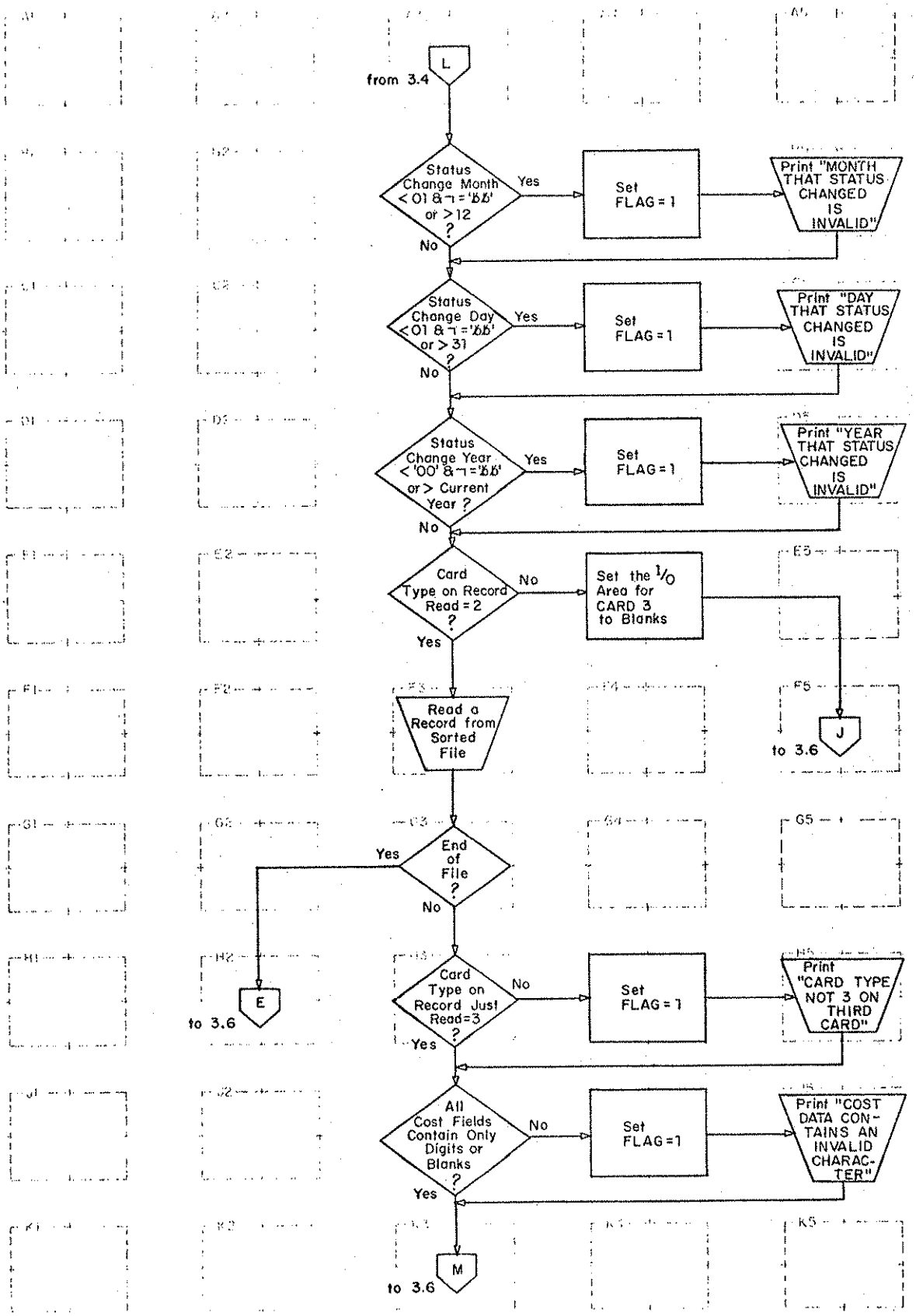
Programmer: Charles Saddoris Program No.: 3 Date: July 1975 Page:
Chart ID: 3.3 Chart Name: Program Name: STCHNGE



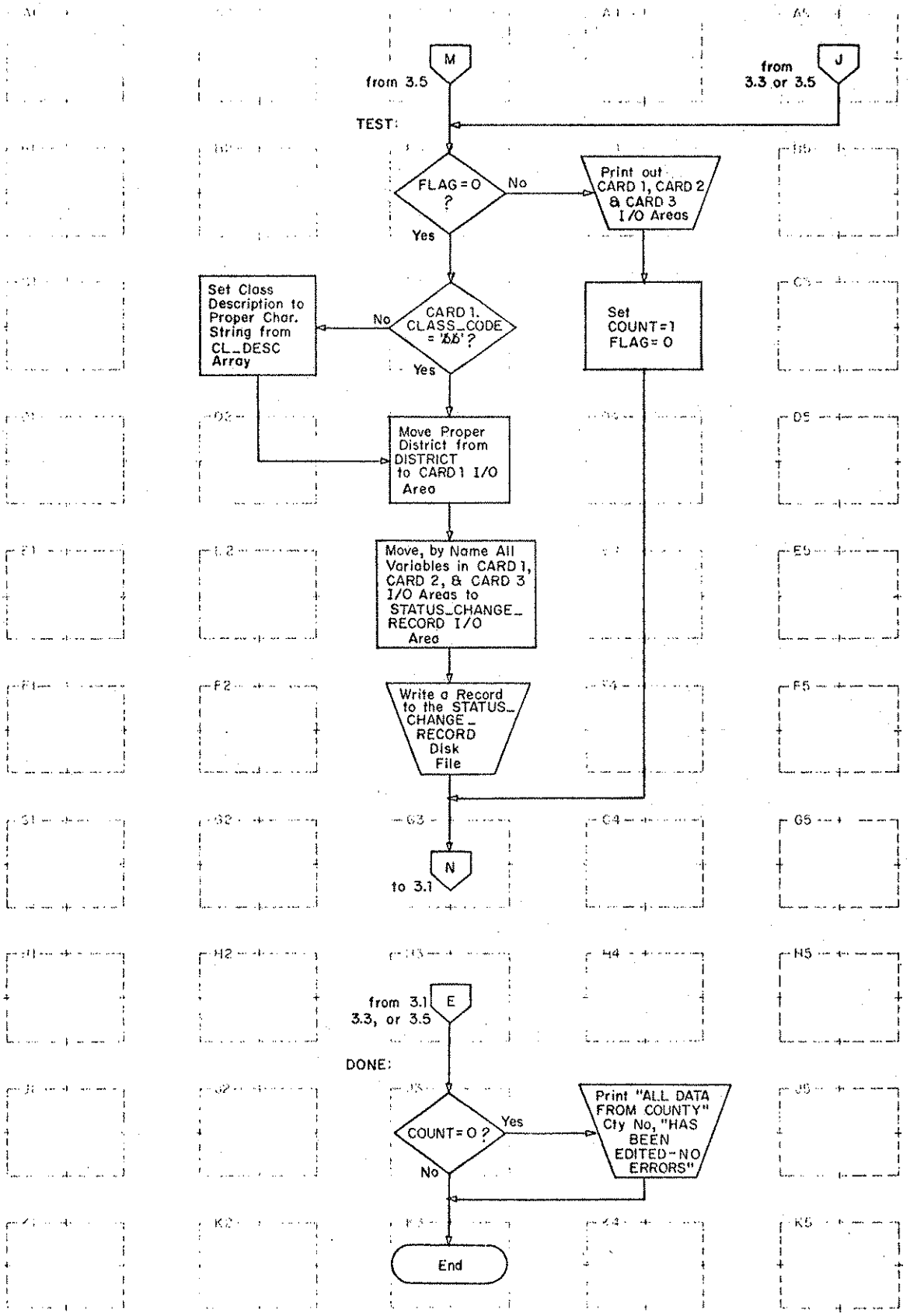
Programmer: Charles Saddoris Program No.: 3 Date: Page:
Chart ID: 3.4 Chart Name: Program Name: STCHNGE



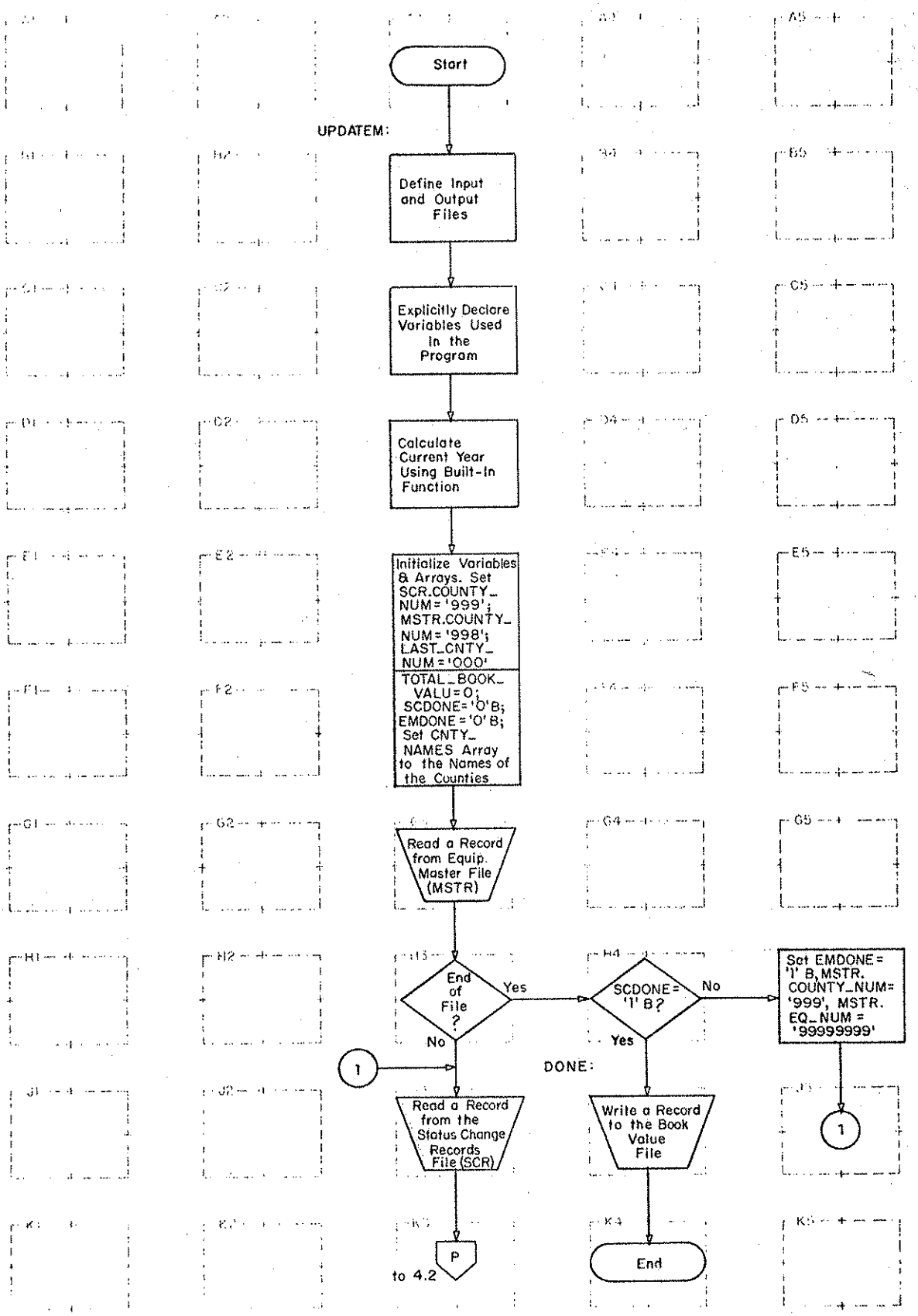
Programmer: Charles Saddoris Program No.: 3 Date: Page:
Chart ID: 3.5 Chart Name: Program Name: STCHNGE



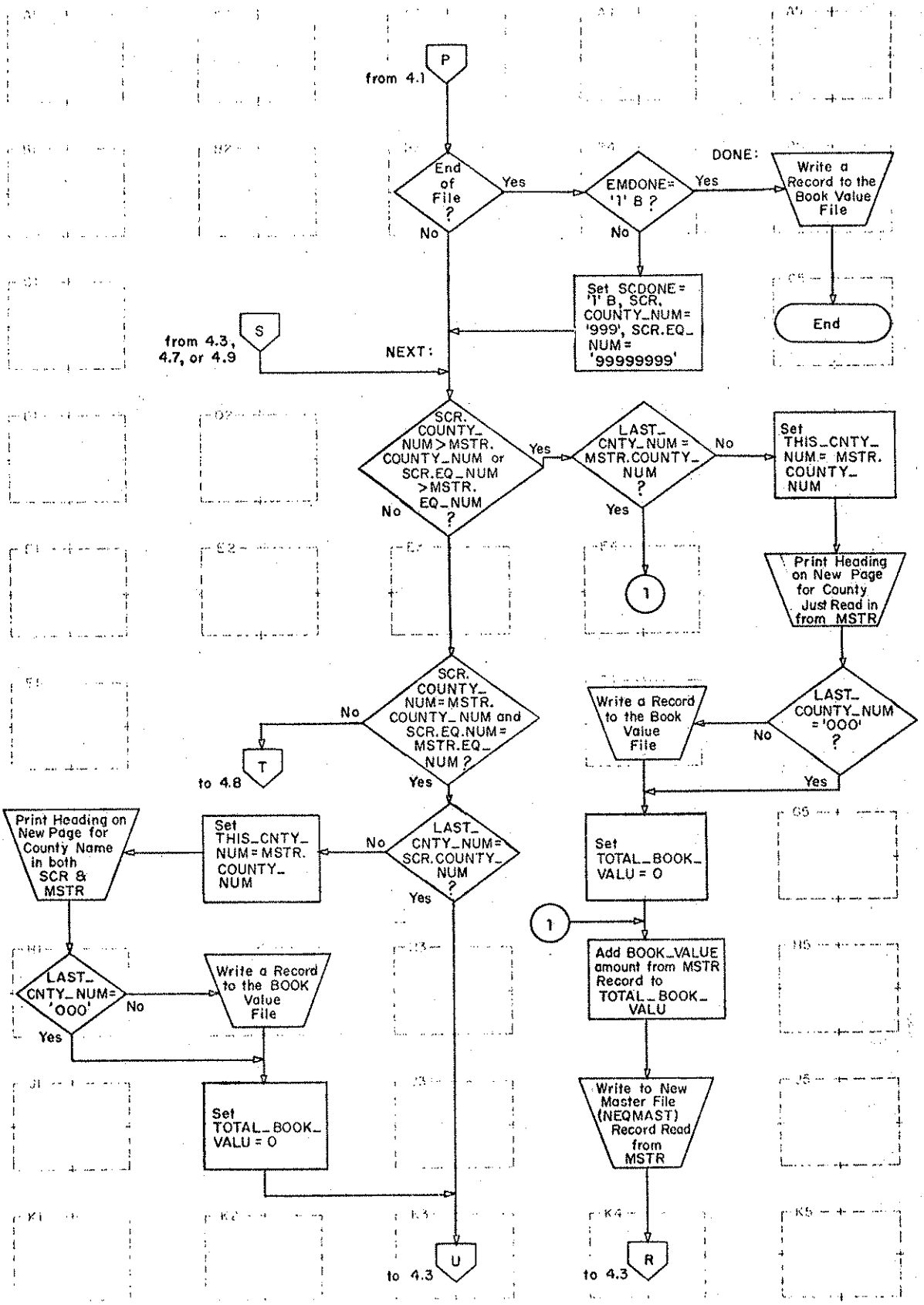
Programmer: Charles Saddoris Program No.: 3 Date: July 1975 Page:
Chart ID: 3.6 Chart Name: Program Name: STCHNGE



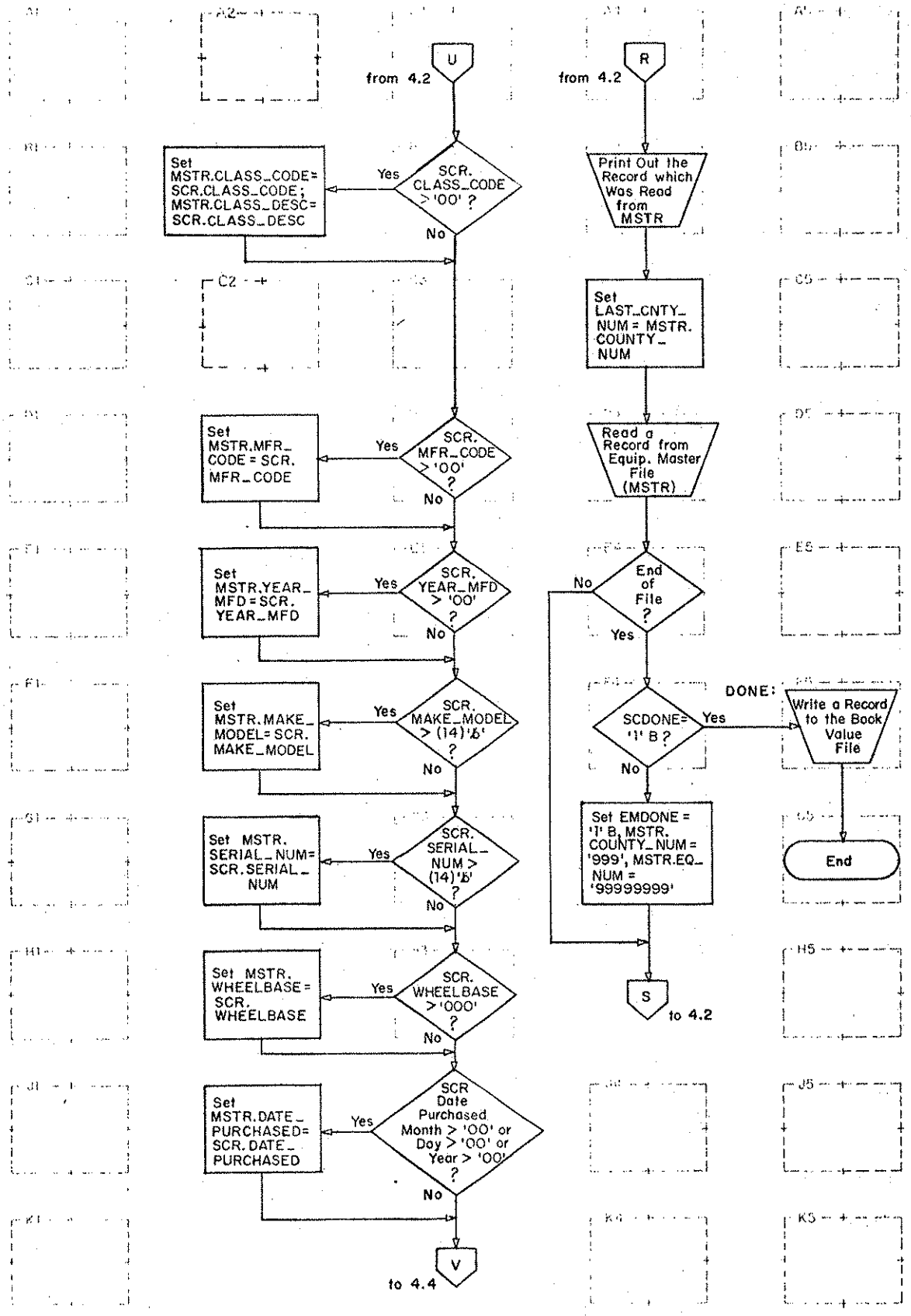
Programmer: Rolf McHenry Program No.: 4 Date: July 1975 Page:
Chart ID: 4.1 Chart Name: Add Status Change Records to Master File, and Calculate Book Value by County Program Name: UPDATEM



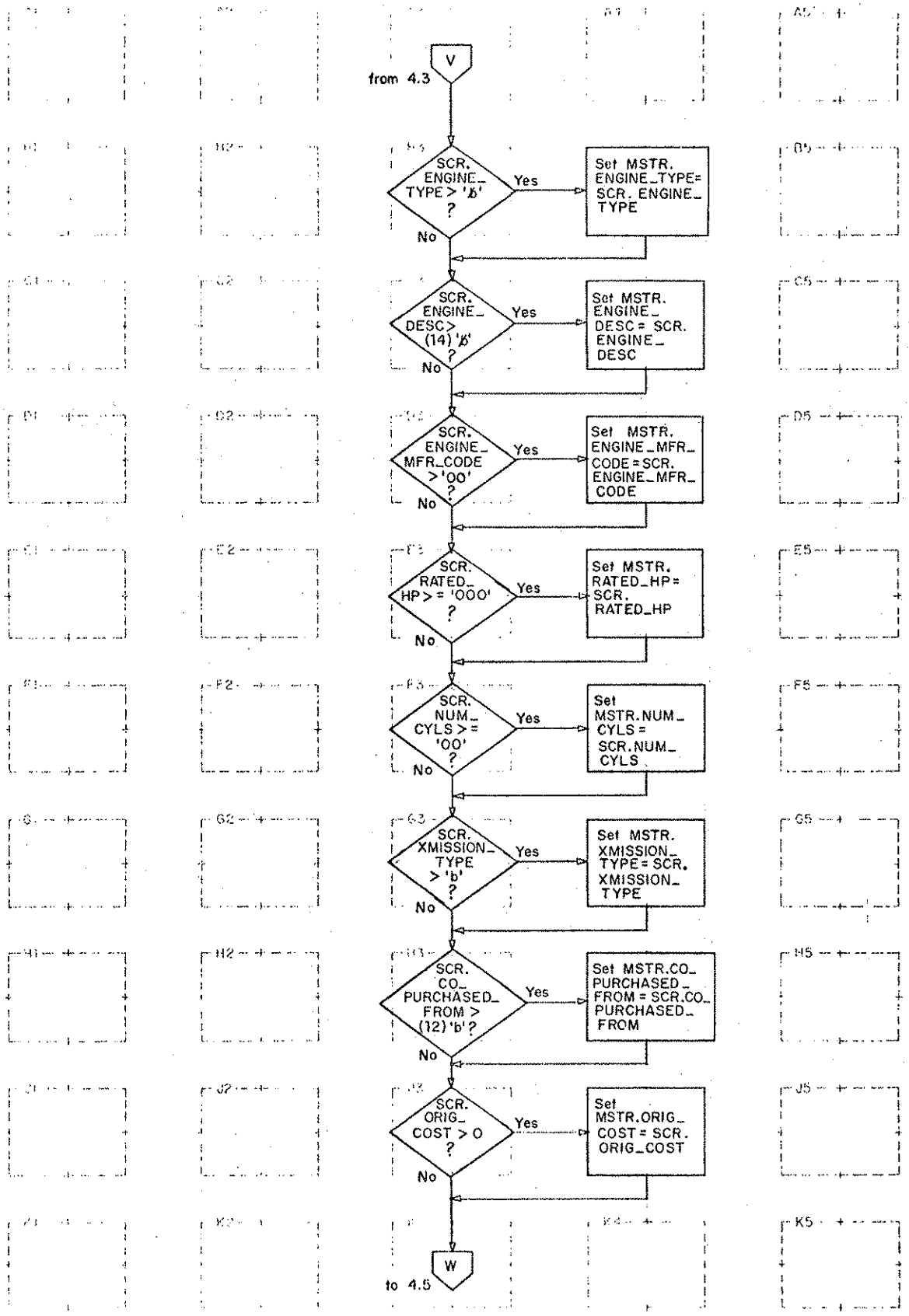
Programmer: Rolf McHenry Program No.: 4 Date: July 1975 Page:
Chart ID: 4.2 Chart Name: Program Name: UPDATEM



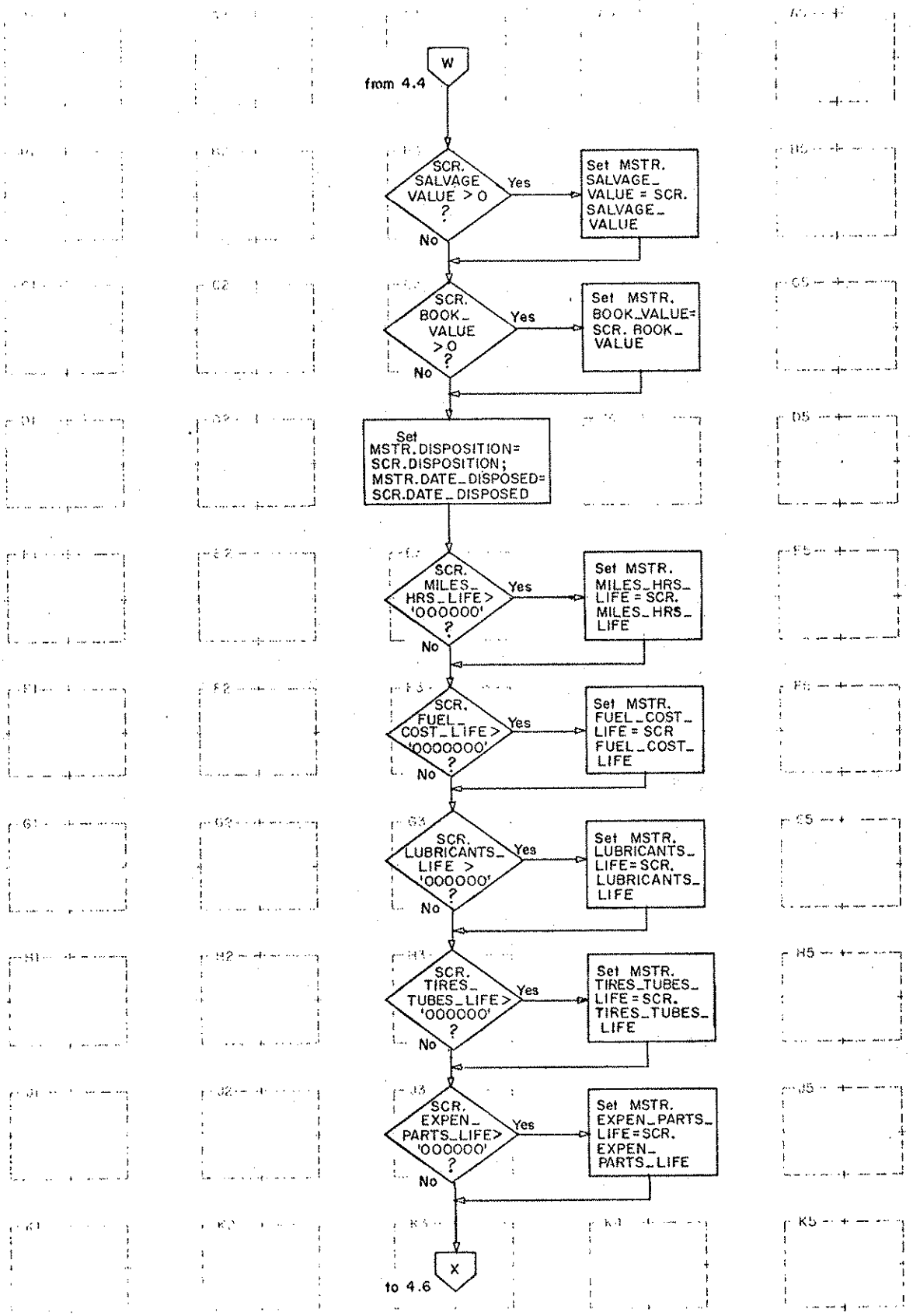
Programmer: Rolf McHenry Program No.: 4 Date: Page:
Chart ID: 4.3 Chart Name: Program Name: UPDATEM



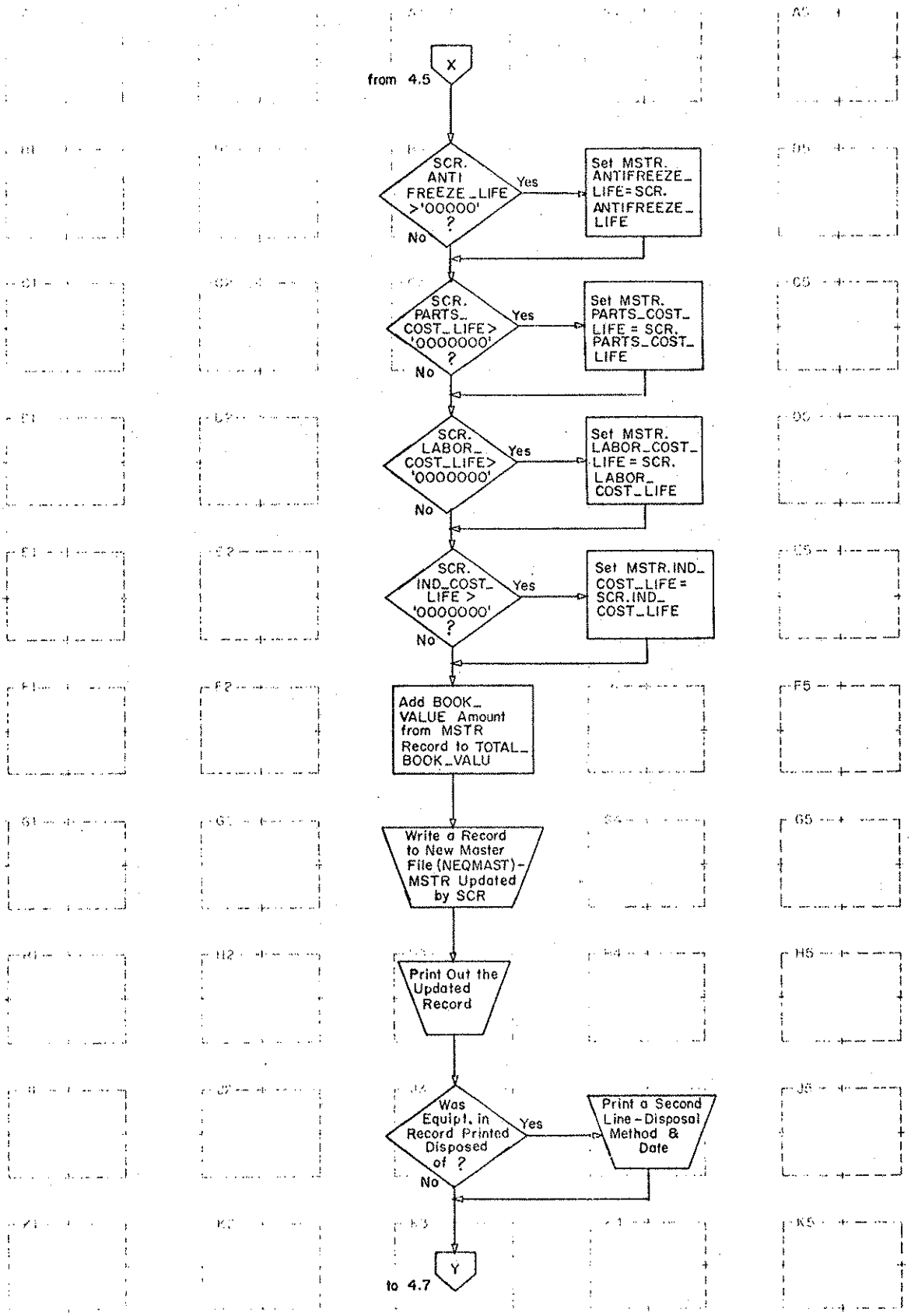
Programmer: Rolf McHenry Program No.: 4 Date: Page:
Chart ID: 4.4 Chart Name: Program Name: UPDATEM



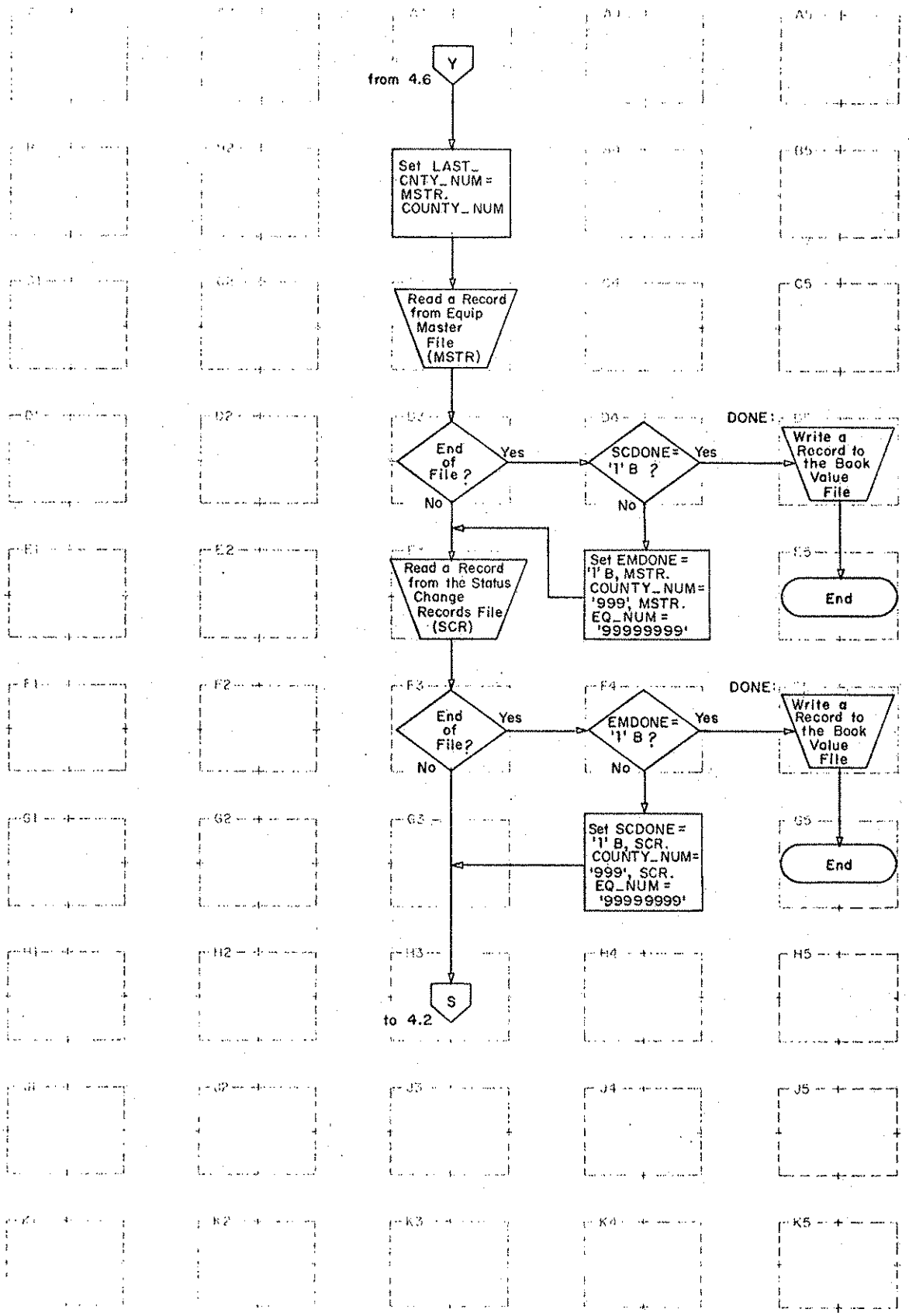
Programmer: Rolf McHenry Program No.: 4 Date: Page:
Chart ID: 4.5 Chart Name: Program Name: UPDATEM



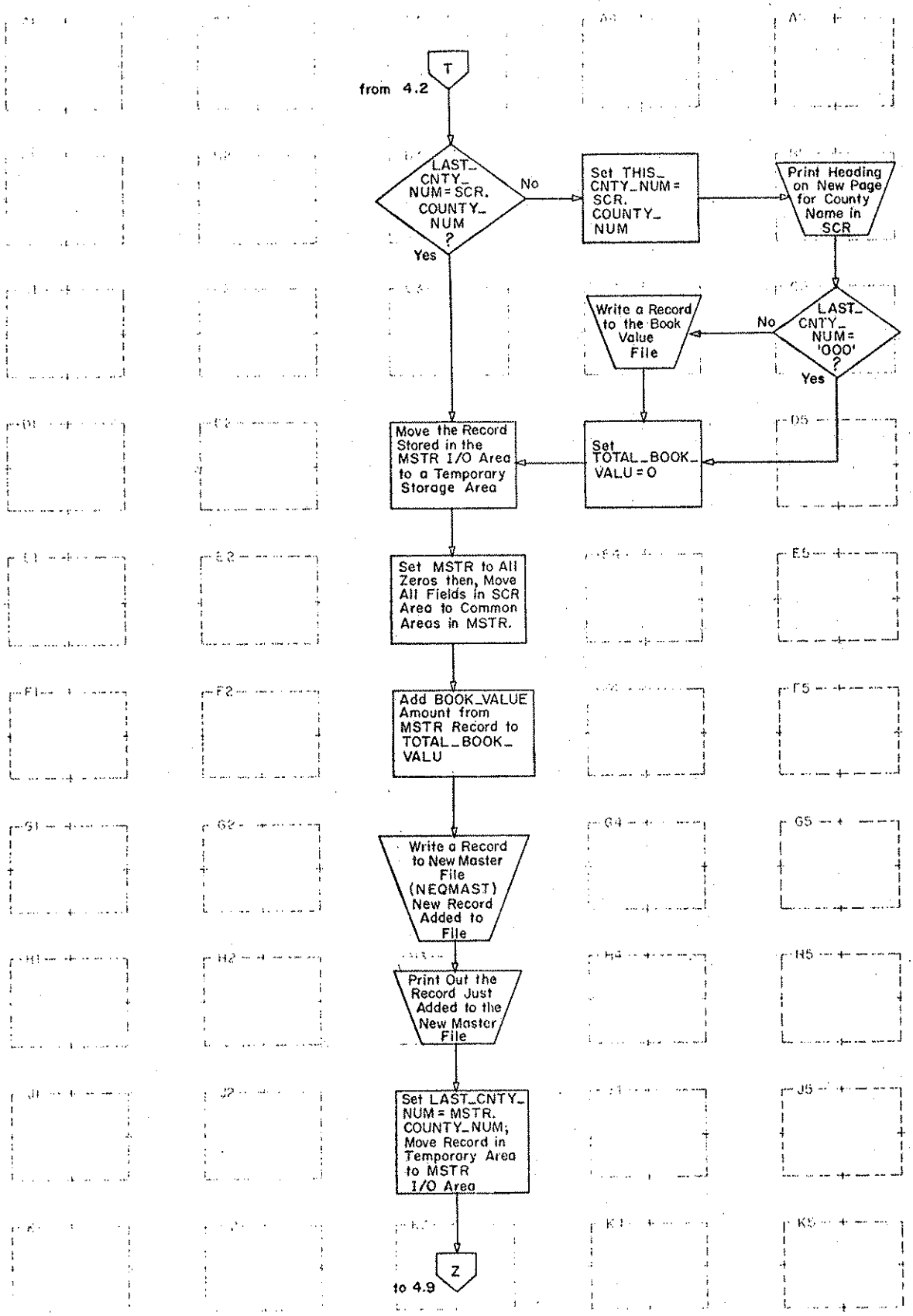
Programmer: Rolf McHenry Program No.: 4 Date: Page:
Chart ID: 4.6 Chart Name: Program Name: UPDATEM



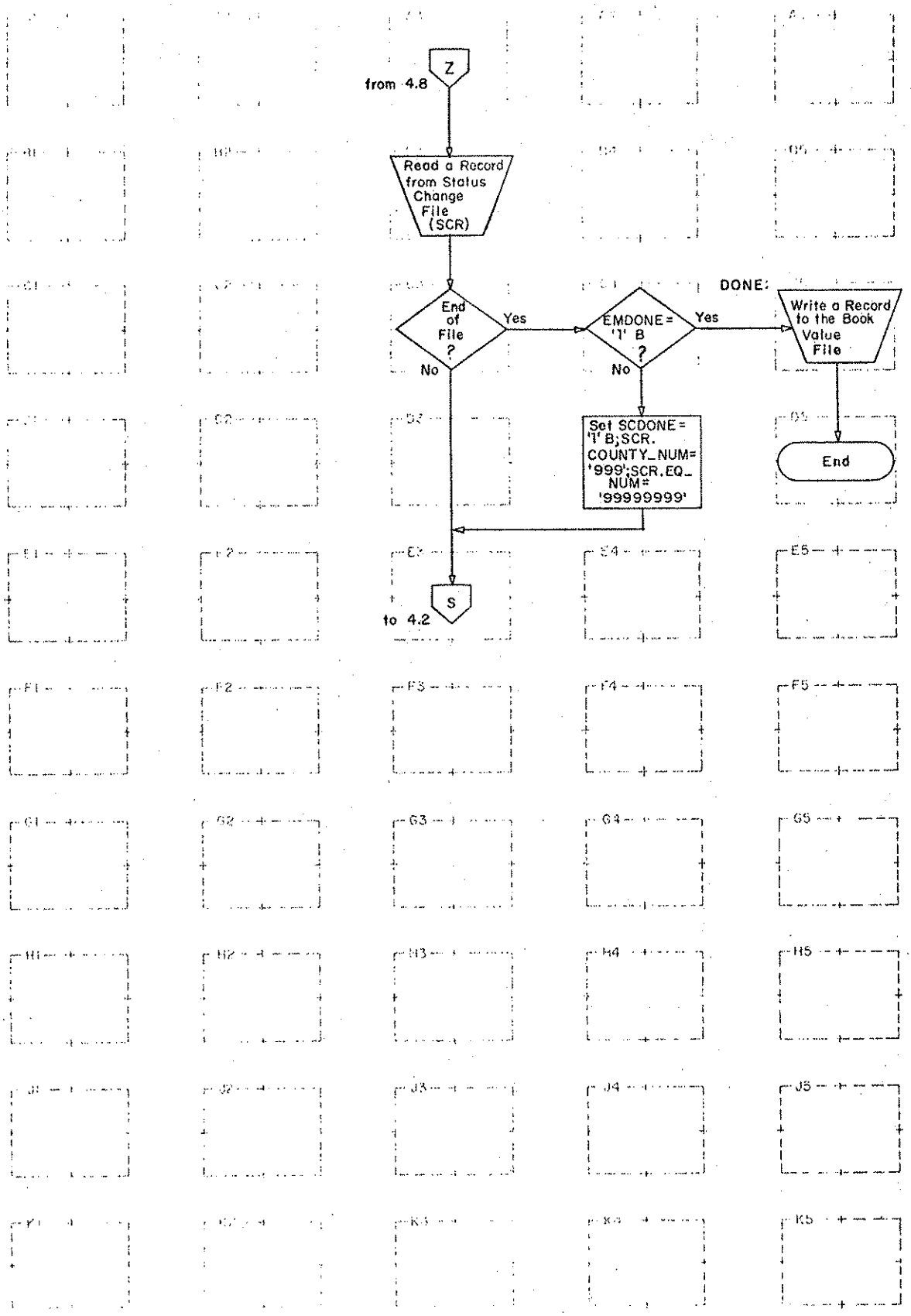
Programmer: Rolf McHenry Program No.: 4 Date: Page:
Chart ID: 4.7 Chart Name: Program Name: UPDATEM



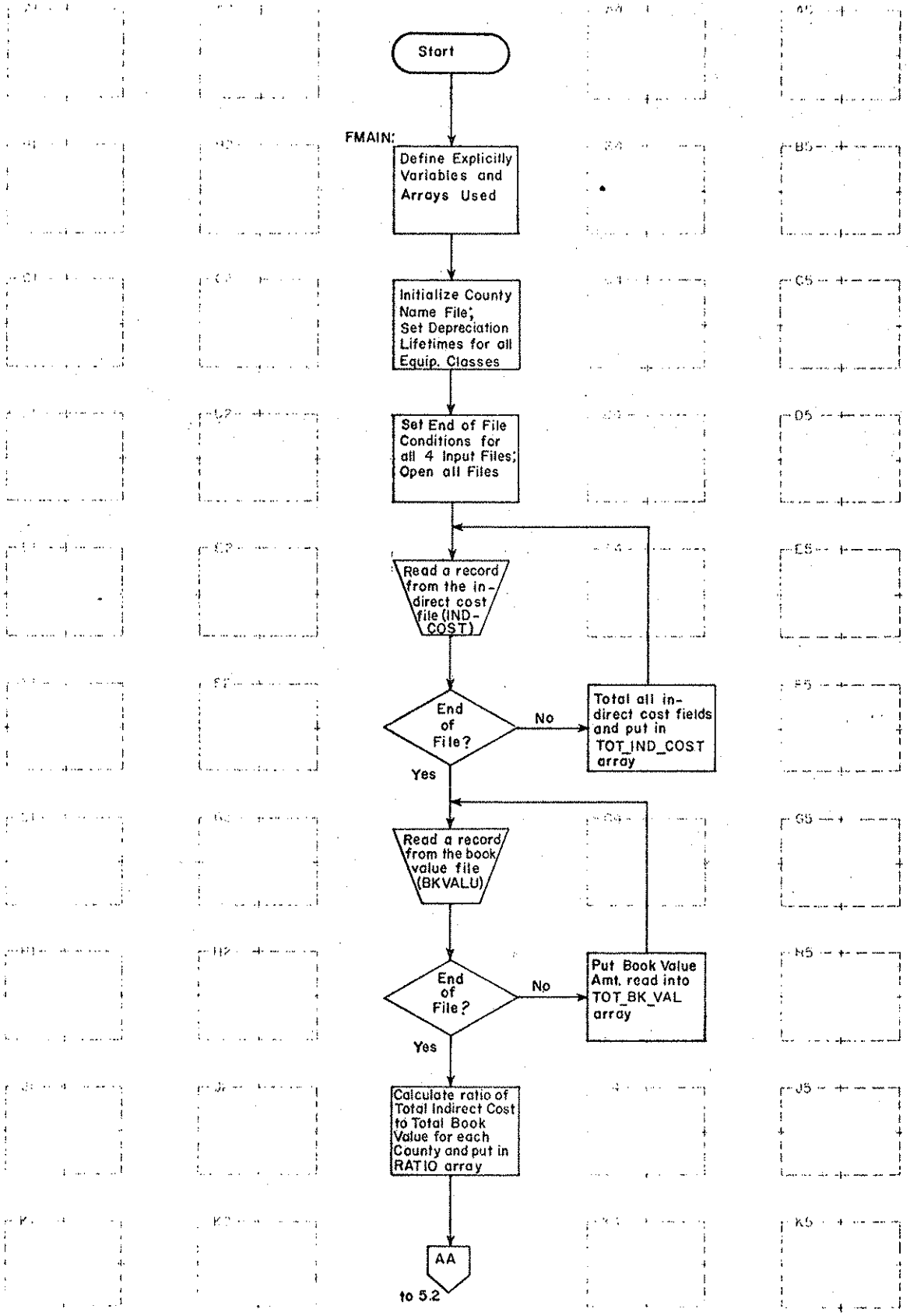
Programmer: Rolf McHenry Program No.: 4 Date: Page:
Chart ID: 4.8 Chart Name: Program Name: UPDATEM



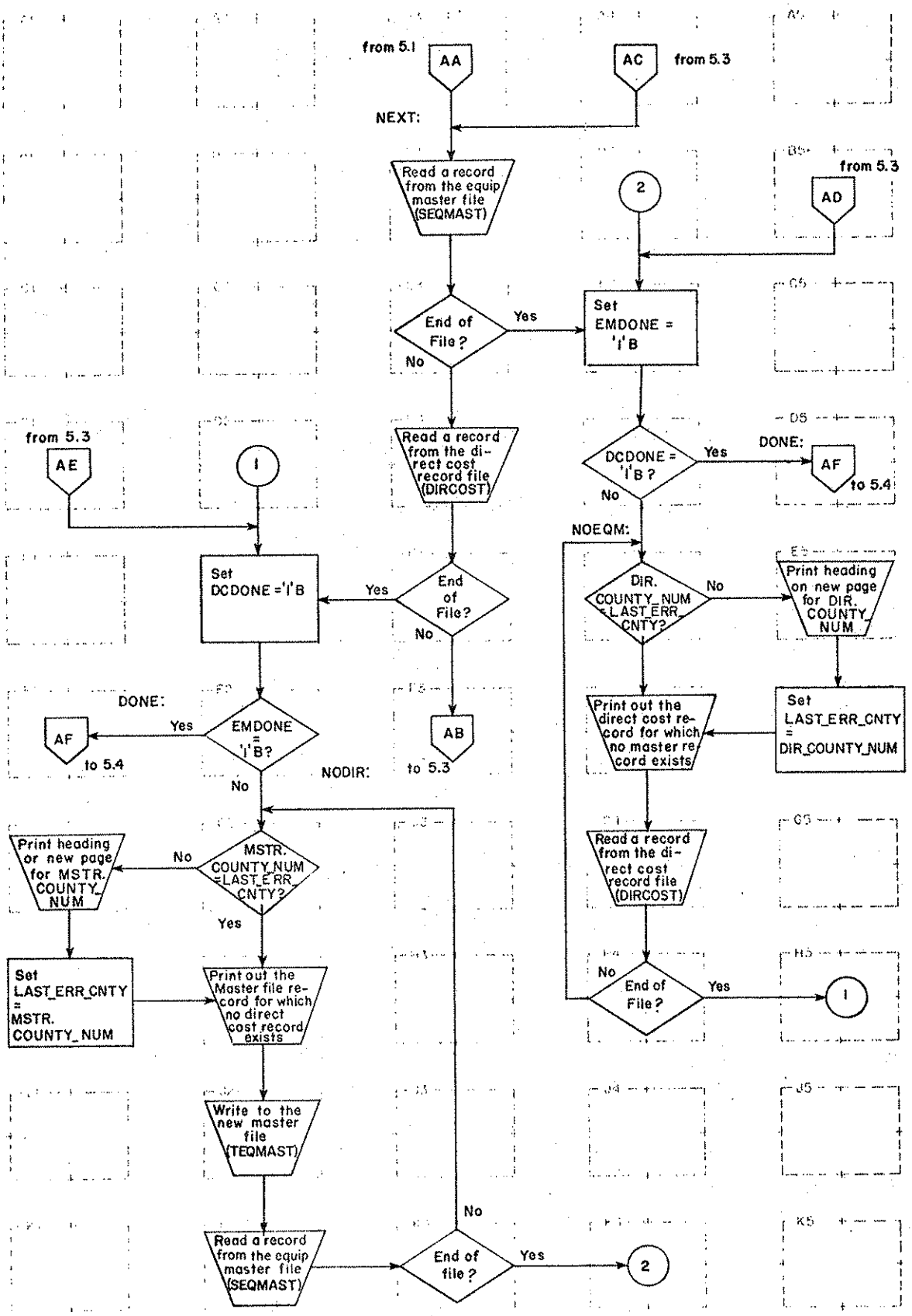
Programmer: Rolf McHenry Program No.: 4 Date: Page:
Chart ID: 4.9 Chart Name: Program Name: UPDATEM



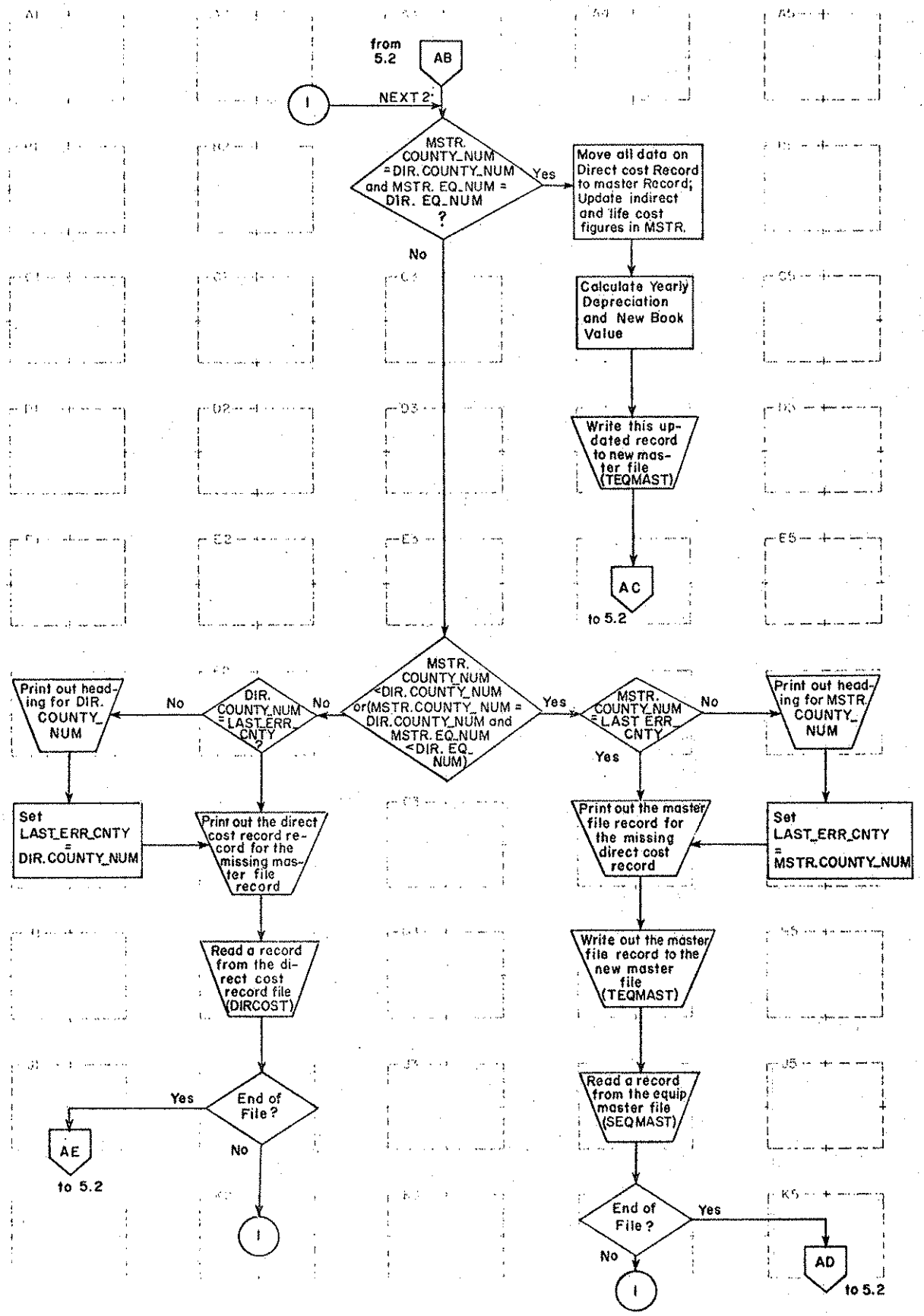
Programmer: Rolf McHenry Program No.: 5 Date: Page:
Chart ID: 5.1 Chart Name: Main Program- Update and List each Record in Master File Program Name: MAIN



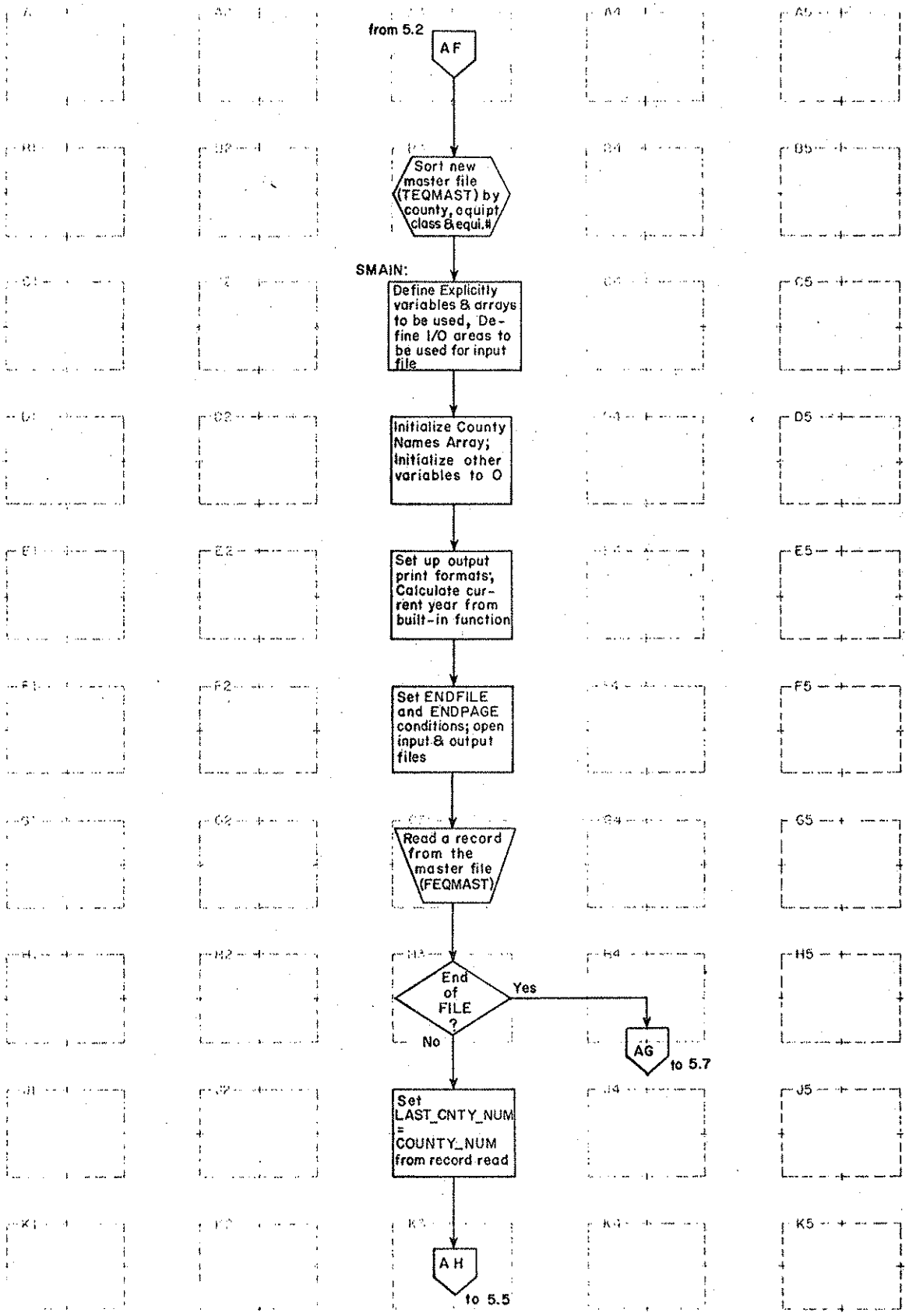
Programmer: Rolf McHenry Program No.: 5 Date: Page:
Chart ID: 5.2 Chart Name: Program Name: MAIN



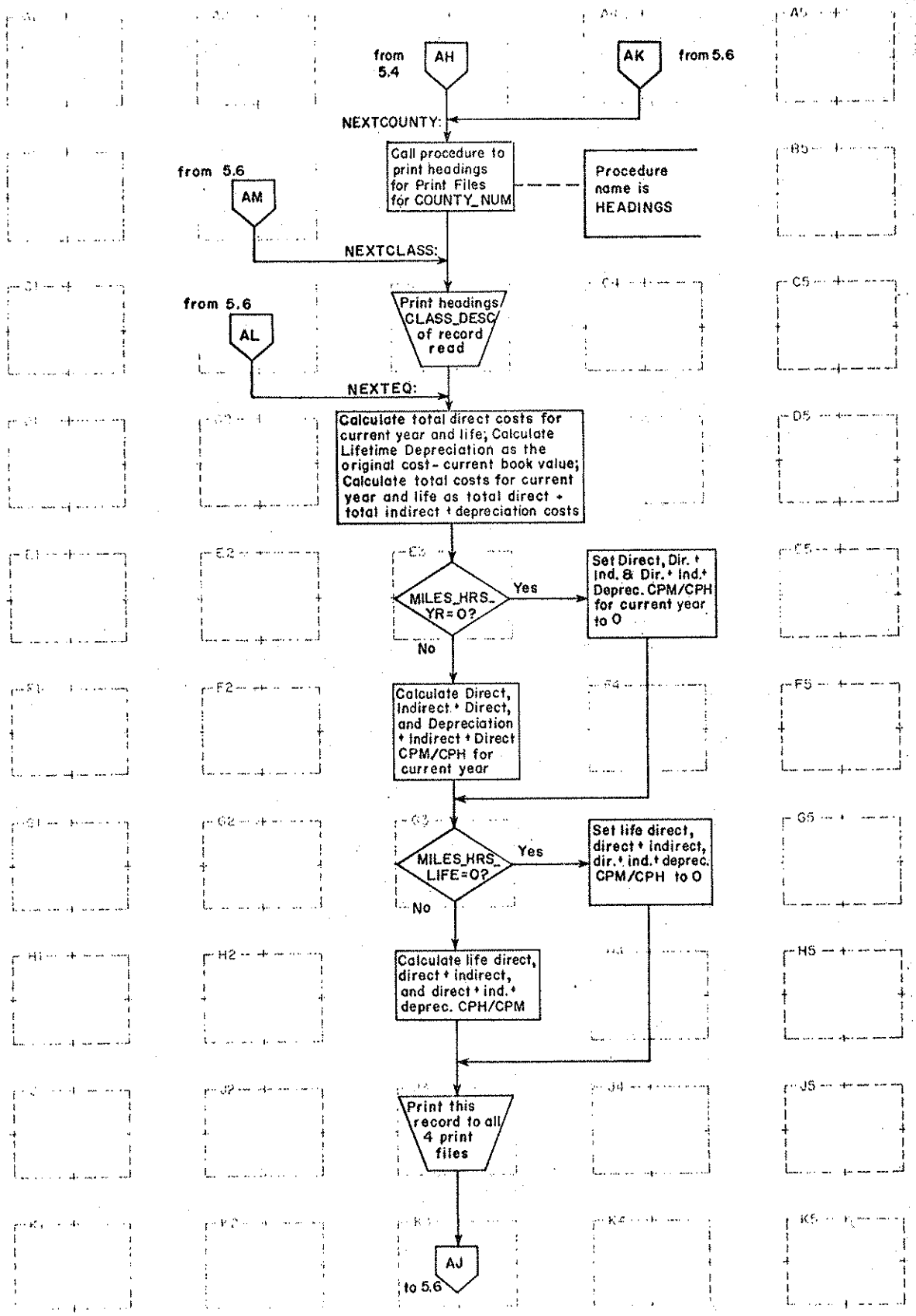
Programmer: Rolf McHenry Program No.: 5 Date: Page:
Chart ID: 5.3 Chart Name: Program Name: MAIN



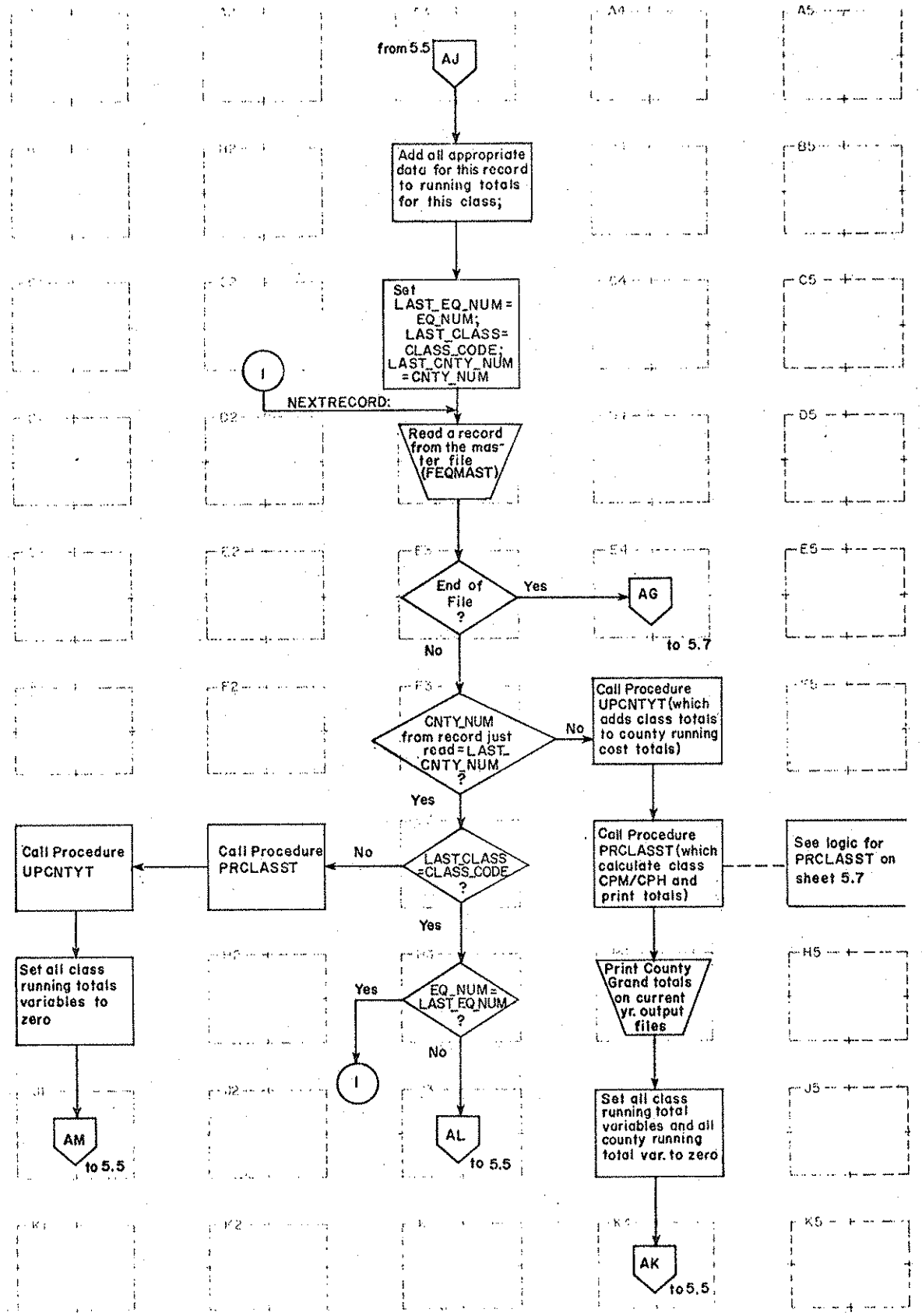
Programmer: Rolf McHenry Program No.: 5 Date: Page:
Chart ID: 5.4 Chart Name: Program Name: MAIN



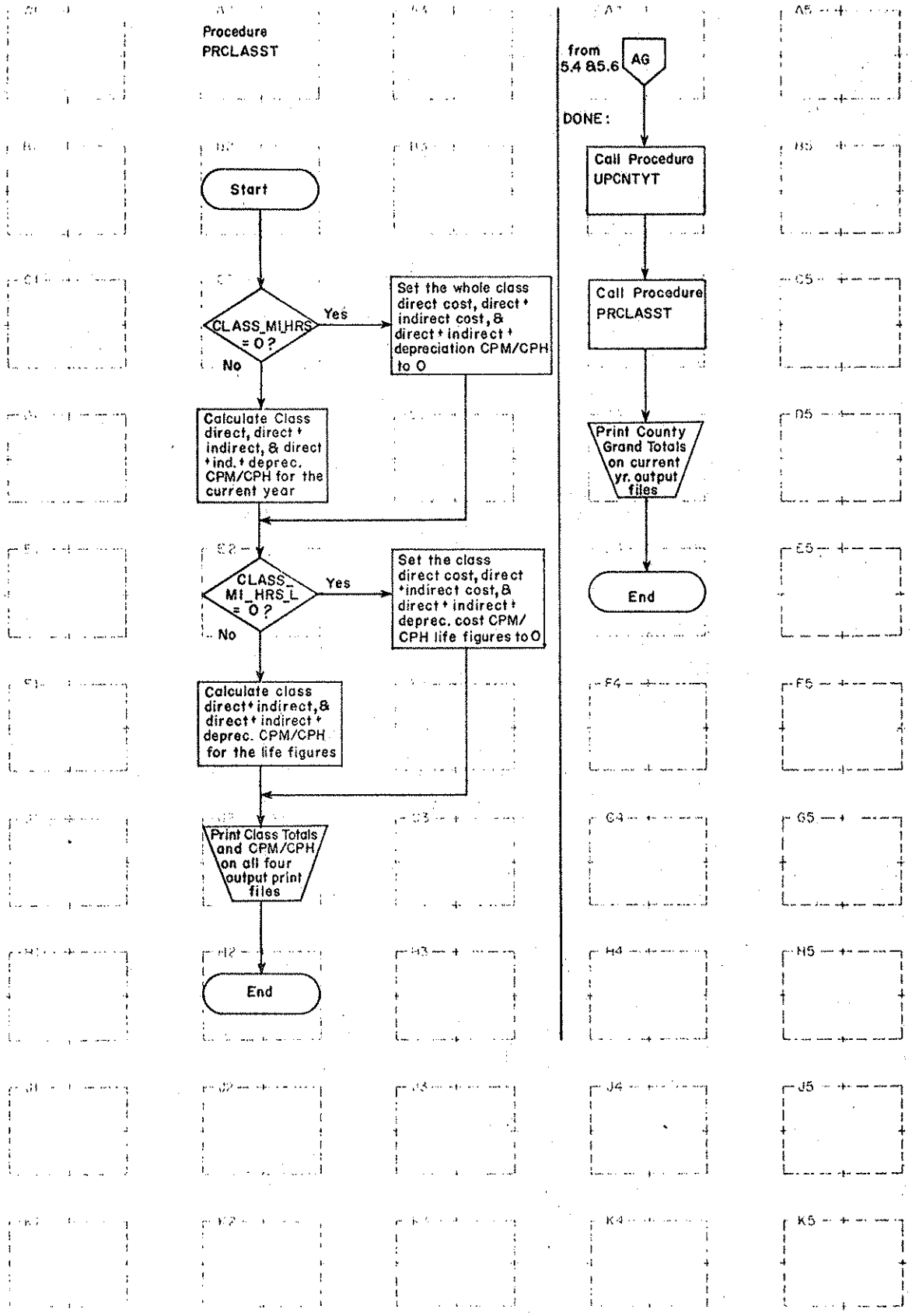
Programmer: Rolf McHenry Program No.: 5 Date: Page:
Chart ID: 5.5 Chart Name: Program Name: MAIN



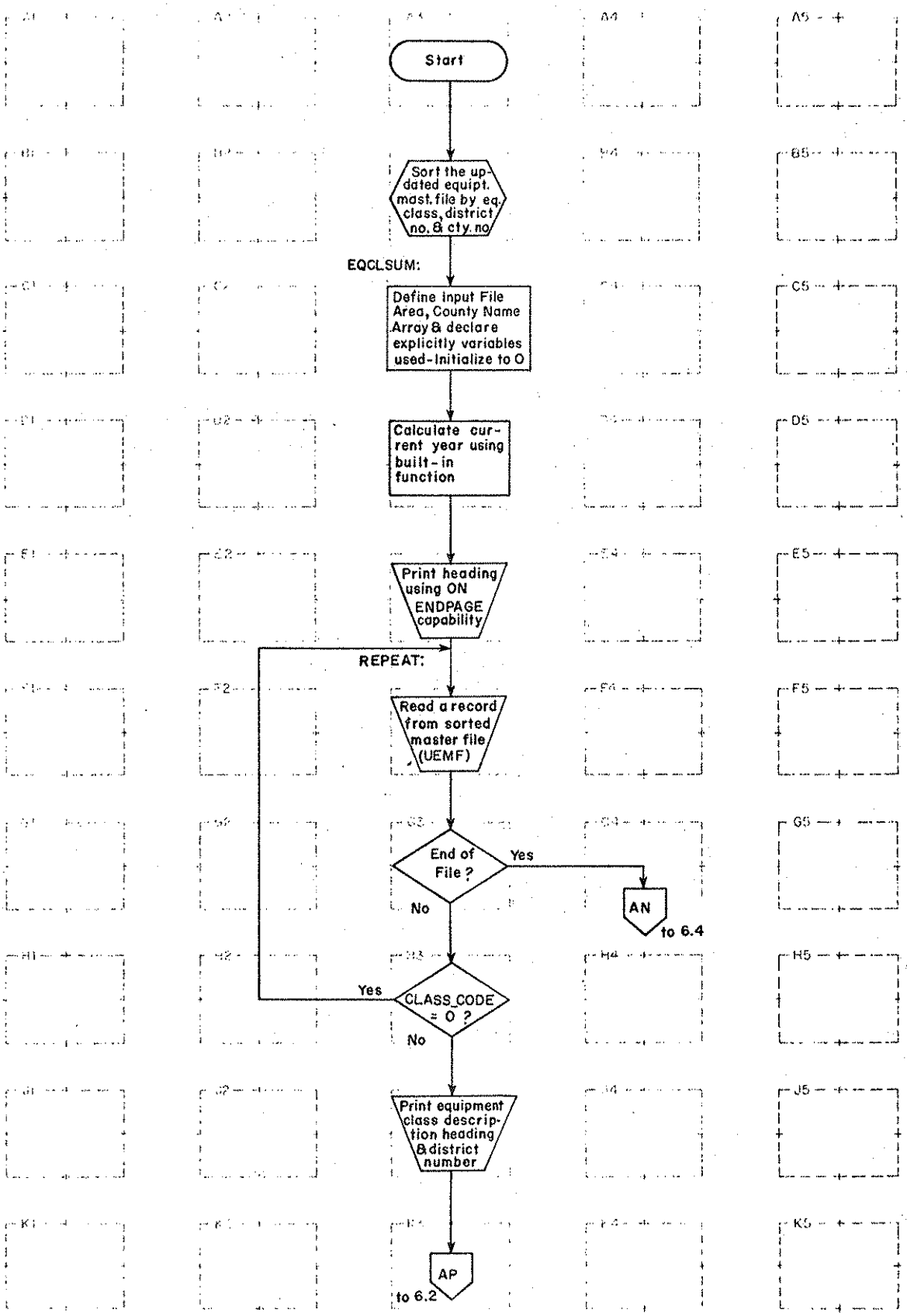
Programmer: Rolf McHenry Program No.: 5 Date: Page:
Chart ID: 5.6 Chart Name: Program Name: MAIN



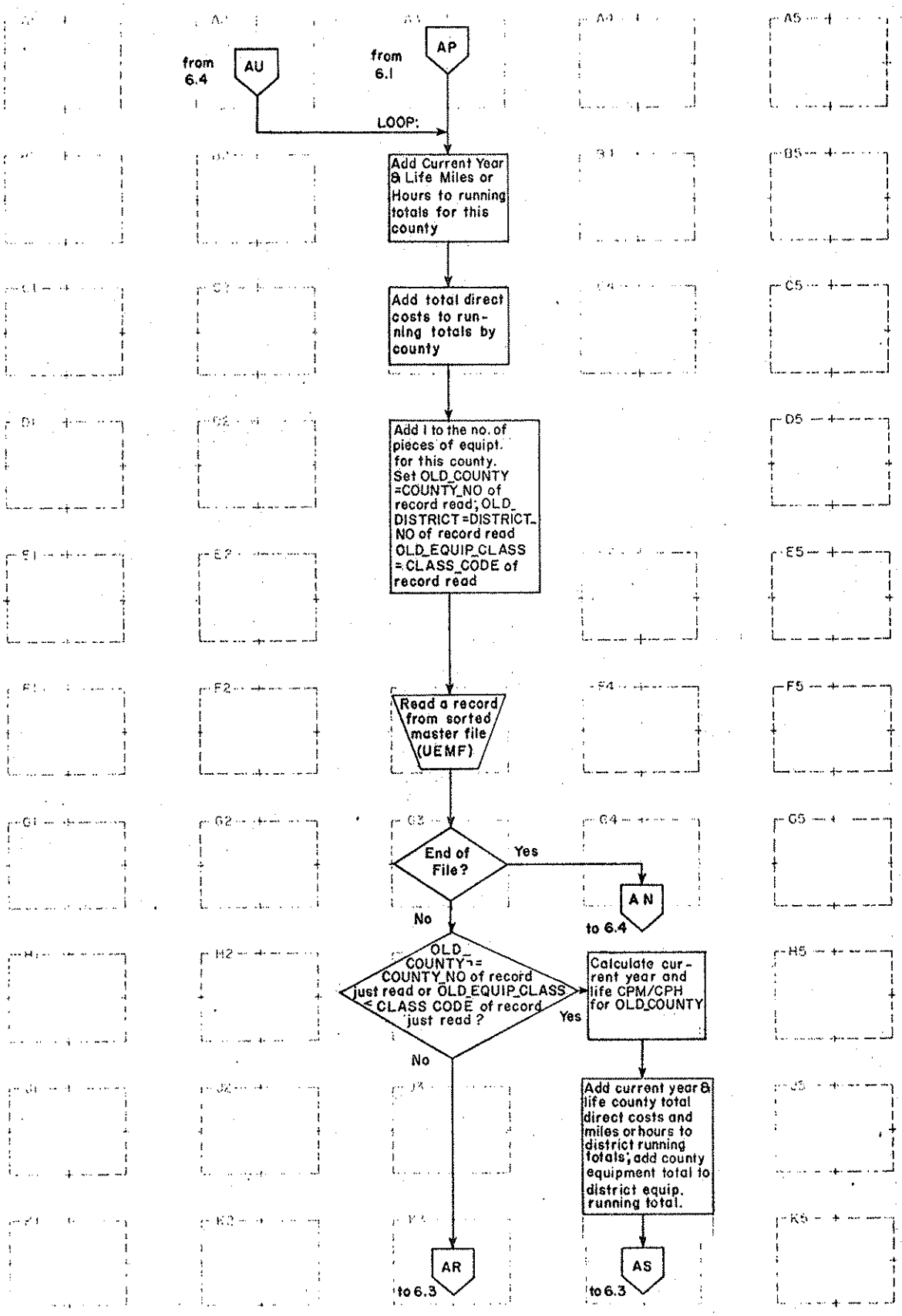
Programmer: Rolf McHenry Program No.: 5 Date: Page:
Chart ID: 5.7 Chart Name: Program Name: MAIN



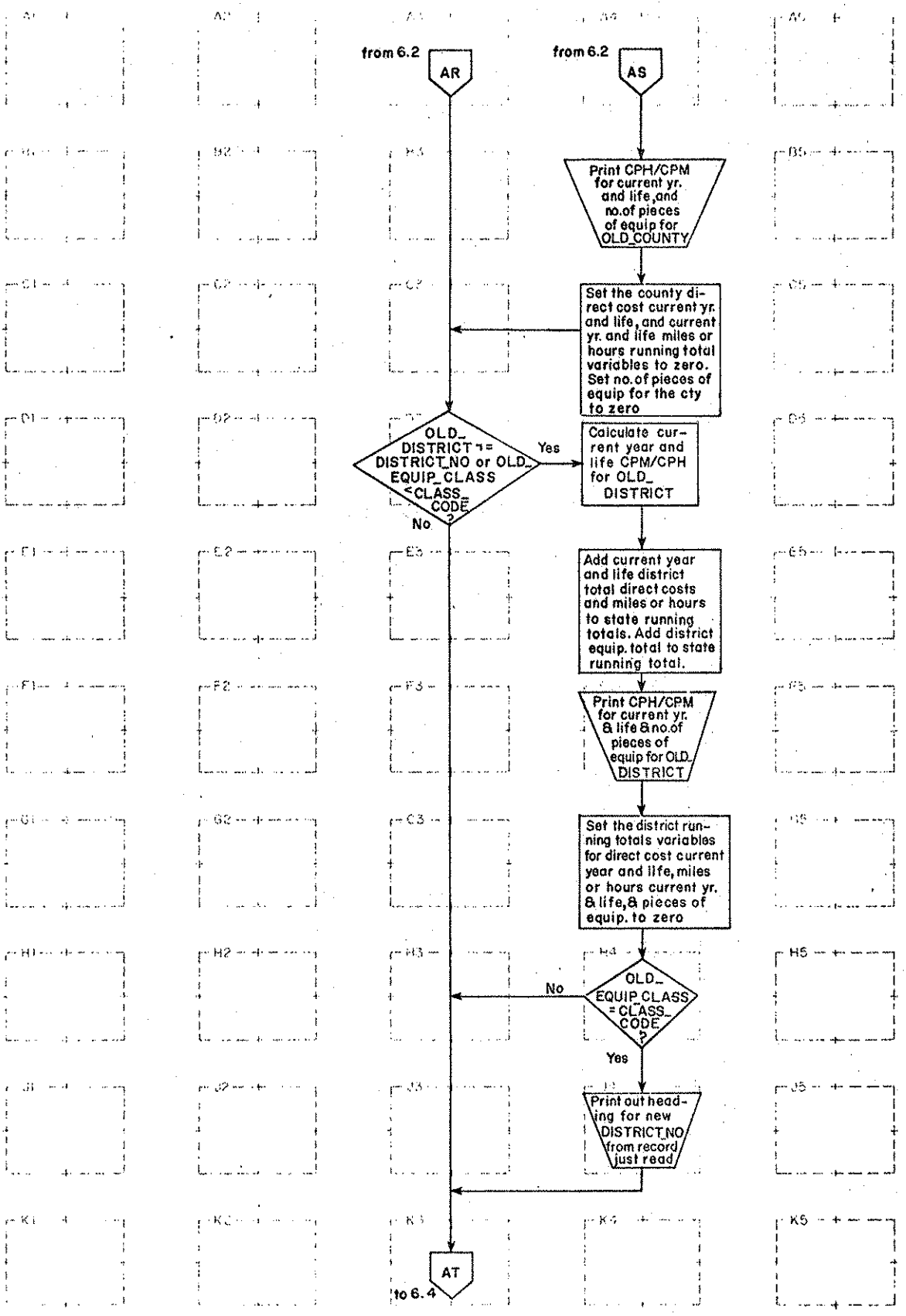
Programmer: John Poyzer Program No.: 6 Date: Page:
Chart ID: 6.1 Chart Name CPM/CPH Summary by Equipment Class District and County Program Name: CTYSUMRY



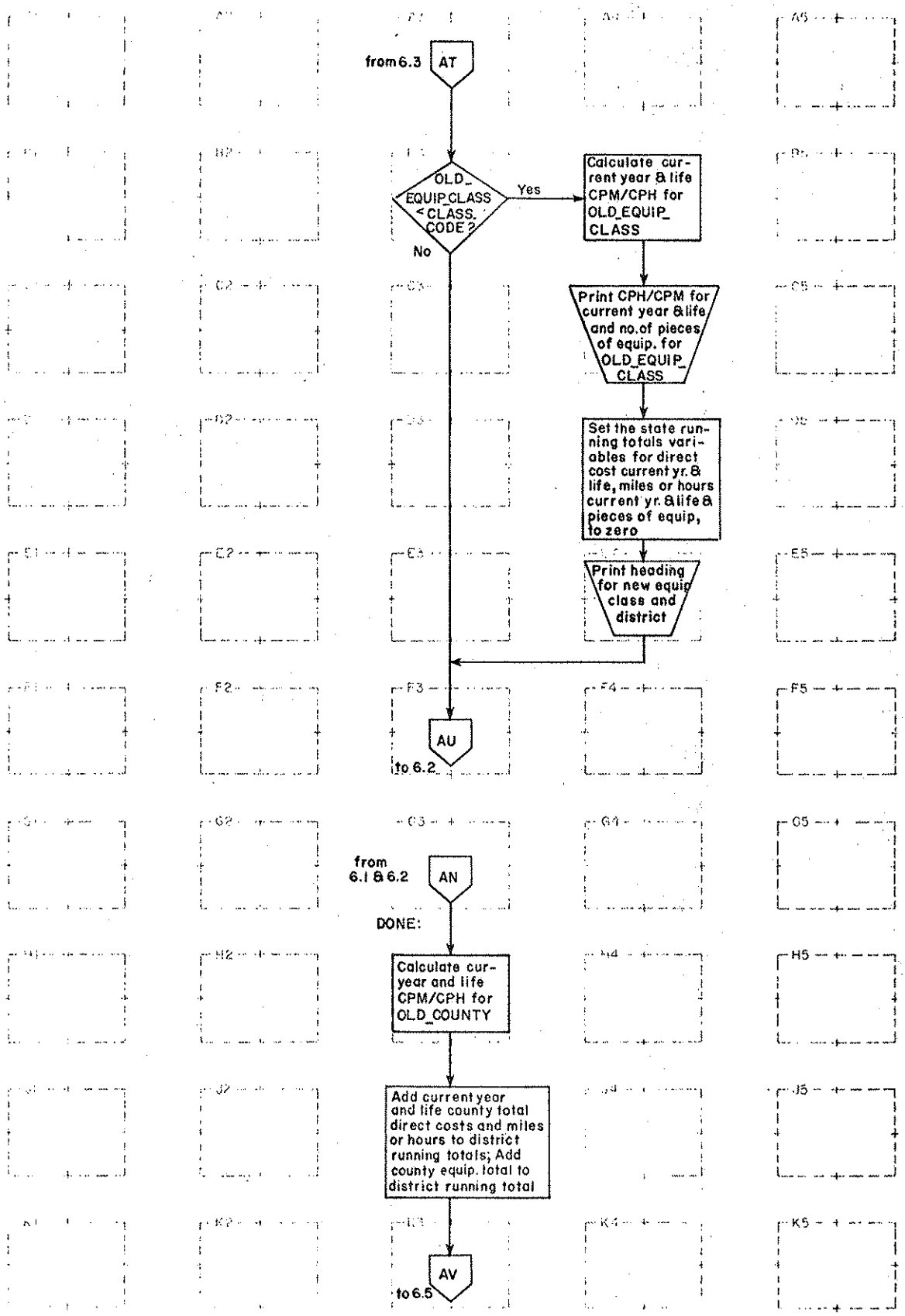
Programmer: John Poyzer Program No.: 6 Date: Page:
Chart ID: 6.2 Chart Name: Program Name: CTYSUMRY



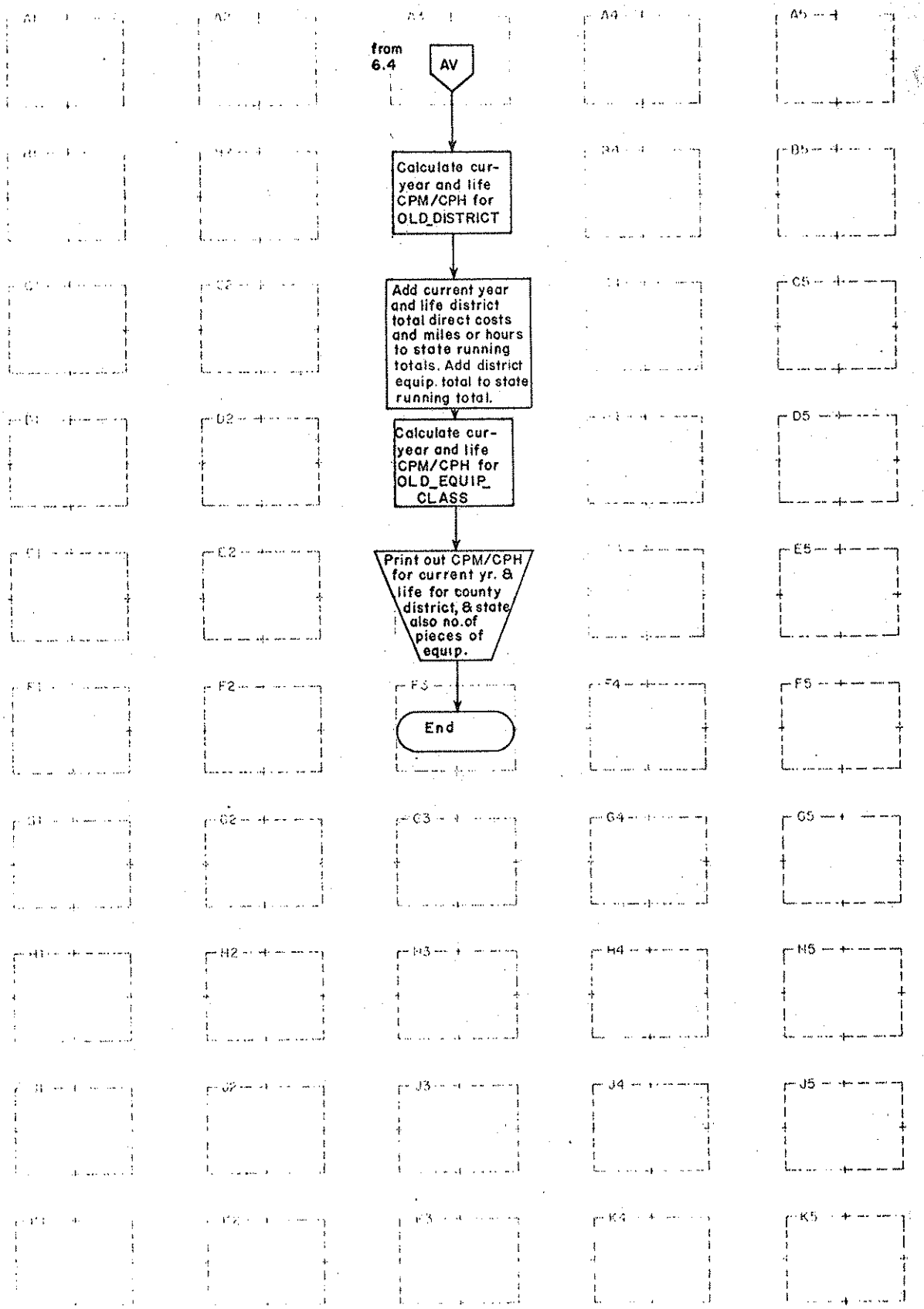
Programmer: John Poyzer Program No.: 6 Date: Page:
Chart ID: 6.3 Chart Name: Program Name: CTYSUMRY



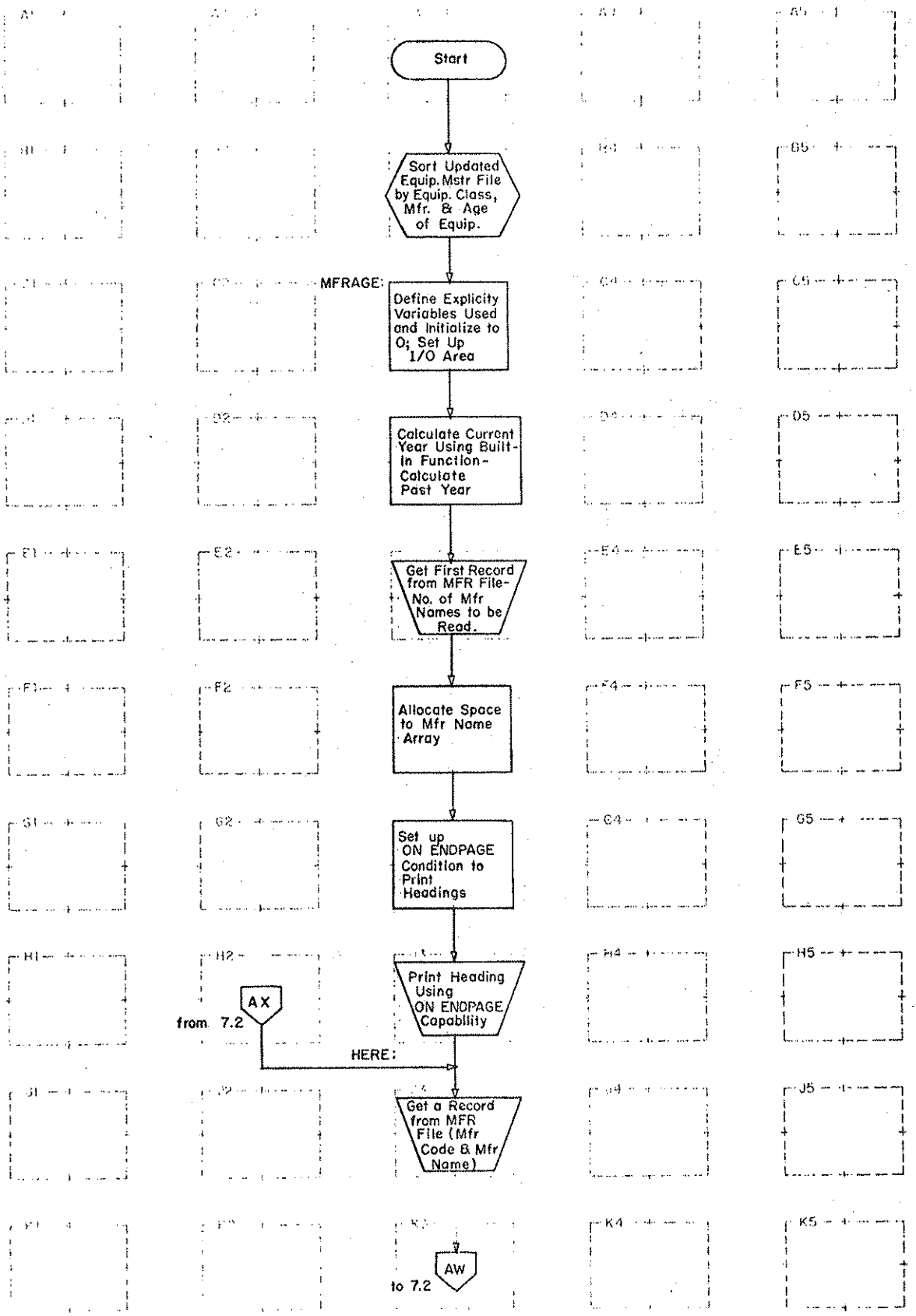
Programmer: John Poyzer Program No.: 6 Date: Page:
Chart ID: 6.4 Chart Name: Program Name: CTYSUMRY



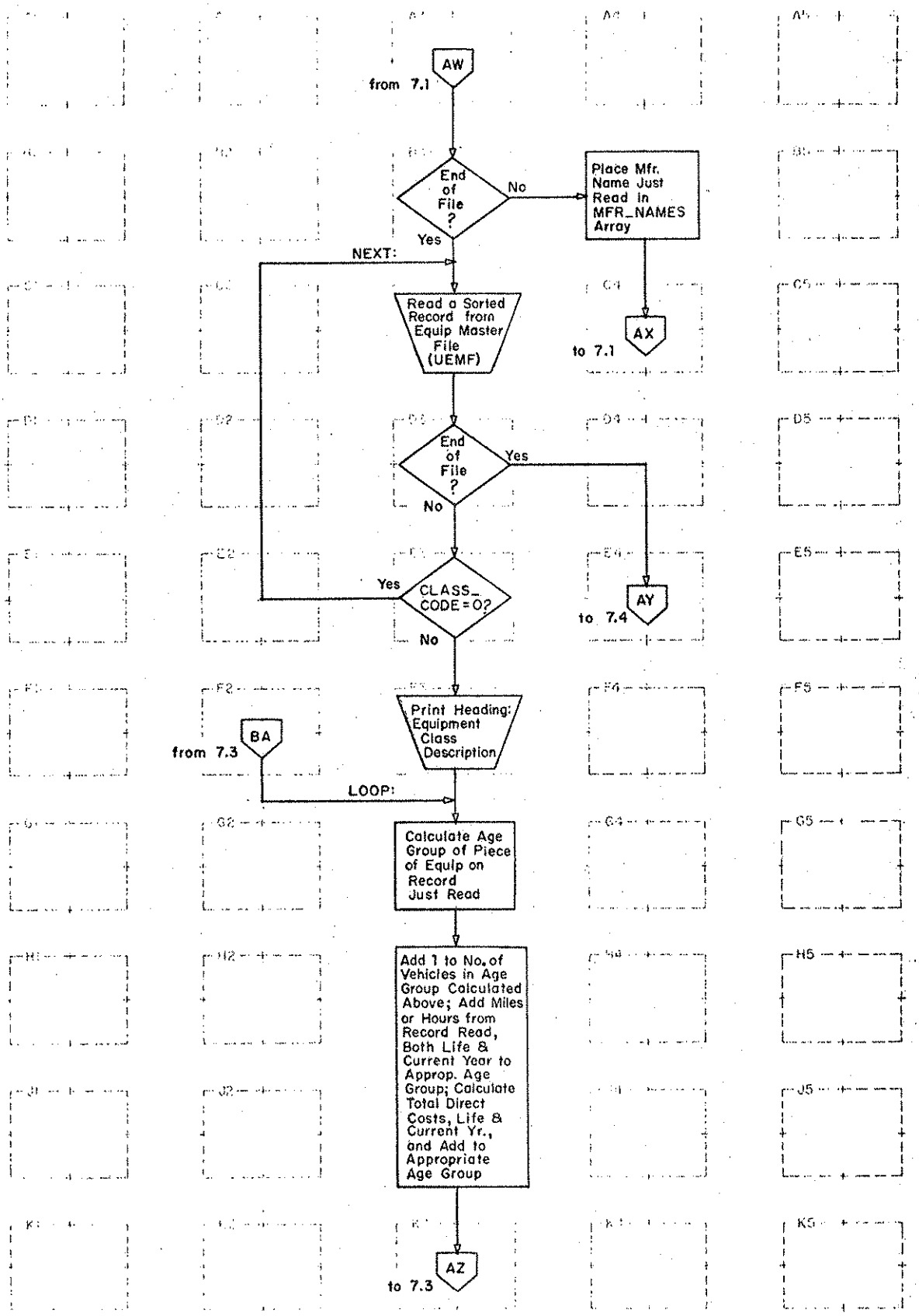
Programmer: John Poyzer Program No.: 6 Date: Page:
Chart ID: 6.5 Chart Name: Program Name: CTYSUMRY



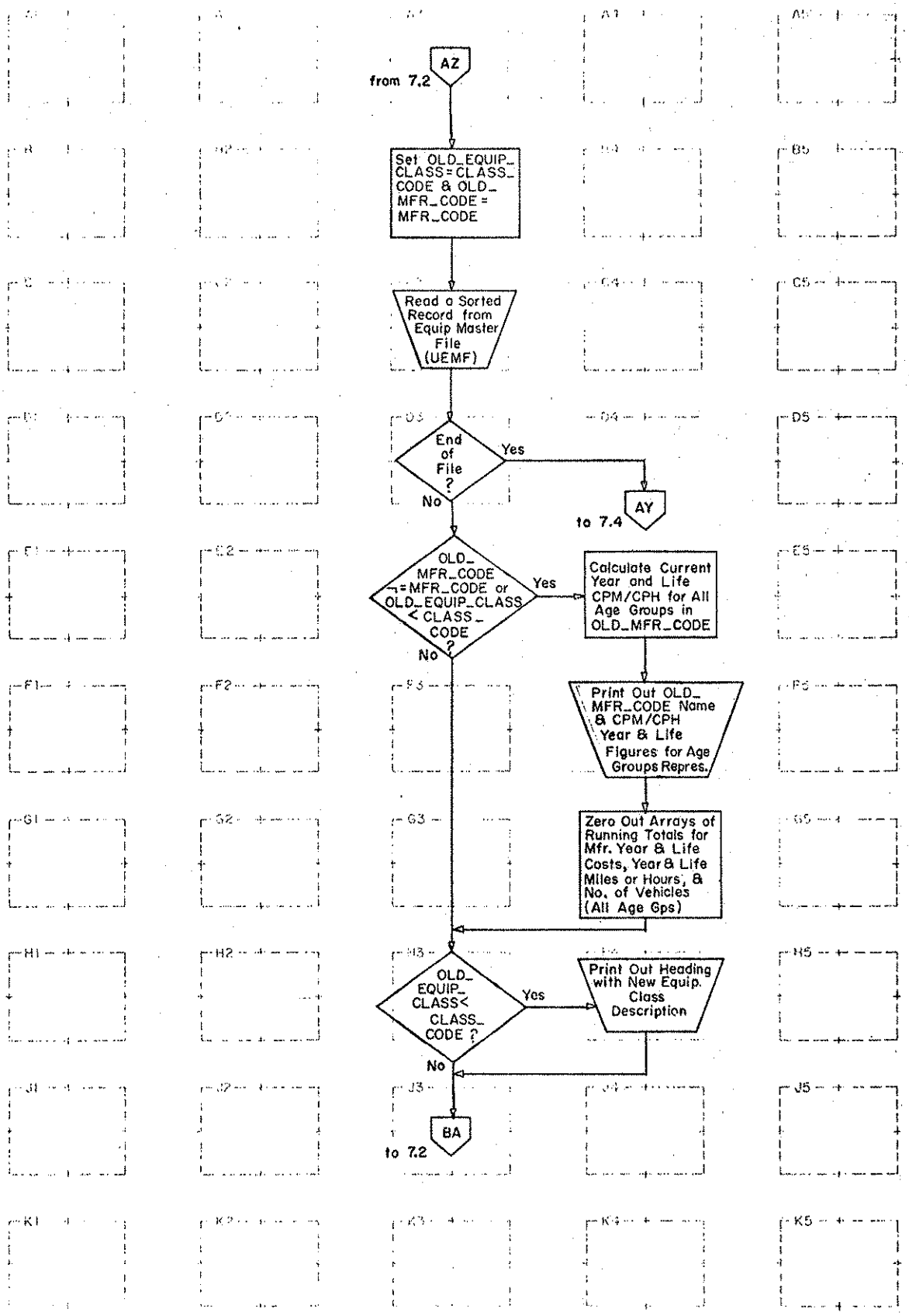
Programmer: John Poyzer Program No.: 7 Date: July 1975 Page:
Chart ID: 7.1 Chart Name: CPM/CPH Summary of Equipment Classes by Manufacturer and Equipment Age Program Name: MFGAGE



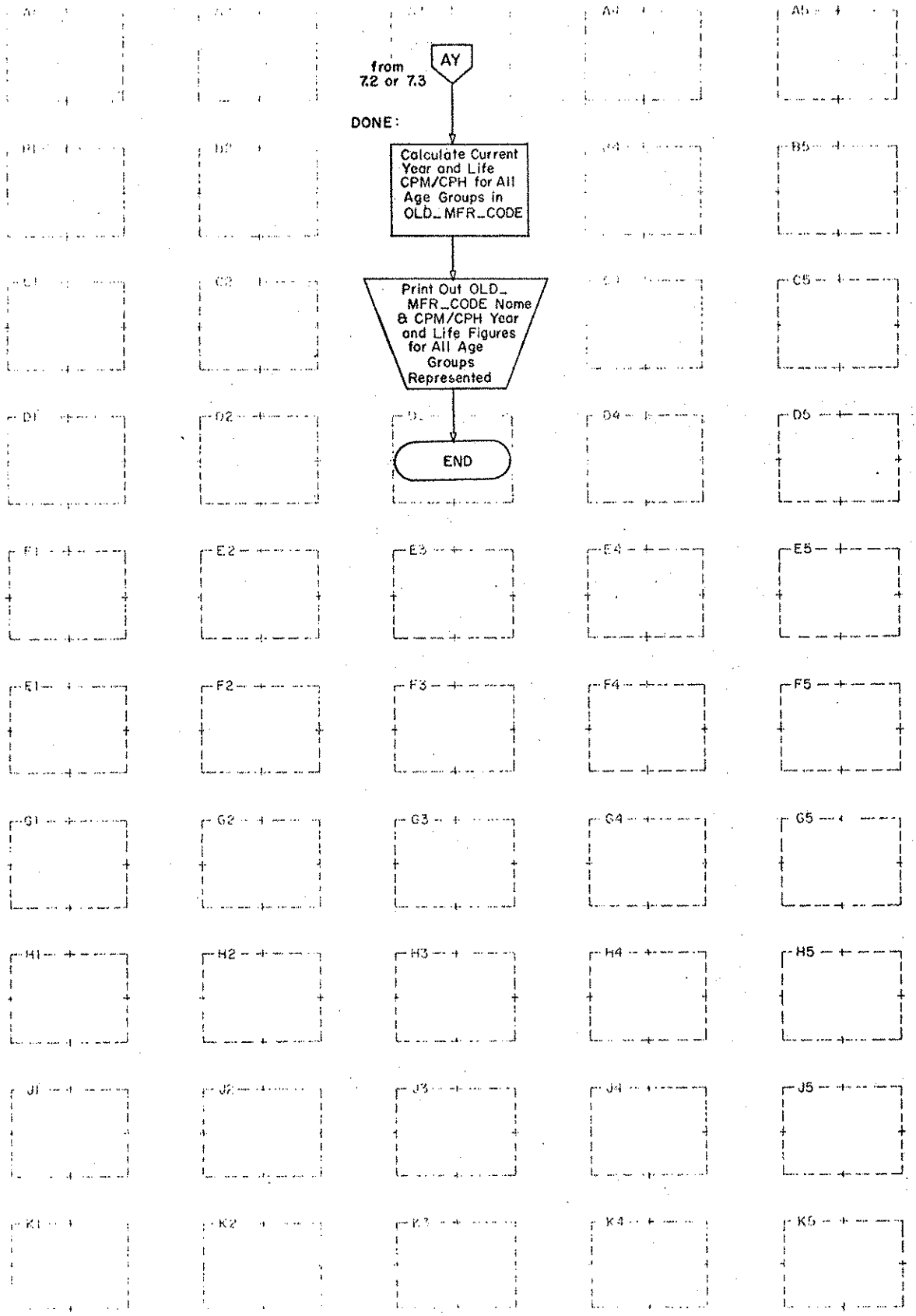
Programmer: John Poyzer Program No.: 7 Date: Page:
Chart ID: 7.2 Chart Name: Program Name: MFGAGE



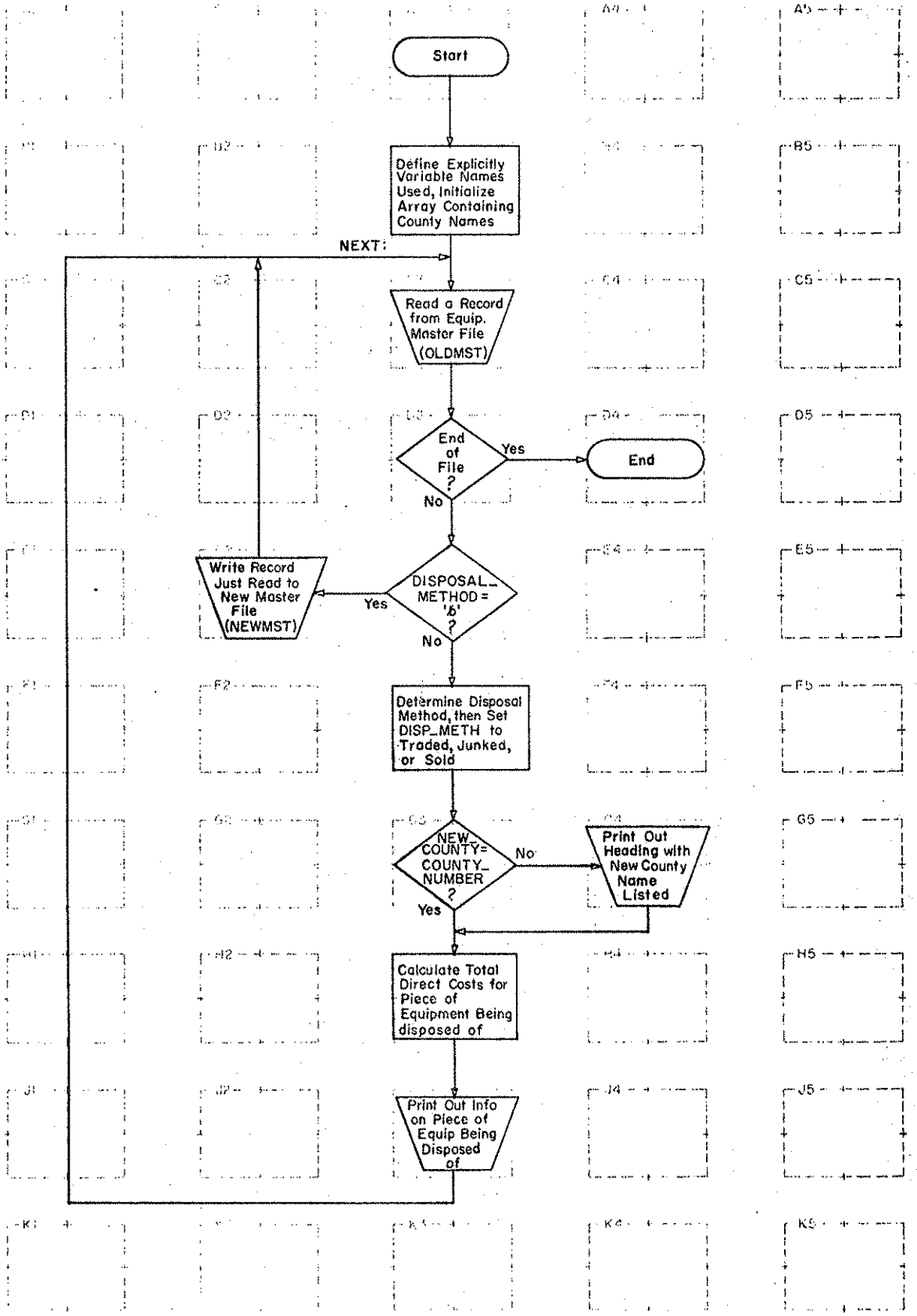
Programmer: John Poyzer Program No.: 7 Date: Page:
Chart ID: 7.3 Chart Name: Program Name: MFGAGE



Programmer: John Poyzer Program No.: 7 Date: Page:
Chart ID: 7.4 Chart Name: Program Name: MFGAGE



Programmer: Charles Saddoris Program No.: 8 Date: Page:
Chart ID: 8.1 Chart Name: Remove Disposed Equipment From Master File Program Name: UPDATE



COMPUTER PROGRAM LISTINGS

This section contains the computer program listing of each of the eight computer programs used in this system. All programs are written in the PL/1 programming language. DIRECT, INDCOST, STCHNGE, CTYSUMRY, and MFGAGE are two-step jobs, the first step being a sort performed by a utility sort program. MAIN is a three step job, the first step and third step are programs written in PL/1, with the second step being a utility sort program. The sort routine portions of these programs are not given in these listings, however, the necessary sort sequences are given in each of the Computer Operating Instructions in the first section of this Appendix.

Listing of Program DIRECT

```
STMT LEVEL NEST
  1              EDCR:  PROC OPTIONS(MAIN);

                 /*      PROGRAM DIRECT                                          */
                 /*                                                              */
                 /*      THIS PROGRAM READS ALL DIRECT COST SUMMARY FORM CARDS,  */
                 /*      CHECKS THEM FOR ERRORS, AND OUTPUTS THE CORRECT RECORDS */
                 /*      TO THE DIRECT COST FILE.  ERRORS FOR EACH COUNTY ARE    */
                 /*      LISTED.                                                 */
                 /*                                                              */
                 /*      THIS PROGRAM IS ONE OF EIGHT COMPUTER PROGRAMS          */
                 /*      WHICH FORM THE "COMPUTER BASED INFORMATION SYSTEM       */
                 /*      FOR COUNTY EQUIPMENT COST RECORDS."                     */
                 /*                                                              */
                 /*      WRITTEN BY                                              */
                 /*                                                              */
                 /*                SYSTEMS DIVISION                              */
                 /*                COLLEGE OF ENGINEERING                        */
                 /*                THE UNIVERSITY OF IOWA                        */
                 /*                IOWA CITY, IOWA                               */
                 /*                JULY, 1975                                    */
                 /*                                                              */
```

```
ECCR:  PROC OPTIONS(MAIN);

STMT LEVEL NEST

  2     1          DECLARE SDCOST FILE RECORD SEQUENTIAL;
  3     1          DECLARE ERROR FIXED DEC(5) INIT(0);
  4     1          DECLARE FLAG FIXED DEC(5) INIT(2);
  5     1          DECLARE LAST_CNTY_NO CHAR(3) INIT('AAA');

  6     1          DCL  1 DIRECT_COST_SUMMARY_RECORDS,
                          2 COUNTY_NUMBER  CHAR(3),
                          2 EQUIPMENT_NUMBER  CHAR(8),
                          2 F_DATE,
                               3 MONTH        CHAR(2),
                               3 YEAR  CHAR(2),
                          2 DIRECT_COSTS  CHAR(50);

  7     1          DECLARE DCOST FILE RECORD SEQUENTIAL;
  8     1          DECLARE COLUMN REAL FIXED BIN(15,0);
  9     1          DECLARE 1 C_DATE,
                          2 C_YEAR  CHAR(2),
                          2 MON_DAY  CHAR(4);

 10     1          ON ENDFILE(SDCOST) GO TO DONE;

 12     1          OPEN FILE(SDCOST) INPUT;
 13     1          OPEN FILE(DCOST) OUTPUT;
 14     1          C_DATE = DATE;
```

```
STMT LEVEL NEST

 15     1          NEXT:
                   READ FILE(SDCOST) INTO (DIRECT_COST_SUMMARY_RECORDS);

 16     1          IF   LAST_CNTY_NO ¬= COUNTY_NUMBER
 17     1          THEN DO;
 18     1    1          IF FLAG = 0
 19     1    1          THEN PUT SKIP(3) EDIT ('NO ERRORS FOUND')(X(5),A);
 20     1    1          PUT PAGE EDIT('ERROR LISTING FOR DIRECT COST SUMMARY FORMS',
                              ' - COUNTY CODE ',COUNTY_NUMBER)(COL(32),A,A,A(3));
 21     1    1          PUT SKIP(3);
 22     1    1          LAST_CNTY_NO = COUNTY_NUMBER;
 23     1    1          FLAG = 0;
 24     1    1          END;

 25     1          IF   COUNTY_NUMBER < '001'  |  COUNTY_NUMBER > '099'
 26     1          THEN DO;
 27     1    1          PUT SKIP EDIT('THE FOLLOWING RECORD HAS AN ILLEGAL COUNTY CODE.')
                        (X(5),A);
 28     1    1          ERROR = 1;
 29     1    1          END;

 30     1          IF   MONTH > '12'
 31     1          THEN DO;
 32     1    1          PUT SKIP EDIT('THE FOLLOWING RECORD HAS AN INVALID MONTH VALUE')
                        (X(5),A);
 33     1    1          ERROR = 1;
 34     1    1          END;

 35     1          IF   YEAR > C_YEAR
 36     1          THEN DO;
 37     1    1          PUT SKIP EDIT('THE FOLLOWING RECORD HAS AN INVALID YEAR VALUE.')
                        (X(5),A);
 38     1    1          ERROR = 1;
 39     1    1          END;

 40     1          COLUMN = VERIFY(DIRECT_COSTS,' 0123456789') + 15;

 41     1          IF   COLUMN ¬= 15
 42     1          THEN DO;
 43     1    1          PUT SKIP EDIT('THE FOLLOWING RECORD HAS AN ILLEGAL CHARACTER',
                              ' AT POSITION ',COLUMN,'. ')(X(5),A,A,F(2),A);
 44     1    1          ERROR = 1;
 45     1    1          END;

 46     1          IF ERROR = 1
 47     1          THEN DO;
 48     1    1          PUT SKIP(2) EDIT (DIRECT_COST_SUMMARY_RECORDS)(X(3),(5) A);
 49     1    1          PUT SKIP(2);
 50     1    1          FLAG = 1;
 51     1    1          ERROR = 0;
 52     1    1          END;
 53     1          ELSE
 53     1               WRITE FILE(DCOST) FROM(DIRECT_COST_SUMMARY_RECORDS);

 54     1          GO TO NEXT;
```

```
STMT LEVEL NEST

 55     1          DONE: IF FLAG = 0 THEN PUT SKIP(3) EDIT('NO ERRORS')(X(5),A);
 57     1          END EDCR;
```

Listing of Program INDCOST

```
STMT LEVEL NEST
                /* EDIT INDIRECT COST RECORDS */
  1             EICR:  PROC OPTIONS(MAIN);

                /*      PROGRAM INDCOST                                          */
                /*                                                               */
                /*      THIS PROGRAM READS ALL INDIRECT COST FORMS, CHECKS       */
                /*      THEM FOR ERRORS, AND OUTPUTS THE CORRECT RECORDS TO      */
                /*      THE INDIRECT COST FILE.  ERRORS FOR EACH COUNTY ARE      */
                /*      LISTED.                                                  */
                /*                                                               */
                /*      THIS PROGRAM IS ONE OF EIGHT COMPUTER PROGRAMS           */
                /*      WHICH FORM THE "COMPUTER BASED INFORMATION SYSTEM        */
                /*      FOR COUNTY EQUIPMENT COST RECORDS."                      */
                /*                                                               */
                /*      WRITTEN BY                                               */
                /*                                                               */
                /*              SYSTEMS DIVISION                                 */
                /*              COLLEGE OF ENGINEERING                           */
                /*              THE UNIVERSITY OF IOWA                           */
                /*              IOWA CITY, IOWA                                  */
                /*              JULY, 1975                                       */
                /*                                                               */
```

```
/* EDIT INDIRECT COST RECORDS */

STMT LEVEL NEST

  2     1          DECLARE SICOST FILE RECORD SEQUENTIAL,
                        1 INDIRECT_COST_RECORD,
                             2 COUNTY_NUMBER CHAR(3),
                             2 INDIRECT_COST CHAR(60);
  3     1          DECLARE ICOST FILE RECORD SEQUENTIAL;
  4     1          DECLARE COUNTY_CODE REAL FIXED BIN(15,0),
                          COLUMN REAL FIXED BIN(15,0);
  5     1          DECLARE LAST_CNTY_NO  CHAR(3) INIT('AAA');
  6     1          DECLARE ERROR FIXED DEC(5) INIT(1);

  7     1          ON ENDFILE(SICOST) GO TO DONE;

  9     1          OPEN FILE(SICOST) INPUT;
 10     1          OPEN FILE(ICOST) OUTPUT;
```

```
STMT LEVEL NEST

 11     1          NEXT:
                   READ FILE(SICCST) INTO (INDIRECT_COST_RECORD);

 12     1          IF   LAST_CNTY_NO ¬= COUNTY_NUMBER
 13     1          THEN DO;
 14     1    1          IF   ERROR = 0  THEN PUT SKIP EDIT ('NO ERRORS')(X(5),A);
 16     1    1          PUT PAGE EDIT ('ERROR LISTING FOR INDIRECT COST FORM',
                              '  -  COUNTY CODE ',COUNTY_NUMBER)(COL(32),A,A,A(3));
 17     1    1          PUT SKIP(3);
 18     1    1          ERROR = 0;
 19     1    1          LAST_CNTY_NO = COUNTY_NUMBER;
 20     1    1          END;

 21     1          IF   COUNTY_NUMBER < '001'  |  COUNTY_NUMBER > '099'
 22     1          THEN COUNTY_CODE = 0;
 23     1          ELSE COUNTY_CODE = 1;
 24     1          COLUMN = VERIFY(INDIRECT_COST,' 0123456789') + 3;

 25     1          IF   COLUMN = 3
 26     1          THEN IF   COUNTY_CODE = 0
 27     1               THEN DO;
 28     1    1               PUT SKIP EDIT('THE FOLLOWING RECORD HAS AN ILLEGAL ',
                                          'COUNTY CODE ') (X(5),A,A);
 29     1    1               PUT SKIP EDIT(INDIRECT_COST_RECORD) (X(10),A,A);
 30     1    1               ERROR = 1;
 31     1    1               END;
 32     1               ELSE DO;
 33     1    1               WRITE FILE(ICOST) FROM (INDIRECT_COST_RECORD);
 34     1    1               END;

 35     1          ELSE IF COUNTY_CODE = 0
 36     1               THEN DO;
 37     1    1               PUT SKIP EDIT('THE FOLLOWING RECORD HAS AN ILLEGAL COUNTY ',
                                          'CODE AND AN ILLEGAL CHARACTER AT POSITION ',
                                          COLUMN) (X(5),A,A,F(2));
 38     1    1               PUT SKIP EDIT (INDIRECT_COST_RECORD) (X(10),A,A);
 39     1    1               ERROR = 1;
 40     1    1               END;
 41     1               ELSE DO;
 42     1    1               PUT SKIP EDIT('THE FOLLOWING RECORD HAS AN ILLEGAL ',
                                    'CHARACTER AT POSITION ',COLUMN)(X(5),A,A,F(2));
 43     1    1               PUT SKIP EDIT(INDIRECT_COST_RECORD) (X(10),A,A);
 44     1    1               ERROR = 1;
 45     1    1               END;

 46     1          GO TO NEXT;

 47     1          DONE:
 48     1          IF   ERROR=0  THEN PUT SKIP EDIT ('NO ERRORS')(X(5),A);
 49     1          END EIOR;
```

Listing of Program STCHNGE

```
STMT LEVEL NEST
  1              SCR: PROC OPTIONS(MAIN);

                 /*      PROGRAM STCHNGE                                          */

                 /*      THIS PROGRAM EDITS EQUIPMENT STATUS CHANGE CARDS.        */
                 /*      INVALID INPUT CARDS ARE LISTED ON PRINTER OUTPUT.        */
                 /*      THE THREE INPUT CARDS PER PIECE OF EQUIPMENT ARE COMBINED */
                 /*      INTO ONE LOGICAL RECORD AND WRITTEN TO AN OUTPUT FILE.   */

                 /*      THIS PROGRAM IS ONE OF EIGHT COMPUTER PROGRAMS WHICH FORM */
                 /*      THE "COMPUTER BASED INFORMATION SYSTEM FOR COUNTY EQUIPMENT */
                 /*      COST RECORDS".                                           */

                 /*      WRITTEN BY                                               */
                 /*                SYSTEMS DIVISION                               */
                 /*                COLLEGE OF ENGINEERING                         */
                 /*                THE UNIVERSITY OF IOWA                         */
                 /*                IOWA CITY, IOWA                                */
                 /*                JULY 1975                                      */

                 /*      DECLARE THE STRUCTURES TO HOLD THE INPUT CARDS           */

  2     1          DECLARE TSC FILE RECORD SEQUENTIAL,
                     1 CARD1,
                          2 COUNTY_NUMBER            CHAR(3),
                          2 EQUIPMENT_NUMBER         CHAR(8),
                          2 CARD_TYPE1               CHAR(1),
                          2 DISTRICT                 CHAR(2),
                          2 CLASS_CODE               CHAR(2),
                          2 CLASS_DESCRIPTION        CHAR(20),
                          2 MANUFACTURER_CODE        CHAR(3),
                          2 YEAR_EQ_MANUFACTURED     CHAR(2),
                          2 MAKE_MODEL_SERIAL_NO     CHAR(28),
                          2 WHEELBASE                CHAR(3),
                          2 DATE_PURCHASED,
                            3 MONTH                  CHAR(2),
                            3 DAY                    CHAR(2),
                            3 YEAR                   CHAR(2),
                          2 FILLER                   CHAR(2);

  3     1          DECLARE
                     1 CARD2,
                          2 CTY_NO_EQ_NO             CHAR(11),
                          2 CARD_TYPE2               CHAR(1),
                          2 TYPE_OF_ENGINE           CHAR(1),
                          2 ENGINE_MAKE_MODEL_DSC    CHAR(14),
                          2 ENG_MAF_CODE             CHAR(2),
                          2 RATED_HORSEPOWER         CHAR(3),
                          2 NO_CYLINDERS             CHAR(2),
                          2 TRANS_TYPE               CHAR(1),
                          2 COMPANY_PUR_FROM         CHAR(12),
                          2 COST_VALUE               CHAR(23),
                          2 CHNG_STATUS_CODE         CHAR(1),
                          2 DATE_CHNG_STATUS,
                            3 MONTH                  CHAR(2),
                            3 DAY                    CHAR(2),
```

```
STMT LEVEL NEST

                        3 YEAR                  CHAR(2),
                      2 FILLER                  CHAR(3);

 4     1          DECLARE
                    1 CARD3,
                      2 CTY_NO_EQ_NO2           CHAR(11),
                      2 CARD_TYPE3              CHAR(1),
                      2 LIFE_COST               CHAR(57),
                      2 FILLER                  CHAR(11);
```

```
STMT LEVEL NEST

                /*      DECLARE THE STRUCTURE TO HOLD THE OUTPUT RECORD              */

  5     1        DECLARE SCHANGE FILE RECORD SEQUENTIAL,
                   1 STATUS_CHANGE_RECORD,
                        2 COUNTY_NUMBER              CHAR(3),
                        2 EQUIPMENT_NUMBER           CHAR(8),
                        2 DISTRICT                   CHAR(2),
                        2 CLASS_CODE                 CHAR(2),
                        2 CLASS_DESCRIPTION          CHAR(20),
                        2 MANUFACTURER_CODE          CHAR(3),
                        2 YEAR_EQ_MANUFACTURED       CHAR(2),
                        2 MAKE_MODEL_SERIAL_NO       CHAR(28),
                        2 WHEELBASE                  CHAR(3),
                        2 DATE_PURCHASED,
                          3 MONTH                    CHAR(2),
                          3 DAY                      CHAR(2),
                          3 YEAR                     CHAR(2),
                        2 TYPE_OF_ENGINE             CHAR(1),
                        2 ENGINE_MAKE_MODEL_DSC      CHAR(14),
                        2 ENG_MAF_CODE               CHAR(2),
                        2 RATED_HORSEPOWER           CHAR(3),
                        2 NO_CYLINDERS               CHAR(2),
                        2 TRANS_TYPE                 CHAR(1),
                        2 COMPANY_PUR_FROM           CHAR(12),
                        2 COST_VALUE                 CHAR(23),
                        2 CHNG_STATUS_CODE           CHAR(1),
                        2 DATE_CHNG_STATUS,
                          3 MONTH                    CHAR(2),
                          3 DAY                      CHAR(2),
                          3 YEAR                     CHAR(2),
                        2 LIFE_COST                  CHAR(57);

  6     1        DECLARE DISTRICT(99) CHAR(2) INIT('04','C4','02','05','04','06','02',
                 '01','02','06','03','02','03','03','04','06','02','03','02','05','03',
                 '02','06','03','04','05','C5','06','05','03','06','02','02','02','02',
                 '04','01','01','04','01','02','01','03','05','02','02','03','06','06',
                 '01','05','06','06','05','02','05','06','05','05','03','04','05','05',
                 '01','04','02','03','05','C4','05','03','03','04','03','03','03','01',
                 '04','01','04','03','06','04','03','01','01','04','04','05','05',
                 '05','05','05','C1','02','02','03','02','02');

  7     1        DECLARE NEW_COUNTY CHAR(3) INIT('   ');
  8     1        DECLARE COUNT FIXED BIN(15,0) INIT(2);
  9     1        DECLARE FLAG FIXED BIN(15,0) INIT(0);
 10     1        DECLARE BLANKS CHAR(80) INIT((80) ' ');
 11     1        DECLARE 1 TODAYS_DATE,
                            2 C_YEAR              CHAR(2),
                            2 C_MONTH_DAY         CHAR(4);

 12     1        TODAYS_DATE = DATE;
 13     1        DECLARE DESCRIPTIONS CHAR(20);
 14     1        DECLARE CL_DESC(0:54) CHAR(20);
 15     1        DECLARE CODES FIXED DEC(2);

 16     1        OPEN FILE(TSC) INPUT;
```

```
STMT LEVEL NEST

 17     1          OPEN FILE(SCHANGE) OUTPUT;

 18     1          ON ENDFILE(TSC) GO TO DONE;
 20     1          ON ENDFILE(SYSIN) GO TO NEXT;
```

```
STMT LEVEL NEST

                    /*      READ IN CLASS DESCRIPTIONS FROM CARDS                          */

 22     1          FIRST: GET EDIT(CODES,DESCRIPTIONS)(COL(0),F(2),A(20));
 23     1           CL_DESC(CODES) = DESCRIPTIONS;
 24     1           GO TO FIRST;

                    /*      READ AND EDIT THE FIRST CARD OF AN EQUIPMENT STATUS            */
                    /*      CHANGE RECORD.                                                 */

 25     1          NEXT: READ FILE(TSC) INTO(CARD1);

 26     1           IF NEW_COUNTY ¬= CARD1.COUNTY_NUMBER
 27     1           THEN DO;
 28     1    1        IF COUNT = 0 THEN PUT SKIP EDIT('ALL DATA SUBMITTED BY COUNTY ',
                          NEW_COUNTY,' HAS BEEN EDITED AND NO ERRORS WERE FOUND.')
                          (COL(30),A,A,A);
 30     1    1        ELSE COUNT = 0;
 31     1    1        PUT PAGE EDIT('ERROR LISTING OF STATUS CHANGE RECORDS FOR COUNTY ',
                          CARD1.COUNTY_NUMBER)(COL(35),A,A);
 32     1    1        PUT SKIP(3);
 33     1    1        NEW_COUNTY = CARD1.COUNTY_NUMBER;
 34     1    1        END;

 35     1           IF ((CARD1.COUNTY_NUMBER < '000') | (CARD1.COUNTY_NUMBER > '099'))
 36     1           THEN DO;
 37     1    1        FLAG = 1;
 38     1    1        PUT SKIP EDIT('THE COUNTY CODE IS INVALID')(X(5),A);
 39     1    1        END;

 40     1           IF CARD_TYPE1 ¬= '1'
 41     1           THEN DO;
 42     1    1        FLAG = 1;
 43     1    1        PUT SKIP EDIT('CARD TYPE NOT 1 ON FIRST CARD.')(X(5),A);
 44     1    1        END;

 45     1           IF ((CARD1.CLASS_CODE < '00') & (CARD1.CLASS_CODE ¬= '  ')) |
                       (CARD1.CLASS_CODE > '54')
 46     1           THEN DO;
 47     1    1        FLAG = 1;
 48     1    1        PUT SKIP EDIT('CLASS CODE IS INVALID.')(X(5),A);
 49     1    1        END;

 50     1           IF (CARD1.YEAR_EQ_MANUFACTURED > C_YEAR) |
                       ((CARD1.YEAR_EQ_MANUFACTURED < '00') &
                       (CARD1.YEAR_EQ_MANUFACTURED ¬='  '))
 51     1           THEN DO;
 52     1    1        FLAG = 1;
 53     1    1        PUT SKIP EDIT('YEAR EQUIPMENT MANUFACTURED IS INVALID.')(X(5),A);
 54     1    1        END;

 55     1           IF ((CARD1.MANUFACTURER_CODE < '000') & (CARD1.MANUFACTURER_CODE ¬=
                    '  ')) | (CARD1.MANUFACTURER_CODE > '135')
 56     1           THEN DO;
 57     1    1        FLAG = 1;
 58     1    1        PUT SKIP EDIT('THE MANUFACTURER CODE NUMBER IS INVALID.')(X(5),A);
```

```
STMT LEVEL NEST

 59     1    1        END;

 60     1           IF VERIFY(CARD1.WHEELBASE,' 1234567890') ¬= 0
 61     1           THEN DO;
 62     1    1        FLAG = 1;
 63     1    1        PUT SKIP EDIT('THE WHEELBASE VALUE IS INVALID.')(X(5),A);
 64     1    1        END;

 65     1           IF ((CARD1.DATE_PURCHASED.MONTH < '01') & (CARD1.DATE_PURCHASED.MONTH
                       ¬= '  ')) | (CARD1.DATE_PURCHASED.MONTH > '12')
 66     1           THEN DO;
 67     1    1        FLAG = 1;
 68     1    1        PUT SKIP EDIT('THE MONTH OF THE DATE PURCHASED IS INVALID.')
                       (X(5),A);
 69     1    1        END;

 70     1           IF ((CARD1.DATE_PURCHASED.DAY < '01') & (CARD1.DATE_PURCHASED.DAY ¬=
                       '  ')) | (CARD1.DATE_PURCHASED.DAY > '31')
 71     1           THEN DO;
 72     1    1        FLAG = 1;
 73     1    1        PUT SKIP EDIT('THE DAY OF THE DATE PURCHASED IS INVALID.')(X(5),A);
 74     1    1        END;

 75     1           IF (CARD1.DATE_PURCHASED.YEAR > C_YEAR) |
                       ((CARD1.DATE_PURCHASED.YEAR < '00') & (CARD1.DATE_PURCHASED.YEAR
                       ¬='  '))
 76     1           THEN DO;
 77     1    1        FLAG = 1;
 78     1    1        PUT SKIP EDIT('THE YEAR OF THE DATE PURCHASED IS INVALID.')(X(5),A);
 79     1    1        END;

 80     1           IF CARD_TYPE1 ¬= '1'
 81     1           THEN DO;
 82     1    1        CARD2 = BLANKS;
 83     1    1        CARD3 = BLANKS;
 84     1    1        GO TO TEST;
 85     1    1        END;
```

```
STMT LEVEL NEST

                    /*      READ AND EDIT THE SECOND CARD OF AN EQUIPMENT STATUS        */
                    /*      CHANGE RECORD                                               */

 86     1           READ FILE(TSC) INTO(CARD2);
 87     1           IF CARD_TYPE2 ¬= '2'
 88     1           THEN DO;
 89     1    1        FLAG = 1;
 90     1    1        PUT SKIP EDIT('THE CARD TYPE FOR THE SECOND CARD IS NOT TYPE 2.')
                      (X(5),A);
 91     1    1        END;

 92     1           IF VERIFY(CARD2.TYPE_OF_ENGINE,' GD') ¬= 0
 93     1           THEN DO;
 94     1    1        FLAG = 1;
 95     1    1        PUT SKIP EDIT('THE ENGINE FUEL CODE IS NOT A ''G'' OR ''D''.')
                      (X(5),A);
 96     1    1        END;

 97     1           IF ((CARD2.ENG_MAF_CODE < '00') & (CARD2.ENG_MAF_CODE ¬= '  ')) |
                       (CARD2.ENG_MAF_CODE  > '34')
 98     1           THEN DO;
 99     1    1        FLAG = 1;
100     1    1        PUT SKIP EDIT('THE ENGINE MANUFACTURER CODE IS INVALID.')(X(5),A);
101     1    1        END;

102     1           IF ((CARD2.RATED_HORSEPOWER < '000') &
                       (CARD2.RATED_HORSEPOWER ¬= '   ')) |
                       (CARD2.RATED_HORSEPOWER > '999')
103     1           THEN DO;
104     1    1        FLAG = 1;
105     1    1        PUT SKIP EDIT('THE RATED HORSEPOWER IS INVALID.')(X(5),A);
106     1    1        END;

107     1           IF (CARD2.NO_CYLINDERS ¬= '02') & (CARD2.NO_CYLINDERS ¬= '04') &
                      (CARD2.NO_CYLINDERS ¬= '06') & (CARD2.NO_CYLINDERS ¬= '08') &
                      (CARD2.NO_CYLINDERS ¬= '12') & (CARD2.NO_CYLINDERS ¬= '01') &
                      (CARD2.NO_CYLINDERS ¬= '00') & (CARD2.NO_CYLINDERS ¬= '  ')
108     1           THEN DO;
109     1    1        FLAG = 1;
110     1    1        PUT SKIP EDIT('THE NUMBER OF CYLINDERS IS INVALID.')(X(5),A);
111     1    1        END;

112     1           IF VERIFY(CARD2.TRANS_TYPE,' AS') ¬= 0
113     1           THEN DO;
114     1    1        FLAG = 1;
115     1    1        PUT SKIP EDIT('THE TRANSMISSION CODE IS INVALID.')(X(5),A);
116     1    1        END;

117     1           IF VERIFY(CARD2.COST_VALUE,' 1234567890') ¬= 0
118     1           THEN DO;
119     1    1        FLAG = 1;
120     1    1        PUT SKIP EDIT('THE ORIGINAL PURCHASE PRICE, SALVAGE VALUE, OR ',
                      'BOOK VALUE CONTAINS INVALID CHARACTER(S).')(X(5),A,A);
121     1    1        END;
```

```
STMT LEVEL NEST

122    1          IF VERIFY(CARD2.CHNG_STATUS_CODE,' JST') ¬= 0
123    1          THEN DO;
124    1    1       FLAG = 1;
125    1    1       PUT SKIP EDIT('THE SOLD, JUNKED, OR TRADED CODE FIELD CONTAINS AN ',
                    'INVALID CHARACTER.')(X(5),A,A);
126    1    1       END;

127    1          IF ((CARD2.DATE_CHNG_STATUS.MONTH < '01') &
                    (CARD2.DATE_CHNG_STATUS.MONTH ¬= '  ')) |
                    (CARD2.DATE_CHNG_STATUS.MONTH > '12')
128    1          THEN DO;
129    1    1       FLAG = 1;
130    1    1       PUT SKIP EDIT('THE MONTH OF DATE SOLD, JUNKED, OR TRADED '
                    ,'IS INVALID.')(X(5),A,A);
131    1    1       END;

132    1          IF((CARD2.DATE_CHNG_STATUS.DAY < '01')&
                    (CARD2.DATE_CHNG_STATUS.DAY ¬= '  '))
                    | (CARD2.DATE_CHNG_STATUS.DAY > '31')
133    1          THEN DO;
134    1    1       FLAG = 1;
135    1    1       PUT SKIP EDIT('THE DAY OF DATE SOLD, JUNKED, OR TRADED IS INVALID.')
                    (X(5),A);
136    1    1       END;

137    1          IF (CARD2.DATE_CHNG_STATUS.YEAR > C_YEAR) |
                     ((CARD2.DATE_CHNG_STATUS.YEAR < '00') &
                     (CARD2.DATE_CHNG_STATUS.YEAR ¬='  '))
138    1          THEN DO;
139    1    1       FLAG = 1;
140    1    1       PUT SKIP EDIT('THE YEAR OF THE DATE SOLD, JUNKED, OR TRADED IS ',
                    'INVALID.')(X(5),A,A);
141    1    1       END;

142    1          IF CARD_TYPE2 ¬= '2'
143    1          THEN DO;
144    1    1       CARD3 = BLANKS;
145    1    1       GO TO TEST;
146    1    1       END;
```

```
STMT LEVEL NEST

                    /*      READ AND EDIT THE THIRD CARD OF AN EQUIPMENT STATUS          */
                    /*      CHANGE RECORD                                                */

147     1            READ FILE(TSC) INTO(CARD3);
148     1            IF CARD_TYPE3 ¬= '3'
149     1            THEN DO;
150     1    1         FLAG = 1;
151     1    1         PUT SKIP EDIT('THE CARD TYPE FOR THE THIRD CARD IS INVALID.')
                       (X(5),A);
152     1    1         END;

153     1            IF VERIFY(CARD3.LIFE_COST,' 1234567890') ¬= 0
154     1            THEN DO;
155     1    1         FLAG = 1;
156     1    1         PUT SKIP EDIT('THE LIFE INFORMATION CONTAINS AT LEAST ONE INVALID ',
                       'CHARACTER.')(X(5),A,A);
157     1    1         END;

158     1           TEST: IF FLAG = 0

159     1            THEN DO;  /*  WRITE A RECORD WITH NO ERRORS TO OUTPUT FILE.          */

160     1    1         CARD1.DISTRICT = DISTRICT(CARD1.COUNTY_NUMBER);
161     1    1         IF CARD1.CLASS_CODE ¬= '  ' THEN
162     1    1         CARD1.CLASS_DESCRIPTION = CL_DESC(CARD1.CLASS_CODE);
163     1    1         STATUS_CHANGE_RECORD = CARD1, BY NAME;
164     1    1         STATUS_CHANGE_RECORD = CARD2, BY NAME;
165     1    1         STATUS_CHANGE_RECORD = CARD3, BY NAME;
166     1    1         WRITE FILE(SCHANGE) FROM(STATUS_CHANGE_RECORD);
167     1    1         GO TO NEXT;
168     1    1         END;


169     1            ELSE DO;  /*  PRINT A RECORD CONTAINING ERRORS ON THE PRINTER.       */

170     1    1         PUT SKIP(2) EDIT(CARD1) (X(1),(13)A);
171     1    1         PUT SKIP EDIT(CARD2)(X(1),(14)A);
172     1    1         PUT SKIP EDIT(CARD3)(X(1),(3)A);
173     1    1         PUT SKIP(2);
174     1    1         COUNT = 1;
175     1    1         FLAG = 0;
176     1    1         GO TO NEXT;
177     1    1         END;

178     1           DONE: IF COUNT = 0
179     1            THEN PUT SKIP EDIT('ALL DATA SUBMITTED BY COUNTY ',
                       NEW_COUNTY,' HAS BEEN EDITED AND NO ERRORS WERE FOUND.')
                       (COL(30),A,A,A);
180     1            END SCR;
```

Listing of Program UPDATEM

```
STMT LEVEL NEST
  1              UPDATEM:  PROC OPTIONS(MAIN);

                 /*      PROGRAM UPDATEM                                          */
                 /*                                                               */
                 /*      THIS PROGRAM INPUTS NEW STATUS CHANGE RECORDS AND        */
                 /*      UPDATES EXISTING RECORDS WITH NEW DATA OR ADDS NEW       */
                 /*      RECORDS TO THE EQUIPMENT MASTER FILE.  TOTAL COUNTY      */
                 /*      EQUIPMENT BOOK VALUES ARE CALCULATED.  THE EQUIPMENT     */
                 /*      INVENTORY LIST FOR THE PREVIOUS YEAR IS OUTPUT.          */
                 /*                                                               */
                 /*      THIS PROGRAM IS ONE OF EIGHT COMPUTER PROGRAMS           */
                 /*      WHICH FORM THE "COMPUTER BASED INFORMATION SYSTEM        */
                 /*      FOR COUNTY EQUIPMENT COST RECORDS."                      */
                 /*                                                               */
                 /*      WRITTEN BY                                               */
                 /*                                                               */
                 /*                SYSTEMS DIVISION                               */
                 /*                COLLEGE OF ENGINEERING                         */
                 /*                THE UNIVERSITY OF IOWA                         */
                 /*                IOWA CITY, IOWA                                */
                 /*                JULY, 1975                                     */
                 /*                                                               */
```

```
STMT LEVEL NEST

  2     1          DCL STCHNG FILE RECORD SEQUENTIAL;
  3     1          DCL 1 SCR,
                         2 COUNTY_NUM                CHAR(3) INIT('999'),
                         2 EC_NUM                    CHAR(8),
                         2 DISTRICT                  CHAR(2),
                         2 CLASS_CODE                CHAR(2),
                         2 CLASS_DESC                CHAR(20),
                         2 MFR_CODE                  CHAR(3),
                         2 YEAR_MFD                  CHAR(2),
                         2 MAKE_MODEL                CHAR(14),
                         2 SERIAL_NUM                CHAR(14),
                         2 WHEELBASE                 CHAR(3),
                         2 DATE_PURCHASED,
                              3 PMCN            CHAR(2),
                              3 PDAY            CHAR(2),
                              3 PYR             CHAR(2),
                         2 ENGINE_TYPE               CHAR(1),
                         2 ENGINE_DESC               CHAR(14),
                         2 ENGINE_MFR_CODE           CHAR(2),
                         2 RATED_HP                  CHAR(3),
                         2 NUM_CYLS                  CHAR(2),
                         2 XMISSION_TYPE             CHAR(1),
                         2 CO_PURCHASED_FROM         CHAR(12),
                         2 ORIG_COST                 PIC'999999V99',
                         2 SALVAGE_VALUE             PIC'99999V99',
                         2 BOOK_VALUE                PIC'999999V99',
                         2 DISPOSITION               CHAR(1),
                         2 DATE_DISPOSED,
                              3 DMCN            CHAR(2),
                              3 DDAY            CHAR(2),
                              3 DYR             CHAR(2),
                         2 MILES_HRS_LIFE            CHAR(6),
                         2 FUEL_COST_LIFE            CHAR(7),
                         2 LUBRICANTS_LIFE           CHAR(6),
                         2 TIRES_TUBES_LIFE          CHAR(6),
                         2 EXPEN_PARTS_LIFE          CHAR(6),
                         2 ANTIFREEZE_LIFE           CHAR(5),
                         2 PARTS_COST_LIFE           CHAR(7),
                         2 LABOR_COST_LIFE           CHAR(7),
                         2 IND_COST_LIFE             CHAR(7);
```

```
STMT LEVEL NEST

  4     1          DCL  ECMAST FILE RECORD SEQUENTIAL,
                        1 MSTR,
                             2 COUNTY_NUM              CHAR(3) INIT('998'),
                             2 DISTRICT                CHAR(2),
                             2 EC_NUM                  CHAR(8),
                             2 CLASS_CODE              CHAR(2),
                             2 YEAR_MFD                CHAR(2),
                             2 MFR_CODE                CHAR(3),
                             2 ENGINE_MFR_CODE         CHAR(2),
                             2 NUM_CYLS                CHAR(2),
                             2 ENGINE_TYPE             CHAR(1),
                             2 XMISSION_TYPE           CHAR(1),
                             2 ORIG_COST               PIC'999999V99',
                             2 SALVAGE_VALUE           PIC'999999V99',
                             2 BOOK_VALUE              PIC'999999V99',
                             2 CURRENT_COSTS           CHAR(63),
                             2 MILES_HRS_LIFE          CHAR(6),
                             2 FUEL_COST_LIFE          CHAR(7),
                             2 LUBRICANTS_LIFE         CHAR(6),
                             2 TIRES_TUBES_LIFE        CHAR(6),
                             2 EXPEN_PARTS_LIFE        CHAR(6),
                             2 ANTIFREEZE_LIFE         CHAR(5),
                             2 PARTS_COST_LIFE         CHAR(7),
                             2 LABOR_COST_LIFE         CHAR(7),
                             2 IND_COST_LIFE           CHAR(7),
                             2 CLASS_DESC              CHAR(20),
                             2 MAKE_MODEL              CHAR(14),
                             2 SERIAL_NUM              CHAR(14),
                             2 ENGINE_DESC             CHAR(14),
                             2 CC_PURCHASED_FROM       CHAR(12),
                             2 DATE_PURCHASED,
                                  3 PMON               CHAR(2),
                                  3 PDAY               CHAR(2),
                                  3 PYR                CHAR(2),
                             2 DATE_DISPOSED,
                                  3 DMON               CHAR(2),
                                  3 DDAY               CHAR(2),
                                  3 DYR                CHAR(2),
                             2 DISPOSITION             CHAR(1),
                             2 WHEELBASE               CHAR(3),
                             2 REPAIRS                 CHAR(13),
                             2 RATED_HP                CHAR(3),
                             2 BLANKS                  CHAR(24);
```

```
STMT LEVEL NEST

  5     1          DCL  1 CNTY_BOOK_VALU,
                          2 LAST_CNTY_NUM      CHAR(3) INIT('000'),
                          2 TOTAL_BOOK_VALU    PIC'99999999V99' INIT((10)'0');
  6     1          DCL DISP  CHAR(6) VARYING;
  7     1          DCL LETTERS FIXED DEC(5);
  8     1          DCL  THIS_CNTY_NUM        CHAR(3);

  9     1          DCL  SCDONE          BIT(1)     INIT('0'B);
 10     1          DCL  EMDONE          BIT(1)     INIT('0'B);

 11     1          DCL  1 TODAYS_DATE,
                          2 C_YEAR             CHAR(2),
                          2 C_MON_DAY          CHAR(4);
 12     1          TODAYS_DATE = DATE;
 13     1          DCL  LAST_YEAR            FIXED DEC(4);
 14     1          LAST_YEAR = 1899 + C_YEAR;

 15     1          DCL  1 SAVMSTR LIKE MSTR;
 16     1          DCL  NEWMAST FILE RECORD SEQUENTIAL;
 17     1          DCL  BKVALU FILE RECORD SEQUENTIAL;

 18     1          EQ_INV_LIST:  FORMAT(COL(3),A,COL(13),A,COL(28),A,COL(43),A,
                       COL(57),(2)A,
                       COL(63),A,COL(69),A,COL(74),A,COL(78),A,COL(82),A,COL(87),A,
                       COL(103),(5)A,COL(112),P'ZZZZZZV.99',COL(122),P'ZZZZZZV.99');

 19     1          DCL  CNTY_NAMES(99) CHAR(13) VARYING
                    INIT('ADAIR','ADAMS','ALLAMAKEE','APPANOOSE','AUDUBON','BENTON',
                    'BLACK HAWK','BOONE','BREMER','BUCHANAN','BUENA VISTA','BUTLER',
                    'CALHOUN','CARROLL','CASS','CEDAR','CERRO GORDO','CHEROKEE',
                    'CHICKASAW','CLARKE','CLAY','CLAYTON','CLINTON','CRAWFORD','DALLAS',
                    'DAVIS','DECATUR','DELAWARE','DES MOINES','DICKINSON','DUBUQUE',
                    'EMMET','FAYETTE','FLOYD','FRANKLIN','FREMONT','GREENE','GRUNDY',
                    'GUTHRIE','HAMILTON','HANCOCK','HARDIN','HARRISON','HENRY',
                    'HOWARD','HUMBOLDT','IDA','IOWA','JACKSON','JASPER','JEFFERSON',
                    'JOHNSON','JONES','KEOKUK','KOSSUTH','LEE','LINN','LOUISA','LUCAS',
                    'LYON','MADISON','MAHASKA','MARION','MARSHALL','MILLS','MITCHELL',
                    'MONONA','MONROE','MONTGOMERY','MUSCATINE','O''BRIEN','OSCEOLA',
                    'PAGE','PALO ALTO','PLYMOUTH','POCAHONTAS','POLK','POTTAWATTAMIE',
                    'POWESHIEK','RINGGOLD','SAC','SCOTT','SHELBY','SIOUX','STORY',
                    'TAMA','TAYLOR','UNION','VAN BUREN','WAPELLO','WARREN',
                    'WASHINGTON','WAYNE','WEBSTER','WINNEBAGO','WINNESHIEK','WOODBURY',
                    'WORTH','WRIGHT');
```

```
STMT LEVEL NEST

 20     1          ON    ENDFILE(EQMAST) BEGIN;
 22     2                IF   SCDONE = '1'B
 23     2                THEN GO TO DONE;
 24     2                ELSE DO;
 25     2    1                EMDONE = '1'B;
 26     2    1                MSTR.COUNTY_NUM = '999';
 27     2    1                MSTR.EQ_NUM = '99999999';
 28     2    1                END;
 29     2                END;

 30     1          ON    ENDFILE(STCHNG)     BEGIN;
 32     2                IF   EMDONE = '1'B
 33     2                THEN GO TO DONE;
 34     2                ELSE DO;
 35     2    1                SCDONE = '1'B;
 36     2    1                SCR.COUNTY_NUM = '999';
 37     2    1                SCR.EQ_NUM = '99999999';
 38     2    1                END;
 39     2                END;

 40     1          OPEN FILE(EQMAST) INPUT;
 41     1          OPEN FILE(STCHNG) INPUT;
 42     1          OPEN FILE(NEQMAST) OUTPUT;
 43     1          OPEN FILE(BKVALU) OUTPUT;
 44     1          OPEN FILE(SYSPRINT) LINESIZE(132) PAGESIZE(60);
 45     1          READ FILE(EQMAST) INTO (MSTR);
 46     1          READ FILE(STCHNG) INTO (SCR);
```

```
STMT LEVEL NEST

 47     1          NEXT:
                   IF   SCR.COUNTY_NUM > MSTR.COUNTY_NUM | SCR.EQ_NUM > MSTR.EQ_NUM
 48     1          THEN DO;  /*  COPY MASTER FILE RECORD  */
 49     1     1          IF   LAST_CNTY_NUM ¬= MSTR.COUNTY_NUM
 50     1     1          THEN DO;
 51     1     2               THIS_CNTY_NUM = MSTR.COUNTY_NUM;
 52     1     2               CALL HEADING;
 53     1     2               IF LAST_CNTY_NUM ¬= '000'
 54     1     2               THEN WRITE FILE(BKVALU) FROM(CNTY_BOOK_VALU);
 55     1     2               ELSE;
 56     1     2               TOTAL_BOOK_VALU = (10)'0';
 57     1     2               END;
 58     1     1          ELSE;

 59     1     1          TOTAL_BOOK_VALU = TOTAL_BOOK_VALU + MSTR.BOOK_VALUE;
 60     1     1          WRITE FILE(NEQMAST) FROM (MSTR);

 61     1     1          PUT SKIP EDIT(MSTR.EQ_NUM,MSTR.MAKE_MODEL,MSTR.SERIAL_NUM,
                               MSTR.DD_PURCHASED_FROM,'19',MSTR.YEAR_MFD,MSTR.WHEELBASE,
                               MSTR.XMISSION_TYPE,MSTR.NUM_CYLS,MSTR.ENGINE_TYPE,
                               MSTR.RATED_HP,MSTR.ENGINE_DESC,MSTR.DATE_PURCHASED.PMON,'-',
                               MSTR.DATE_PURCHASED.PDAY,'-',MSTR.DATE_PURCHASED.PYR,
                               MSTR.ORIG_COST,MSTR.BOOK_VALUE)(R(EQ_INV_LIST));

 62     1     1          LAST_CNTY_NUM = MSTR.COUNTY_NUM;
 63     1     1          READ FILE(EQMAST) INTO (MSTR);
 64     1     1          GO TO NEXT;
 65     1     1          END;
```

```
STMT LEVEL NEST

 66    1          ELSE IF   SCR.COUNTY_NUM = MSTR.COUNTY_NUM & SCR.EQ_NUM = MSTR.EQ_NUM
 67    1               THEN DO;  /*  UPDATE EXISTING RECORD ON MASTER FILE  */
 68    1    1               IF   LAST_CNTY_NUM ¬= SCR.COUNTY_NUM
 69    1    1               THEN DO;
 70    1    2               THIS_CNTY_NUM = SCR.COUNTY_NUM;
 71    1    2                    CALL HEADING;
 72    1    2                    IF LASY_CNTY_NUM ¬= '000'
 73    1    2                    THEN WRITE FILE(BKVALU) FROM(CNTY_BOOK_VALU);
 74    1    2                    WRITE FILE(BKVALU) FROM (CNTY_BOOK_VALU);
 75    1    2                    TOTAL_BOOK_VALU = (10)'0';
 76    1    2                    END;
 77    1    1               ELSE;

 78    1    1               IF   SCR.CLASS_CODE >= '00'
 79    1    1               THEN DO;
 80    1    2                    MSTR.CLASS_CODE = SCR.CLASS_CODE;
 81    1    2                    MSTR.CLASS_DESC = SCR.CLASS_DESC;
 82    1    2               END;

 83    1    1               IF   SCR.MFR_CODE > '00'
 84    1    1               THEN MSTR.MFR_CODE = SCR.MFR_CODE;

 85    1    1               IF   SCR.YEAR_MFD > '00'
 86    1    1               THEN MSTR.YEAR_MFD = SCR.YEAR_MFD;

 87    1    1               IF   SCR.MAKE_MODEL > (14)' '
 88    1    1               THEN MSTR.MAKE_MODEL = SCR.MAKE_MODEL;

 89    1    1               IF   SCR.SERIAL_NUM > (14)' '
 90    1    1               THEN MSTR.SERIAL_NUM = SCR.SERIAL_NUM;

 91    1    1               IF   SCR.WHEELBASE > '000'
 92    1    1               THEN MSTR.WHEELBASE = SCR.WHEELBASE;

 93    1    1               IF   SCR.DATE_PURCHASED.PMON > '00'
                                 | SCR.DATE_PURCHASED.PDAY > '00'
                                 | SCR.DATE_PURCHASED.PYR > '00'
 94    1    1               THEN MSTR.DATE_PURCHASED = SCR.DATE_PURCHASED;

 95    1    1               IF   SCR.ENGINE_TYPE > ' '
 96    1    1               THEN MSTR.ENGINE_TYPE = SCR.ENGINE_TYPE;

 97    1    1               IF   SCR.ENGINE_DESC > (14)' '
 98    1    1               THEN MSTR.ENGINE_DESC = SCR.ENGINE_DESC;

 99    1    1               IF   SCR.ENGINE_MFR_CODE > '00'
100    1    1               THEN MSTR.ENGINE_MFR_CODE = SCR.ENGINE_MFR_CODE;

101    1    1               IF   SCR.RATED_HP >= '000'
102    1    1               THEN MSTR.RATED_HP = SCR.RATED_HP;

103    1    1               IF   SCR.NUM_CYLS >= '00'
104    1    1               THEN MSTR.NUM_CYLS = SCR.NUM_CYLS;

105    1    1               IF   SCR.XMISSION_TYPE > ' '
```

```
STMT LEVEL NEST

106    1    1            THEN MSTR.XMISSION_TYPE = SCR.XMISSION_TYPE;

107    1    1            IF   SCR.CC_PURCHASED_FROM > (12)' '
108    1    1            THEN MSTR.CC_PURCHASED_FROM = SCR.CC_PURCHASED_FROM;

109    1    1            IF   SCR.ORIG_COST > 0
110    1    1            THEN MSTR.ORIG_COST = SCR.ORIG_COST;

111    1    1            IF   SCR.SALVAGE_VALUE > 0
112    1    1            THEN MSTR.SALVAGE_VALUE = SCR.SALVAGE_VALUE;

113    1    1            IF   SCR.BOOK_VALUE > 0
114    1    1            THEN MSTR.BOOK_VALUE = SCR.BOOK_VALUE;

115    1    1            MSTR.DISPOSITION = SCR.DISPOSITION;
116    1    1            MSTR.DATE_DISPOSED = SCR.DATE_DISPOSED;

117    1    1            IF   SCR.MILES_HRS_LIFE > '000000'
118    1    1            THEN MSTR.MILES_HRS_LIFE = SCR.MILES_HRS_LIFE;

119    1    1            IF   SCR.FUEL_COST_LIFE > '0000000'
120    1    1            THEN MSTR.FUEL_COST_LIFE = SCR.FUEL_COST_LIFE;

121    1    1            IF   SCR.LUBRICANTS_LIFE > '000000'
122    1    1            THEN MSTR.LUBRICANTS_LIFE = SCR.LUBRICANTS_LIFE;

123    1    1            IF   SCR.TIRES_TUBES_LIFE > '000000'
124    1    1            THEN MSTR.TIRES_TUBES_LIFE = SCR.TIRES_TUBES_LIFE;

125    1    1            IF   SCR.EXPEN_PARTS_LIFE > '000000'
126    1    1            THEN MSTR.EXPEN_PARTS_LIFE = SCR.EXPEN_PARTS_LIFE;

127    1    1            IF   SCR.ANTIFREEZE_LIFE > '00000'
128    1    1            THEN MSTR.ANTIFREEZE_LIFE = SCR.ANTIFREEZE_LIFE;

129    1    1            IF   SCR.PARTS_COST_LIFE > (7)'0'
130    1    1            THEN MSTR.PARTS_COST_LIFE = SCR.PARTS_COST_LIFE;

131    1    1            IF   SCR.LABOR_COST_LIFE > (7)'0'
132    1    1            THEN MSTR.LABOR_COST_LIFE = SCR.LABOR_COST_LIFE;

133    1    1            IF   SCR.IND_COST_LIFE > (7)'0'
134    1    1            THEN MSTR.IND_COST_LIFE = SCR.IND_COST_LIFE;

135    1    1            TOTAL_BOOK_VALU = TOTAL_BOOK_VALU + MSTR.BOOK_VALUE;
136    1    1            WRITE FILE(NEQMAST) FROM (MSTR);

137    1    1            PUT SKIP EDIT(MSTR.EQ_NUM,MSTR.MAKE_MODEL,MSTR.SERIAL_NUM,
                             MSTR.CO_PURCHASED_FROM,'19',MSTR.YEAR_MFG,
                             MSTR.WHEELBASE,MSTR.XMISSION_TYPE,MSTR.NUM_CYLS,
                             MSTR.ENGINE_TYPE,MSTR.RATED_HP,
                             MSTR.ENGINE_DESC,MSTR.DATE_PURCHASED.PMON,'-',
                             MSTR.DATE_PURCHASED.PDAY,'-',MSTR.DATE_PURCHASED.PYR,
                             MSTR.ORIG_COST,MSTR.BOOK_VALUE)(R(EQ_INV_LIST));
138    1    1            IF   MSTR.DISPOSITION > ' '
```

```
STMT LEVEL NEST

139    1    1              THEN DO;
140    1    2                   IF   MSTR.DISPOSITION = 'J'
141    1    2                   THEN DISP = 'JUNKED';
142    1    2                   IF   MSTR.DISPOSITION = 'T'
143    1    2                   THEN DISP = 'TRADED';
144    1    2                   IF   MSTR.DISPOSITION = 'S'
145    1    2                   THEN DISP = 'SOLD';
146    1    2                   PUT SKIP EDIT ('*',MSTR.EQ_NUM,'WAS ',DISP,' ON ',
                                    MSTR.DATE_DISPOSED.DMON,'-',MSTR.DATE_DISPOSED.DDAY,
                                    '-',MSTR.DATE_DISPOSED.DYR)(COL(2),(10)A);
147    1    2                   END;

148    1    1              LAST_CNTY_NUM = MSTR.COUNTY_NUM;
149    1    1              READ FILE(EQMAST) INTO (MSTR);
150    1    1              READ FILE(STCHNG) INTO (SCR);
151    1    1              GO TO NEXT;
152    1    1              END;
```

```
STMT LEVEL NEST

153    1              ELSE DO;  /*  ADD NEW RECORD TO MASTER FILE  */
154    1    1               IF   LAST_CNTY_NUM ¬= SCR.COUNTY_NUM
155    1    1               THEN DO;
156    1    2                    THIS_CNTY_NUM = SCR.COUNTY_NUM;
157    1    2                    CALL HEADING;
158    1    2                    IF LAST_CNTY_NUM ¬= '000'
159    1    2                    THEN WRITE FILE(BKVALU) FROM(CNTY_BOOK_VALU);
160    1    2                    TOTAL_BOOK_VALU = (10)'0';
161    1    2                    END;
162    1    1               ELSE;

163    1    1               SAVMSTR = MSTR, BY NAME;
164    1    1               MSTR = (300)'0';
165    1    1               MSTR = SCR, BY NAME;
166    1    1               TOTAL_BOOK_VALU = TOTAL_BOOK_VALU + MSTR.BOOK_VALUE;
167    1    1               WRITE FILE (NEOMAST) FROM (MSTR);

168    1    1               PUT SKIP EDIT(MSTR.EQ_NUM,MSTR.MAKE_MODEL,MSTR.SERIAL_NUM,
                                 MSTR.CO_PURCHASED_FROM,'19',MSTR.YEAR_MFD,
                                 MSTR.WHEELBASE,MSTR.XMISSION_TYPE,MSTR.NUM_CYLS,
                                 MSTR.ENGINE_TYPE,MSTR.RATED_HP,
                                 MSTR.ENGINE_DESC,MSTR.DATE_PURCHASED.PMON,'-',
                                 MSTR.DATE_PURCHASED.PDAY,'-',MSTR.DATE_PURCHASED.PYR,
                                 MSTR.ORIG_COST,MSTR.BOOK_VALUE)(R(EQ_INV_LIST));

169    1    1               IF   MSTR.DISPOSITION > ' '
170    1    1               THEN DO;
171    1    2                    IF   MSTR.DISPOSITION = 'J'
172    1    2                    THEN DISP = 'JUNKED';
173    1    2                    IF   MSTR.DISPOSITION = 'T'
174    1    2                    THEN DISP = 'TRADED';
175    1    2                    IF   MSTR.DISPOSITION = 'S'
176    1    2                    THEN DISP = 'SOLD';
177    1    2                    PUT SKIP EDIT ('*',MSTR.EQ_NUM,'WAS ',DISP,' ON ',
                                    MSTR.DATE_DISPOSED.DMON,'-',MSTR.DATE_DISPOSED.DDAY,
                                    '-',MSTR.DATE_DISPOSED.DYR)(COL(2),(10)A);
178    1    2                    END;

179    1    1               LAST_CNTY_NUM = MSTR.COUNTY_NUM;
180    1    1               MSTR = SAVMSTR, BY NAME;
181    1    1               READ FILE(SYCHNG) INTO (SCR);
182    1    1               GO TO NEXT;
183    1    1               END;
```

```
STMT LEVEL NEST

184    1        HEADING:        PROC;
185    2        LETTERS = LENGTH(CNTY_NAMES(THIS_CNTY_NUM));
186    2        PUT PAGE EDIT(CNTY_NAMES(THIS_CNTY_NUM),' COUNTY')
                         (COL((125-LETTERS)/2),A,A);
187    2        PUT SKIP(2) EDIT (LAST_YEAR,' EQUIPMENT INVENTORY LIST')
                         (COL(51),F(4),A);
188    2        PUT SKIP(3) EDIT('EQUIPMENT','YEAR  WPB  TRAN','ENGINE MAKE',
                     'PURCHASE  PURCHASE   BOOK')(COL(3),A,COL(57),A,COL(88),A,
                     COL(103),A);
189    2        PUT SKIP EDIT('NUMBER    MAKE & MODEL  SERIAL NUMBER     DEALER',
                     'MFRD  INS  TYPE CYL FUEL  HP    AND MODEL',
                     'DATE      COST     VALUE')(COL(4),A,COL(57),A,COL(105),A);
190    2        PUT SKIP(2);
191    2        RETURN;
192    2        END HEADING;

193    1        DONE:
                WRITE FILE(BKVALU) FROM (CNTY_BOOK_VALU);
194    1        END UPDATEM;
```

Listing of Program MAIN

Step 1

```
STMT LEVEL NEST
  1              FMAIN:  PROC OPTIONS(MAIN);

                 /*      PROGRAM MAIN                                          */
                 /*                                                            */
                 /*      THIS PROGRAM CALCULATES COST/MILE OR COST/HOUR FOR ALL */
                 /*      PIECES OF EQUIPMENT, BOTH FOR PAST YEAR AND LIFETIME  */
                 /*      COSTS.                                                */
                 /*                                                            */
                 /*      OUTPUT CONSISTS OF YEARLY AND LIFETIME DIRECT         */
                 /*      OPERATING COSTS AND YEARLY AND LIFETIME TOTAL         */
                 /*      OPERATING COSTS.                                      */
                 /*                                                            */
                 /*      THIS PROGRAM IS ONE OF EIGHT COMPUTER PROGRAMS        */
                 /*      WHICH FORM THE "COMPUTER BASED INFORMATION SYSTEM     */
                 /*      FOR COUNTY EQUIPMENT COST RECORDS."                   */
                 /*                                                            */
                 /*      WRITTEN BY                                            */
                 /*                                                            */
                 /*                SYSTEMS DIVISION                            */
                 /*                COLLEGE OF ENGINEERING                      */
                 /*                THE UNIVERSITY OF IOWA                      */
                 /*                IOWA CITY, IOWA                             */
                 /*                JULY, 1975                                  */
                 /*                                                            */
```

```
STMT LEVEL NEST

  2     1          DCL  SEQMAST FILE RECORD SEQUENTIAL,
                       1 MSTR,
                            2 COUNTY_NUM              PIC'999',
                            2 DISTRICT            CHAR(2),
                            2 EQ_NUM              CHAR(8),
                            2 CLASS_CODE          PIC'99',
                            2 MISC1               CHAR(11),
                            2 ORIG_COST           PIC'999999V99',
                            2 SALVAGE_VALUE       PIC'999999V99',
                            2 BOOK_VALUE          PIC'999999V99',
                            2 DEPRECIATION        PIC'99999V99',
                            2 MILES_HRS_YR        PIC'999999',
                            2 FUEL_COST_YR        PIC'99999V99',
                            2 LUBRICANTS_YR       PIC'999V99',
                            2 TIRES_TUBES_YR          PIC'9999V99',
                            2 EXPEN_PARTS_YR      PIC'9999V99',
                            2 ANTIFREEZE_YR       PIC'999V99',
                            2 PARTS_COST_YR       PIC'99999V99',
                            2 LABOR_COST_YR       PIC'99999V99',
                            2 IND_COST_YR         PIC'99999V99',
                            2 MILES_HRS_LIFE      PIC'999999',
                            2 FUEL_COST_LIFE      PIC'99999V99',
                            2 LUBRICANTS_LIFE     PIC'9999V99',
                            2 TIRES_TUBES_LIFE        PIC'9999V99',
                            2 EXPEN_PARTS_LIFE    PIC'9999V99',
                            2 ANTIFREEZE_LIFE     PIC'999V99',
                            2 PARTS_COST_LIFE     PIC'99999V99',
                            2 LABOR_COST_LIFE     PIC'99999V99',
                            2 IND_COST_LIFE       PIC'99999V99',
                            2 CLASS_DESC          CHAR(2)),
                            2 MAKE_MODEL          CHAR(14),
                            2 SERIAL_NUM          CHAR(14),
                            2 MISC2               CHAR(42),
                            2 DOWN_TIME_YR        PIC'9999',
                            2 DOWN_TIME_LIFE      PIC'9999',
                            2 NUM_REPAIRS_YR      PIC'99',
                            2 NUM_REPAIRS_LIFE    PIC'999',
                            2 RATED_HP            CHAR(3),
                            2 BLANKS              CHAR(24);
```

```
STMT LEVEL NEST

  3     1          DCL  INDCOST FILE RECORD SEQUENTIAL,
                        1 IND,
                             2 COUNTY_NUM          PIC'999',
                             2 SUP_SALARIES        PIC'99999V99',
                             2 CLER_SALARIES       PIC'99999V99',
                             2 UTILITIES           PIC'99999V99',
                             2 BLDG_COSTS          PIC'99999V99',
                             2 EQ_DEPR             PIC'9999V99',
                             2 EXP_TOOLS           PIC'9999V99',
                             2 SUPPLIES            PIC'9999V99',
                             2 MOVING_COSTS        PIC'99999V99',
                             2 EQ_INS              PIC'99999V99';
```

```
STMT LEVEL NEST

  4     1          DCL CIRCOST    FILE RECORD SEQUENTIAL,
                        1 DIR,
                             2 COUNTY_NUM        PIC'999',
                             2 EQ_NUM            CHAR(8),
                             2 DATE              CHAR(4),
                             2 FUEL_COST_YR      PIC'9999V99',
                             2 LUBRICANTS_YR     PIC'999V99',
                             2 ANTIFREEZE_YR     PIC'99V99',
                             2 TIRES_TUBES_YR    PIC'9999V99',
                             2 EXPEN_PARTS_YR    PIC'9999V99',
                             2 PARTS_COST_YR     PIC'9999V99',
                             2 LABOR_COST_YR     PIC'9999V99',
                             2 MILES_HRS_YR      PIC'99999',
                             2 DOWN_TIME_YR      PIC'9999',
                             2 NUM_REPAIRS_YR    PIC'99';
```

```
STMT LEVEL NEST

  5     1          DCL  BKVALU FILE RECORD SEQUENTIAL,
                       1 BKVAL,
                            2 CNTY_NUM          PIC'999',
                            2 VALUE          PIC'99999999V99';

  6     1          DCL  CNTY_NAMES(99) CHAR(13) VARYING
                     INIT('ADAIR','ADAMS','ALLAMAKEE','APPANOOSE','AUDUBON','BENTON',
                     'BLACK HAWK','BOONE','BREMER','BUCHANAN','BUENA VISTA','BUTLER',
                     'CALHOUN','CARROLL','CASS','CEDAR','CERRO GORDO','CHEROKEE',
                     'CHICKASAW','CLARKE','CLAY','CLAYTON','CLINTON','CRAWFORD','DALLAS',
                     'DAVIS','DECATUR','DELAWARE','DES MOINES','DICKINSON','DUBUQUE',
                     'EMMET','FAYETTE','FLOYD','FRANKLIN','FREMONT','GREENE','GRUNDY',
                     'GUTHRIE','HAMILTON','HANCOCK','HARDIN','HARRISON','HENRY',
                     'HOWARD','HUMBOLDT','IDA','IOWA','JACKSON','JASPER','JEFFERSON',
                     'JOHNSON','JONES','KEOKUK','KOSSUTH','LEE','LINN','LOUISA','LUCAS',
                     'LYON','MADISON','MAHASKA','MARION','MARSHALL','MILLS','MITCHELL',
                     'MONONA','MONROE','MONTGOMERY','MUSCATINE','O''BRIEN','OSCEOLA',
                     'PAGE','PALO ALTO','PLYMOUTH','POCAHONTAS','POLK','POTTAWATTAMIE',
                     'POWESHIEK','RINGGOLD','SAC','SCOTT','SHELBY','SIOUX','STORY',
                     'TAMA','TAYLOR','UNION','VAN BUREN','WAPELLO','WARREN',
                     'WASHINGTON','WAYNE','WEBSTER','WINNEBAGO','WINNESHIEK','WOODBURY',
                     'WORTH','WRIGHT');
```

```
STMT LEVEL NEST

  7     1          DCL  TEMP_BK_VAL     FIXED DEC(10,2);
  8     1          DCL  TOT_IND_COST(99)      PIC'99999999V99' INIT((99)(10)'0');
  9     1          DCL  TOT_BK_VAL(99)        PIC'99999999V99' INIT((99)(10)'0');
 10     1          DCL  RATIO(99) PIC'999V999' INIT((99)(6)'0');
 11     1          DCL  INDEX      FIXED DEC(3);
 12     1          DCL  DEPRECIATION_YRS(0:54) FIXED DEC(6)
                     INIT(10,5,5,5,5,6,7,7,6,7,6,8,5,6,8,9,10,10,10,10,12,13,13,14,
                     13,14,15,10,10,10,13,13,8,8,10,10,10,10,10,10,10,8,10,10,10,12,
                     13,13,8,11,11,11,12,12,12);
 13     1          DCL IND_OK      BIT(1) INIT('1'B);
 14     1          DCL  BKVAL_OK   BIT(1) INIT('1'B);
 15     1          DCL LAST_ERR_CNTY         FIXED DEC(3) INIT(0);
 16     1          DCL  EMDONE     BIT(1) INIT('0'B);
 17     1          DCL  DCDONE     BIT(1) INIT('0'B);

 18     1          ON ENDFILE(DIRCOST) BEGIN;
 20     2               DCDONE = '1'B;
 21     2               IF   EMDONE = '1'B
 22     2               THEN GO TO DONE;
 23     2               ELSE DO;
 24     2    1          NODIR:
                             IF   MSTR.COUNTY_NUM ¬= LAST_ERR_CNTY
 25     2    1                THEN DO;
 26     2    2                PUT PAGE EDIT ('ERROR LISTING FOR ',
                                  CNTY_NAMES(MSTR.COUNTY_NUM),' COUNTY')(COL(30),A,A,A);
 27     2    2                LAST_ERR_CNTY = MSTR.COUNTY_NUM;
 28     2    2                END;
 29     2    1          PUT SKIP(2) EDIT ('NO DIRECT COST CARD WAS FOUND FOR THE ',
                             'FOLLOWING PIECE OF EQUIPMENT:')(A,A);
 30     2    1          PUT SKIP EDIT ('EQUIPMENT NO.: ',MSTR.EQ_NUM,'MAKE & MODEL: ',
                             MSTR.MAKE_MODEL,'SERIAL NO.: ',MSTR.SERIAL_NUM)
                             (A,A,X(4),A,A,X(4),A,A);
 31     2    1          WRITE FILE(TEQMAST)FROM (MSTR);
 32     2    1          READ FILE(SEQMAST) INTO (MSTR);
 33     2    1          GO TO NODIR;
 34     2    1               END;
 35     2               END;

 36     1          ON ENDFILE(INDCCST)
 37     1               IND_OK = '0'B;

 38     1          ON ENDFILE(BKVALU)
 39     1               BKVAL_OK = '0'B;
```

```
SYMT LEVEL NEST

 40     1          ON ENDFILE(SEQMAST) BEGIN;
 42     2               EMDONE = '1'B;
 43     2               IF   DCDONE = '1'B
 44     2               THEN GO TO DONE;
 45     2               ELSE DO;
 46     2    1                NOEQM:
                        IF   DIR.COUNTY_NUM ¬= LAST_ERR_CNTY
 47     2    1          THEN DO;
 48     2    2                PUT PAGE EDIT ('ERROR LISTING FOR ',
                                   CNTY_NAMES(DIR.COUNTY_NUM),' COUNTY')(COL(30),A,A,A);
 49     2    2                LAST_ERR_CNTY = DIR.COUNTY_NUM;
 50     2    2                END;
 51     2    1          PUT SKIP(2) EDIT ('THE EQUIPMENT NUMBER IN THE FOLLOWING DIRECT ',
                             'COST RECORD WAS NOT FOUND IN THE MASTER FILE')(A,A);
 52     2    1          PUT SKIP EDIT (DIR)(A);
 53     2    1          READ FILE(DIRCOST) INTO (DIR);
 54     2    1               GO TO NOEQM;
 55     2    1               END;
 56     2               END;

 57     1          DCL  TEQMAST FILE RECORD SEQUENTIAL;

 58     1          OPEN FILE(SEQMAST)  INPUT;
 59     1          OPEN FILE(SYSPRINT) LINESIZE(132) PAGESIZE(60);
 60     1          OPEN FILE(BKVALU) INPUT;
 61     1          OPEN FILE(INDCOST) INPUT;
 62     1          OPEN FILE(DIRCOST) INPUT;
 63     1          OPEN FILE(TEQMAST) OUTPUT;
```

```
FMAIN:  PROC OPTIONS(MAIN);

STMT LEVEL NEST

 64    1          READ FILE(INDCOST) INTO (IND);

 65    1          DO WHILE (IND_OK);
                      /*  FIND TOTAL INDIRECT COST COST FOR COUNTY  */
 66    1    1          TOT_IND_COST(IND.COUNTY_NUM) =
                            IND.SUP_SALARIES + IND.CLER_SALARIES
                            + IND.UTILITIES + IND.BLDG_COSTS + IND.EQ_DEPR
                            + IND.EXP_TOOLS + IND.SUPPLIES + IND.MOVING_COSTS
                            + IND.EC_INS;
 67    1    1          READ FILE(INDCOST) INTO (IND);
 68    1    1          END;
 69    1          READ FILE(BKVALU) INTO (BKVAL);

 70    1          DO WHILE (BKVAL_OK);
 71    1    1          TOT_BK_VAL(BKVAL.CNTY_NUM) = BKVAL.VALUE;
 72    1    1          READ FILE(BKVALU) INTO (BKVAL);
 73    1    1          END;
 74    1          INDEX = 1;

                  /*  THE MAX VALUE OF INDEX MUST BE CHANGED AS CITIES ARE ADDED  */
 75    1          DO WHILE (INDEX <= 99);
 76    1    1          IF   TOT_BK_VAL(INDEX) ¬= (10)'0'
 77    1    1          THEN RATIO(INDEX) = TOT_IND_COST(INDEX)/TOT_BK_VAL(INDEX);
 78    1    1          ELSE RATIO(INDEX) = (10)'0';
 79    1    1          INDEX = INDEX + 1;
 80    1    1          END;
```

```
FMAIN:  PROC OPTIONS(MAIN);

STMT LEVEL NEST

 81     1          NEXT:
                   READ FILE(SEQMAST) INTO (MSTR);
 82     1          READ FILE(DIRCOST) INTO (DIR);

 83     1          NEXT2:
                   IF   MSTR.COUNTY_NUM = DIR.COUNTY_NUM & MSTR.EC_NUM = DIR.EC_NUM
 84     1          THEN DO;  /*  UPDATE LIFE FIGURES FOR ALL EQUIPMENT  */
 85     1    1          MSTR.IND_COST_YR = MSTR.BOOK_VALUE * RATIO(MSTR.COUNTY_NUM);
 86     1    1          MSTR = DIR, BY NAME;
 87     1    1          MSTR.MILES_HRS_LIFE = MSTR.MILES_HRS_LIFE + MSTR.MILES_HRS_YR;
 88     1    1          MSTR.FUEL_COST_LIFE = MSTR.FUEL_COST_LIFE + MSTR.FUEL_COST_YR;
 89     1    1          MSTR.LUBRICANTS_LIFE = MSTR.LUBRICANTS_LIFE + MSTR.LUBRICANTS_YR;
 90     1    1          MSTR.TIRES_TUBES_LIFE=MSTR.TIRES_TUBES_LIFE + MSTR.TIRES_TUBES_YR;
 91     1    1          MSTR.EXPEN_PARTS_LIFE=MSTR.EXPEN_PARTS_LIFE+MSTR.EXPEN_PARTS_YR;
 92     1    1          MSTR.ANTIFREEZE_LIFE = MSTR.ANTIFREEZE_LIFE + MSTR.ANTIFREEZE_YR;
 93     1    1          MSTR.PARTS_COST_LIFE = MSTR.PARTS_COST_LIFE + MSTR.PARTS_COST_YR;
 94     1    1         MSTR.LABOR_COST_LIFE = MSTR.LABOR_COST_LIFE + MSTR.LABOR_COST_YR;
 95     1    1          MSTR.DOWN_TIME_LIFE = MSTR.DOWN_TIME_LIFE + MSTR.DOWN_TIME_YR;
 96     1    1         MSTR.NUM_REPAIRS_LIFE=MSTR.NUM_REPAIRS_LIFE + MSTR.NUM_REPAIRS_YR;
 97     1    1          MSTR.IND_COST_LIFE = MSTR.IND_COST_LIFE + MSTR.IND_COST_YR;
 98     1    1          MSTR.DEPRECIATION = (MSTR.ORIG_COST - MSTR.SALVAGE_VALUE)
                             / DEPRECIATION_YRS(MSTR.CLASS_CODE);
 99     1    1          TEMP_BK_VAL = MSTR.BOOK_VALUE - MSTR.DEPRECIATION;
100     1    1          IF   TEMP_BK_VAL > MSTR.SALVAGE_VALUE
101     1    1          THEN MSTR.BOOK_VALUE = TEMP_BK_VAL;
102     1    1          ELSE MSTR.BOOK_VALUE = MSTR.SALVAGE_VALUE;
103     1    1          WRITE FILE(TEQMAST) FROM (MSTR);
104     1    1          GO TO NEXT;
105     1    1          END;
```

```
STMT LEVEL NEST

106    1          IF   MSTR.COUNTY_NUM < DIR.COUNTY_NUM |
                  (MSTR.COUNTY_NUM = DIR.COUNTY_NUM & MSTR.EQ_NUM < DIR.EQ_NUM)
107    1          THEN DO;
108    1    1          IF   MSTR.COUNTY_NUM ¬= LAST_ERR_CNTY
109    1    1          THEN DO;
110    1    2               PUT PAGE EDIT ('ERROR LISTING FOR ',
                                CNTY_NAMES(MSTR.COUNTY_NUM),' COUNTY')(COL(30),A,A,A);
111    1    2               LAST_ERR_CNTY = MSTR.COUNTY_NUM;
112    1    2               END;
113    1    1          PUT SKIP(2) EDIT ('NO DIRECT COST CARD WAS FOUND FOR THE ',
                            'FOLLOWING PIECE OF EQUIPMENT:')(A,A);
114    1    1          PUT SKIP EDIT ('EQUIPMENT NO.: ',MSTR.EQ_NUM,'MAKE & MODEL: ',
                            MSTR.MAKE_MODEL,'SERIAL NO.: ',MSTR.SERIAL_NUM)
                            (A,A,X(4),A,A,X(4),A,A);
115    1    1          WRITE FILE(TECMAST) FROM (MSTR);
116    1    1          READ FILE(SECMAST) INTO (MSTR);
117    1    1          GO TO NEXT2;
118    1    1          END;

                   /* IF MSTR.COUNTY_NUM > DIR.COUNTY_NUM | MSTR.EQ_NUM > DIR.EQ_NUM  */
119    1          ELSE DO;
120    1    1          IF   DIR.COUNTY_NUM ¬= LAST_ERR_CNTY
121    1    1          THEN DO;
122    1    2               PUT PAGE EDIT ('ERROR LISTING FOR ',
                                CNTY_NAMES(DIR.COUNTY_NUM),' COUNTY')(COL(30),A,A,A);
123    1    2               LAST_ERR_CNTY = DIR.COUNTY_NUM;
124    1    2               END;
125    1    1          PUT SKIP(2) EDIT ('THE EQUIPMENT NUMBER IN THE FOLLOWING DIRECT ',
                            'COST RECORD WAS NOT FOUND IN THE MASTER FILE')(A,A);
126    1    1          PUT SKIP EDIT (DIR)(A);
127    1    1          READ FILE(DIRCOST) INTO (DIR);
128    1    1          GO TO NEXT2;
129    1    1          END;
130    1          DONE:
                  END FMAIN;
```

Listing of Program MAIN

Step 3

```
STMT LEVEL NEST

  1              SMAIN:  PROC OPTIONS(MAIN);
  2     1        DCL  1 MSTR,
                       2 COUNTY_NUM                PIC'999',
                       2 DISTRICT              CHAR(2),
                       2 EQ_NUM                CHAR(8),
                       2 CLASS_CODE            PIC'99',
                       2 YEAR_MFD                  CHAR(2),
                       2 MFR_CODE                  CHAR(3),
                       2 ENGINE_MFR_CODE           CHAR(2),
                       2 NUM_CYLS                  CHAR(2),
                       2 ENGINE_TYPE               CHAR(1),
                       2 XMISSION_TYPE             CHAR(1),
                       2 ORIG_COST             PIC'999999V99',
                       2 SALVAGE_VALUE         PIC'999999V99',
                       2 BOOK_VALUE            PIC'999999V99',
                       2 DEPRECIATION          PIC'99999V99',
                       2 MILES_HRS_YR          PIC'999999',
                       2 FUEL_COST_YR          PIC'99999V99',
                       2 LUBRICANTS_YR         PIC'999V99',
                       2 TIRES_TUBES_YR        PIC'9999V99',
                       2 EXPEN_PARTS_YR        PIC'9999V99',
                       2 ANTIFREEZE_YR         PIC'999V99',
                       2 PARTS_COST_YR         PIC'99999V99',
                       2 LABOR_COST_YR         PIC'99999V99',
                       2 IND_COST_YR           PIC'99999V99',
                       2 MILES_HRS_LIFE        PIC'999999',
                       2 FUEL_COST_LIFE        PIC'99999V99',
                       2 LUBRICANTS_LIFE       PIC'9999V99',
                       2 TIRES_TUBES_LIFE      PIC'9999V99',
                       2 EXPEN_PARTS_LIFE      PIC'9999V99',
                       2 ANTIFREEZE_LIFE       PIC'999V99',
                       2 PARTS_COST_LIFE       PIC'99999V99',
                       2 LABOR_COST_LIFE       PIC'99999V99',
                       2 IND_COST_LIFE         PIC'99999V99',
                       2 CLASS_DESC            CHAR(20),
                       2 MAKE_MODEL                CHAR(14),
                       2 SERIAL_NUM                CHAR(14),
                       2 ENGINE_DESC               CHAR(14),
                       2 CO_PURCHASED_FROM         CHAR(12),
                       2 DATE_PURCHASED,
                            3 PMON                 CHAR(2),
                            3 PDAY                 CHAR(2),
                            3 PYR                  CHAR(2),
                       2 DATE_DISPOSED,
                            3 DMON                 CHAR(2),
                            3 DDAY                 CHAR(2),
                            3 DYR                  CHAR(2),
                       2 DISPOSITION               CHAR(1),
                       2 WHEELBASE                 CHAR(3),
                       2 DOWN_TIME_YR              PIC'9999',
                       2 DOWN_TIME_LIFE            PIC'9999',
                       2 NUM_REPAIRS_YR            PIC'99',
                       2 NUM_REPAIRS_LIFE          PIC'999',
                       2 RATED_HP                  CHAR(3),
                       2 BLANKS                    CHAR(24);
```

```
STMT LEVEL NEST

  3     1          DCL  CNTY_NAMES(99) CHAR(13) VARYING
                      INIT('ADAIR','ADAMS','ALLAMAKEE','APPANOOSE','AUDUBON','BENTON',
                      'BLACK HAWK','BOONE','BREMER','BUCHANAN','BUENA VISTA','BUTLER',
                      'CALHOUN','CARROLL','CASS','CEDAR','CERRO GORDO','CHEROKEE',
                      'CHICKASAW','CLARKE','CLAY','CLAYTON','CLINTON','CRAWFORD','DALLAS',
                      'DAVIS','DECATUR','DELAWARE','DES MOINES','DICKINSON','DUBUQUE',
                      'EMMET','FAYETTE','FLOYD','FRANKLIN','FREMONT','GREENE','GRUNDY',
                      'GUTHRIE','HAMILTON','HANCOCK','HARDIN','HARRISON','HENRY',
                      'HOWARD','HUMBOLDT','IDA','IOWA','JACKSON','JASPER','JEFFERSON',
                      'JOHNSON','JONES','KEOKUK','KOSSUTH','LEE','LINN','LOUISA','LUCAS',
                      'LYON','MADISON','MAHASKA','MARION','MARSHALL','MILLS','MITCHELL',
                      'MONONA','MONROE','MONTGOMERY','MUSCATINE','O''BRIEN','OSCEOLA',
                      'PAGE','PALO ALTO','PLYMOUTH','POCAHONTAS','POLK','POTTAWATTAMIE',
                      'POWESHIEK','RINGGOLD','SAC','SCOTT','SHELBY','SIOUX','STORY',
                      'TAMA','TAYLOR','UNION','VAN BUREN','WAPELLO','WARREN',
                      'WASHINGTON','WAYNE','WEBSTER','WINNEBAGO','WINNESHIEK','WOODBURY',
                      'WORTH','WRIGHT');

  4     1          DCL  DEPRECN_LIFE              PIC'999999V99';
  5     1          DCL  DIR_CPMH                  PIC'99V999';
  6     1          DCL  DIR_CPMH_L                PIC'99V999';
  7     1          DCL  DIR_IND_CPMH              PIC'99V999';
  8     1          DCL  DIR_IND_CPMH_L            PIC'99V999';
  9     1          DCL  DEPR_D_I_CPMH             PIC'99V999';
 10     1          DCL  DEPR_D_I_CPMH_L           PIC'99V999';
 11     1          DCL  TOT_DIR                   PIC'9999999V99';
 12     1          DCL  TOT_DIR_L                 PIC'9999999V99';
 13     1          DCL  TOT_COST                  PIC'9999999V99';
 14     1          DCL  TOT_COST_L                PIC'9999999V99';
 15     1          DCL  LAST_CNTY_NUM             PIC'999';
 16     1          DCL  LAST_CLASS                PIC'99';
 17     1          DCL  LAST_EQ_NUM               CHAR(8);
```

```
STMT LEVEL NEST

 18    1        DCL  CLASS_MI_HRS            PIC'9999999'        INIT((7)'0');
 19    1        DCL  CLASS_FUEL              PIC'999999V99'      INIT((8)'0');
 20    1        DCL  CLASS_LUB               PIC'9999V99'        INIT((6)'0');
 21    1        DCL  CLASS_ANTIFZ            PIC'9999V99'        INIT((6)'0');
 22    1        DCL  CLASS_TIRES             PIC'999999V99'      INIT((8)'0');
 23    1        DCL  CLASS_EXPEN_PARTS       PIC'99999V99'       INIT((7)'0');
 24    1        DCL  CLASS_REPAIR_PARTS      PIC'99999V99'       INIT((7)'0');
 25    1        DCL  CLASS_REPAIR_LABOR      PIC'99999V99'       INIT((7)'0');
 26    1        DCL  CLASS_TOT_DIR           PIC'999999V99'      INIT((8)'0');
 27    1        DCL CLASS_DOWN_TIME          PIC'99999'          INIT((5)'0');
 28    1        DCL  CLASS_NUM_REPAIRS       PIC'9999'           INIT((4)'0');
 29    1        DCL  CLASS_TOT_IND           PIC'999999V99'      INIT((8)'0');
 30    1        DCL  CLASS_DEPRECN           PIC'999999V99'      INIT((8)'0');
 31    1        DCL  CLASS_COST              PIC'9999999V99'     INIT((9)'0');
 32    1        DCL  CLASS_DIR_CPMH          PIC'99V999'         INIT((5)'0');
 33    1        DCL  CLASS_D_I_CPMH          PIC'99V999'         INIT((5)'0');
 34    1        DCL  CLASS_D_D_I_CPMH        PIC'99V999'         INIT((5)'0');
 35    1        DCL  CLASS_MI_HRS_L          PIC'9999999'        INIT((7)'0');
 36    1        DCL  CLASS_FUEL_L            PIC'999999V99'      INIT((8)'0');
 37    1        DCL  CLASS_LUB_L             PIC'9999V99'        INIT((6)'0');
 38    1        DCL  CLASS_ANTIFZ_L          PIC'9999V99'        INIT((6)'0');
 39    1        DCL  CLASS_TIRES_L           PIC'999999V99'      INIT((8)'0');
 40    1        DCL  CLASS_EXPEN_PARTS_L     PIC'99999V99'       INIT((7)'0');
 41    1        DCL  CLASS_REPAIR_PARTS_L    PIC'99999V99'       INIT((7)'0');
 42    1        DCL  CLASS_REPAIR_LABOR_L    PIC'99999V99'       INIT((7)'0');
 43    1        DCL  CLASS_TOT_DIR_L         PIC'999999V99'      INIT((8)'0');
 44    1        DCL  CLASS_DOWN_TIME_L       PIC'99999'          INIT((5)'0');
 45    1        DCL  CLASS_NUM_REPAIRS_L     PIC'9999'           INIT((4)'0');
 46    1        DCL  CLASS_TOT_IND_L         PIC'999999V99'      INIT((8)'0');
 47    1        DCL  CLASS_DEPRECN_L         PIC'999999V99'      INIT((8)'0');
 48    1        DCL  CLASS_COST_L            PIC'9999999V99'     INIT((9)'0');
 49    1        DCL  CLASS_DIR_CPMH_L        PIC'99V999'         INIT((5)'0');
 50    1        DCL  CLASS_D_I_CPMH_L        PIC'99V999'         INIT((5)'0');
 51    1        DCL  CLASS_D_D_I_CPMH_L      PIC'99V999'         INIT((5)'0');
 52    1        DCL CNTY_FUEL                PIC'9999999V99'     INIT((9)'0');
 53    1        DCL CNTY_LUB                 PIC'99999V99'       INIT((7)'0');
 54    1        DCL CNTY_ANTIFZ              PIC'9999V99'        INIT((6)'0');
 55    1        DCL CNTY_TIRES               PIC'999999V99'      INIT((8)'0');
 56    1        DCL CNTY_EXPEN_PARTS         PIC'999999V99'      INIT((8)'0');
 57    1        DCL CNTY_REPAIR_PARTS        PIC'999999V99'      INIT((8)'0');
 58    1        DCL CNTY_REPAIR_LABOR        PIC'999999V99'      INIT((8)'0');
 59    1        DCL CNTY_TOT_DIR             PIC'9999999V99'     INIT((9)'0');
 60    1        DCL CNTY_TOT_IND             PIC'9999999V99'     INIT((9)'0');
 61    1        DCL CNTY_DEPRECN             PIC'9999999V99'     INIT((9)'0');
 62    1        DCL CNTY_COST                PIC'9999999V99'     INIT((9)'0');
```

```
STMT LEVEL NEST

 63     1          DIR_FORM: FORMAT(COL(3),A,COL(15),A,COL(31),P'ZZZZZ9',COL(39),
                              P'ZZZZ9V.99',COL(49),P'ZZZ9V.99',COL(59),P'ZZ9V.99',
                              COL(67),P'ZZZZ9V.99',COL(77),P'ZZZZ9V.99',COL(87),
                               P'ZZZZ9V.99',COL(97),P'ZZZZ9V.99',COL(108),P'ZZZZZ9V.99',
                               COL(123),P'Z9V.999');

 64     1          TOT_FORM: FORMAT(COL(3),A,COL(12),A,COL(27),P'ZZZZZ9',COL(36),
                               P'ZZZZ9',COL(43),P'ZZZ9',COL(52),P'ZZZZZ9V.99',COL(64),
                               P'ZZZZZ9V.99',COL(76),P'ZZZZZ9V.99',COL(88),P'ZZZZZZ9V.99',
                               COL(101),P'Z9V.999',COL(112),P'Z9V.999',COL(123),
                               P'Z9V.999');

 65     1          GRAND_DIR: FORMAT(COL(38),P'ZZZZZ9V.99',COL(48),P'ZZZZ9V.99',COL(58),
                              P'ZZZ9V.99',COL(66),P'ZZZZZ9V.99',COL(76),P'ZZZZZ9V.99',
                              COL(86),P'ZZZZZ9V.99',COL(96),P'ZZZZZ9V.99',COL(107),
                              P'ZZZZZZ9V.99');

 66     1          GRAND_TOT: FORMAT(COL(51),P'ZZZZZZ9V.99',COL(63),P'ZZZZZZ9V.99',
                              COL(75),P'ZZZZZZ9V.99',COL(88),P'ZZZZZZ9V.99');

 67     1          DCL  LAST_YEAR            FIXED DEC(4);
 68     1          DCL  1  TODAYS_DATE,
                           2 C_YEAR         CHAR(2),
                           2 C_MON_DAY      CHAR(4);
 69     1          TODAYS_DATE = DATE;
 70     1          LAST_YEAR = 1899 + C_YEAR;
```

```
STMT LEVEL NEST

 71    1        DCL  YRDIR PRINT FILE;
 72    1        DCL  YRTOT PRINT FILE;
 73    1        DCL  LIFEDIR PRINT FILE;
 74    1        DCL  LIFETOT PRINT FILE;
 75    1        DCL  FEQMAST FILE RECORD SEQUENTIAL;

 76    1        ON ENDFILE(FEQMAST) GO TO DONE;

 78    1        ON   ENDPAGE(YRDIR) BEGIN;
 80    2             CALL HEADINGS;
 81    2             END;

 82    1        OPEN FILE(FEQMAST) INPUT;
 83    1        OPEN FILE(YRDIR) LINESIZE(132) PAGESIZE(60);
 84    1        OPEN FILE(YRTOT) LINESIZE(132) PAGESIZE(60);
 85    1        OPEN FILE(LIFEDIR) LINESIZE(132) PAGESIZE(60);
 86    1        OPEN FILE(LIFETOT) LINESIZE(132) PAGESIZE(60);
```

```
STMT LEVEL NEST

 87    1          READ FILE(FEQMAST) INTO (MSTR);
 88    1          LAST_CNTY_NUM = COUNTY_NUM;

 89    1          NEXTCOUNTY:
                  CALL HEADINGS;

 90    1          NEXTCLASS:
                  PUT SKIP(2) FILE(YRDIR) EDIT('EQUIPMENT CLASS - ',CLASS_DESC)
                            (X(3),A,A);
 91    1          PUT SKIP(2) FILE(YRTOT) EDIT('EQUIPMENT CLASS - ',CLASS_DESC)
                            (X(3),A,A);
 92    1          PUT SKIP(2) FILE(LIFEDIR) EDIT('EQUIPMENT CLASS - ',CLASS_DESC)
                            (X(3),A,A);
 93    1          PUT SKIP(2) FILE(LIFETOT) EDIT('EQUIPMENT CLASS - ',CLASS_DESC)
                            (X(3),A,A);

 94    1          NEXTEQ:
                  TOT_DIR = FUEL_COST_YR + LUBRICANTS_YR + TIRES_TUBES_YR +
                            EXPEN_PARTS_YR + ANTIFREEZE_YR + PARTS_COST_YR +
                            LABOR_COST_YR;
 95    1          TOT_DIR_L = FUEL_COST_LIFE + LUBRICANTS_LIFE + TIRES_TUBES_LIFE +
                            EXPEN_PARTS_LIFE + ANTIFREEZE_LIFE + PARTS_COST_LIFE +
                            LABOR_COST_LIFE;
 96    1          DEPRECN_LIFE = ORIG_COST - BOOK_VALUE;
 97    1          TOT_COST = TOT_DIR + IND_COST_YR + DEPRECIATION;
 98    1          TOT_COST_L = TOT_DIR_L + IND_COST_LIFE + DEPRECN_LIFE;

 99    1          IF MILES_HRS_YR ¬= (6)'0'
100    1          THEN DO;
101    1    1          DIR_CPMH = TOT_DIR / MILES_HRS_YR;
102    1    1          DIR_IND_CPMH = (TOT_DIR + IND_COST_YR) / MILES_HRS_YR;
103    1    1          DEPR_D_I_CPMH = TOT_COST / MILES_HRS_YR;
104    1    1          END;
105    1          ELSE DO;
106    1    1          DIR_CPMH = (5)'0';
107    1    1          DIR_IND_CPMH = (5)'0';
108    1    1          DEPR_D_I_CPMH = (5)'0';
109    1    1          END;

110    1          IF MILES_HRS_LIFE ¬= (6)'0'
111    1          THEN DO;
112    1    1          DIR_CPMH_L = TOT_DIR_L / MILES_HRS_LIFE;
113    1    1          DIR_IND_CPMH_L = (TOT_DIR_L + IND_COST_LIFE) / MILES_HRS_LIFE;
114    1    1          DEPR_D_I_CPMH_L = TOT_COST_L / MILES_HRS_LIFE;
115    1    1          END;
116    1          ELSE DO;
117    1    1          DEPR_D_I_CPMH_L = (5)'0';
118    1    1          DIR_IND_CPMH_L = (5)'0';
119    1    1          DIR_CPMH_L = (5)'0';
120    1    1          END;

121    1          PUT FILE(YRDIR) EDIT(EQ_NUM,MAKE_MODEL,MILES_HRS_YR,FUEL_COST_YR,
                            LUBRICANTS_YR,ANTIFREEZE_YR,TIRES_TUBES_YR,EXPEN_PARTS_YR,
                            PARTS_COST_YR,LABOR_COST_YR,TOT_DIR,DIR_CPMH)(R(DIR_FORM));
```

```
SMAIN:  PROC OPTIONS(MAIN);

STMT LEVEL NEST

122    1        PUT FILE(LIFEDIR) EDIT(EQ_NUM,MAKE_MODEL,MILES_HRS_LIFE,
                        FUEL_COST_LIFE,LUBRICANTS_LIFE,ANTIFREEZE_LIFE,
                        TIRES_TUBES_LIFE,EXPEN_PARTS_LIFE,PARTS_COST_LIFE,
                        LABOR_COST_LIFE,TOT_DIR_L,DIR_CPMH_L)(R(DIR_FORM));

123    1        PUT FILE(YRTOT) EDIT(EQ_NUM,MAKE_MODEL,MILES_HRS_YR,DOWN_TIME_YR,
                        NUM_REPAIRS_YR,TOT_DIR,IND_COST_YR,DEPRECIATION,TOT_COST,
                        DIR_CPMH,DIR_IND_CPMH,DEPR_D_I_CPMH)(R(TOT_FORM));

124    1        PUT FILE(LIFETOT) EDIT(EQ_NUM,MAKE_MODEL,MILES_HRS_LIFE,
                        DOWN_TIME_LIFE,NUM_REPAIRS_LIFE,TOT_DIR_L,IND_COST_LIFE,
                        DEPRECN_LIFE,TOT_COST_L,DIR_CPMH_L,DIR_IND_CPMH_L,
                        DEPR_D_I_CPMH_L)(R(TOT_FORM));
125    1        CLASS_MI_HRS = CLASS_MI_HRS + MILES_HRS_YR;
126    1        CLASS_MI_HRS_L = CLASS_MI_HRS_L + MILES_HRS_LIFE;
127    1        CLASS_FUEL = CLASS_FUEL + FUEL_COST_YR;
128    1        CLASS_FUEL_L = CLASS_FUEL_L + FUEL_COST_LIFE;
129    1        CLASS_LUB = CLASS_LUB + LUBRICANTS_YR;
130    1        CLASS_LUB_L = CLASS_LUB_L + LUBRICANTS_LIFE;
131    1        CLASS_ANTIFZ = CLASS_ANTIFZ + ANTIFREEZE_YR;
132    1        CLASS_ANTIFZ_L = CLASS_ANTIFZ_L + ANTIFREEZE_LIFE;
133    1        CLASS_TIRES = CLASS_TIRES + TIRES_TUBES_YR;
134    1        CLASS_TIRES_L = CLASS_TIRES_L + TIRES_TUBES_LIFE;
135    1        CLASS_EXPEN_PARTS = CLASS_EXPEN_PARTS + EXPEN_PARTS_YR;
136    1        CLASS_EXPEN_PARTS_L = CLASS_EXPEN_PARTS_L + EXPEN_PARTS_LIFE;
137    1        CLASS_REPAIR_PARTS = CLASS_REPAIR_PARTS + PARTS_COST_YR;
138    1        CLASS_REPAIR_PARTS_L = CLASS_REPAIR_PARTS_L + PARTS_COST_LIFE;
139    1        CLASS_REPAIR_LABOR = CLASS_REPAIR_LABOR + LABOR_COST_YR;
140    1        CLASS_REPAIR_LABOR_L = CLASS_REPAIR_LABOR_L + LABOR_COST_LIFE;
141    1        CLASS_TOT_DIR = CLASS_TOT_DIR + TOT_DIR;
142    1        CLASS_TOT_DIR_L = CLASS_TOT_DIR_L + TOT_DIR_L;
143    1        CLASS_DOWN_TIME = CLASS_DOWN_TIME + DOWN_TIME_YR;
144    1        CLASS_DOWN_TIME_L = CLASS_DOWN_TIME_L + DOWN_TIME_LIFE;
145    1        CLASS_NUM_REPAIRS = CLASS_NUM_REPAIRS + NUM_REPAIRS_YR;
146    1        CLASS_NUM_REPAIRS_L = CLASS_NUM_REPAIRS_L + NUM_REPAIRS_LIFE;
147    1        CLASS_TOT_IND = CLASS_TOT_IND + IND_COST_YR;
148    1        CLASS_TOT_IND_L = CLASS_TOT_IND_L + IND_COST_LIFE;
149    1        CLASS_DEPRECN = CLASS_DEPRECN + DEPRECIATION;
150    1        CLASS_DEPRECN_L = CLASS_DEPRECN_L + DEPRECN_LIFE;
151    1        CLASS_COST = CLASS_COST + TOT_COST;
152    1        CLASS_COST_L = CLASS_COST_L + TOT_COST_L;
153    1        LAST_EQ_NUM = EQ_NUM;
154    1        LAST_CLASS = CLASS_CODE;
155    1        LAST_CNTY_NUM = COUNTY_NUM;
```

```
STMT LEVEL NEST

156     1          NEXTRECORD:
                   READ FILE(FECMAST) INTO (MSTR);
157     1          IF   COUNTY_NUM ¬= LAST_CNTY_NUM
158     1          THEN DO;
159     1    1          CALL UPCNTYT;
160     1    1          CALL PRCLASST;
161     1    1          PUT SKIP(2) FILE(YRDIR) EDIT ('GRAND TOTALS',CNTY_FUEL,CNTY_LUB,
                             CNTY_ANTIFZ,CNTY_TIRES,CNTY_EXPEN_PARTS,CNTY_REPAIR_PARTS,
                             CNTY_REPAIR_LABOR,CNTY_TOT_DIR)(X(6),A,R(GRAND_DIR));
162     1    1          PUT SKIP(2) FILE(YRTOT) EDIT ('GRAND TOTALS',CNTY_TOT_DIR,
                             CNTY_TOT_IND,CNTY_DEPRECN,CNTY_COST)(X(6),A,R(GRAND_TOT));
163     1    1          CLASS_MI_HRS            = (7) '0';
164     1    1          CLASS_FUEL              = (8)'0';
165     1    1          CLASS_LUB               = (6)'0';
166     1    1          CLASS_ANTIFZ            = (6)'0';
167     1    1          CLASS_TIRES             =(8)'0';
168     1    1          CLASS_EXPEN_PARTS       = (7)'0';
169     1    1          CLASS_REPAIR_PARTS      = (7)'0';
170     1    1          CLASS_REPAIR_LABOR      = (7)'0';
171     1    1          CLASS_TOT_DIR           = (8) '0';
172     1    1          CLASS_DOWN_TIME         = (5)'0';
173     1    1          CLASS_NUM_REPAIRS       = (4)'0';
174     1    1          CLASS_TOT_IND           =(8)'0';
175     1    1          CLASS_DEPRECN           =(8)'0';
176     1    1          CLASS_COST              = (9)'0';
177     1    1          CLASS_DIR_CPMH          = (5)'0';
178     1    1          CLASS_D_I_CPMH          = (5)'0';
179     1    1          CLASS_D_D_I_CPMH        = (5)'0';
180     1    1          CLASS_MI_HRS_L          = (7)'0';
181     1    1          CLASS_FUEL_L            = (8)'0';
182     1    1          CLASS_LUB_L             = (6)'0';
183     1    1          CLASS_ANTIFZ_L          = (6)'0';
184     1    1          CLASS_TIRES_L           = (8)'0';
185     1    1          CLASS_EXPEN_PARTS_L     = (7)'0';
186     1    1          CLASS_REPAIR_PARTS_L    = (7)'0';
187     1    1          CLASS_REPAIR_LABOR_L    = (7)'0';
188     1    1          CLASS_TOT_DIR_L         = (8)'0';
189     1    1          CLASS_DOWN_TIME_L       = (5)'0';
190     1    1          CLASS_NUM_REPAIRS_L     = (4)'0';
191     1    1          CLASS_TOT_IND_L         = (8)'0';
192     1    1          CLASS_DEPRECN_L         = (8)'0';
193     1    1          CLASS_COST_L            = (9)'0';
194     1    1          CLASS_DIR_CPMH_L        = (5)'0';
195     1    1          CLASS_D_I_CPMH_L        = (5)'0';
196     1    1          CLASS_D_D_I_CPMH_L      = (5)'0';
197     1    1         CNTY_FUEL                = (9)'0';
198     1    1         CNTY_LUB                 = (7)'0';
199     1    1         CNTY_ANTIFZ              = (6)'0';
200     1    1         CNTY_TIRES               = (8)'0';
201     1    1         CNTY_EXPEN_PARTS         = (8)'0';
202     1    1         CNTY_REPAIR_PARTS        = (8)'0';
203     1    1         CNTY_REPAIR_LABOR        = (8)'0';
204     1    1         CNTY_TOT_DIR             = (9)'0';
205     1    1         CNTY_TOT_IND             =(9)'0';
206     1    1         CNTY_DEPRECN             = (9)'0';
```

```
STMT LEVEL NEST

207    1    1        CNTY_COST                = (9)'0';
208    1    1         GO TO NEXTCOUNTY;
209    1    1         END;
```

```
STMT LEVEL NEST

210    1        IF   LAST_CLASS = CLASS_CODE
211    1        THEN IF   EQ_NUM = LAST_EQ_NUM
212    1                 THEN GO TO NEXTRECORD;
213    1                 ELSE GO TO NEXTEQ;
214    1        ELSE;
215    1        CALL PPCLASST;
216    1        CALL UPCNTYT;
217    1             CLASS_MI_HRS            = (7) '0';
218    1             CLASS_FUEL              = (8)'0';
219    1             CLASS_LUB               = (6)'0';
220    1             CLASS_ANTIFZ            = (6)'0';
221    1             CLASS_TIRES             =(8)'0';
222    1             CLASS_EXPEN_PARTS       = (7)'0';
223    1             CLASS_REPAIR_PARTS      = (7)'0';
224    1             CLASS_REPAIR_LABOR      = (7)'0';
225    1             CLASS_TOT_DIR           = (8) '0';
226    1             CLASS_DOWN_TIME         = (5)'0';
227    1             CLASS_NUM_REPAIRS       = (4)'0';
228    1             CLASS_TOT_IND           =(8)'0';
229    1             CLASS_DEPRECN           =(8)'0';
230    1             CLASS_COST              = (9)'0';
231    1             CLASS_DIR_CPMH          = (5)'0';
232    1             CLASS_D_I_CPMH          = (5)'0';
233    1             CLASS_D_D_I_CPMH        = (5)'0';
234    1             CLASS_MI_HRS_L          = (7)'0';
235    1             CLASS_FUEL_L            = (8)'0';
236    1             CLASS_LUB_L             = (6)'0';
237    1             CLASS_ANTIFZ_L          = (6)'0';
238    1             CLASS_TIRES_L           = (8)'0';
239    1             CLASS_EXPEN_PARTS_L     = (7)'0';
240    1             CLASS_REPAIR_PARTS_L    = (7)'0';
241    1             CLASS_REPAIR_LABOR_L    = (7)'0';
242    1             CLASS_TOT_DIR_L         = (8)'0';
243    1             CLASS_DOWN_TIME_L       = (5)'0';
244    1             CLASS_NUM_REPAIRS_L     = (4)'0';
245    1             CLASS_TOT_IND_L         = (8)'0';
246    1             CLASS_DEPRECN_L         = (8)'0';
247    1             CLASS_COST_L            = (9)'0';
248    1             CLASS_DIR_CPMH_L        = (5)'0';
249    1             CLASS_D_I_CPMH_L        = (5)'0';
250    1             CLASS_D_D_I_CPMH_L      = (5)'0';
251    1         GO TO NEXTCLASS;
```

```
STMT LEVEL NEST

252     1          PRCLASST:  PROC;

253     2          CLASS_DIR: FORMAT(COL(30),P'ZZZZZZ9',COL(38),P'ZZZZZ9V.99',COL(49),
                              P'ZZZ9V.99',COL(58),P'ZZZ9V.99',COL(67),P'ZZZZ9V.99',
                              COL(77),P'ZZZZ9V.99',COL(87),P'ZZZZ9V.99',COL(97),
                              P'ZZZZ9V.99',COL(108),P'ZZZZZ9V.99',COL(123),P'Z9V.999');

254     2          CLASS_TOT: FORMAT(COL(26),P'ZZZZZZ9',COL(36),P'ZZZZ9',COL(43),P'ZZZ9',
                              COL(52),P'ZZZZZ9V.99',COL(64),P'ZZZZZ9V.99',COL(76),
                              P'ZZZZZ9V.99',COL(88),P'ZZZZZZ9V.99',COL(101),P'Z9V.999',
                              COL(112),P'Z9V.999',COL(123),P'Z9V.999');

255     2                IF   CLASS_MI_HRS ¬= (7)'0'
256     2                THEN DO;
257     2     1                CLASS_DIR_CPMH = CLASS_TOT_DIR / CLASS_MI_HRS;
258     2     1                CLASS_D_I_CPMH = (CLASS_TOT_DIR+CLASS_TOT_IND)/CLASS_MI_HRS;
259     2     1                CLASS_D_D_I_CPMH = CLASS_COST / CLASS_MI_HRS;
260     2     1                END;
261     2                ELSE DO;
262     2     1                CLASS_D_I_CPMH = (5)'0';
263     2     1                CLASS_D_D_I_CPMH = (5)'0';
264     2     1                CLASS_DIR_CPMH = (5)'0';
265     2     1                END;

266     2                IF   CLASS_MI_HRS_L ¬= (7)'0'
267     2                THEN DO;
268     2     1                CLASS_DIR_CPMH_L = CLASS_TOT_DIR_L / CLASS_MI_HRS_L;
269     2     1                CLASS_D_I_CPMH_L =(CLASS_TOT_DIR_L + CLASS_TOT_IND_L) /
                                    CLASS_MI_HRS_L;
270     2     1                CLASS_D_D_I_CPMH_L = CLASS_COST_L / CLASS_MI_HRS_L;
271     2     1                END;
272     2                ELSE DO;
273     2     1                CLASS_D_I_CPMH_L = (5)'0';
274     2     1                CLASS_D_D_I_CPMH_L = (5)'0';
275     2     1                CLASS_DIR_CPMH_L = (5)'0';
276     2     1                END;

277     2          PUT SKIP(2) FILE(YRDIR) EDIT('CLASS TOTALS',CLASS_MI_HRS,CLASS_FUEL,
                              CLASS_LUB,CLASS_ANTIFZ,CLASS_TIRES,CLASS_EXPEN_PARTS,
                              CLASS_REPAIR_PARTS,CLASS_REPAIR_LABOR,CLASS_TOT_DIR,
                              CLASS_DIR_CPMH)
                              (X(6),A,R(CLASS_DIR));

278     2          PUT SKIP(2) FILE(YRTOT) EDIT ('CLASS TOTALS',CLASS_MI_HRS,
                              CLASS_DOWN_TIME,CLASS_NUM_REPAIRS,CLASS_TOT_DIR,
                              CLASS_TOT_IND,CLASS_DEPRECN,CLASS_COST,CLASS_DIR_CPMH,
                              CLASS_D_I_CPMH,CLASS_D_D_I_CPMH)
                              (X(6),A,R(CLASS_TOT));

279     2          PUT SKIP(2) FILE(LIFEDIR) EDIT ('CLASS TOTALS',CLASS_MI_HRS_L,
                              CLASS_FUEL_L,CLASS_LUB_L,CLASS_ANTIFZ_L,CLASS_TIRES_L,
                              CLASS_EXPEN_PARTS_L,CLASS_REPAIR_PARTS_L,
                              CLASS_REPAIR_LABOR_L,CLASS_TOT_DIR_L,CLASS_DIR_CPMH_L)
                              (X(6),A,R(CLASS_DIR));
```

```
STMT LEVEL NEST

280     2          PUT SKIP(2) FILE(LIFETOT) EDIT ('CLASS TOTALS',CLASS_MI_HRS_L,
                              CLASS_DOWN_TIME_L,CLASS_NUM_REPAIRS_L,CLASS_TOT_DIR_L,
                              CLASS_TOT_IND_L,CLASS_DEPRECN_L,CLASS_COST_L,
                              CLASS_DIR_CPMH_L,CLASS_D_I_CPMH_L,CLASS_D_D_I_CPMH_L)
                              (X(6),A,R(CLASS_TCT));
281     2          END PRCLASST;
```

```
STMT LEVEL NEST

282    1        HEADINGS:  PROC;
283    2        COLUMN_START = (125 - LENGTH(CNTY_NAMES(COUNTY_NUM))) / 2;
284    2        PUT PAGE FILE(YRDIR) EDIT (CNTY_NAMES(COUNTY_NUM),' COUNTY')
                         (COL(COLUMN_START),A,A);
285    2        PUT PAGE FILE(YRTOT) EDIT (CNTY_NAMES(COUNTY_NUM),' COUNTY')
                         (COL(COLUMN_START),A,A);
286    2        PUT PAGE FILE(LIFEDIR) EDIT (CNTY_NAMES(COUNTY_NUM),' COUNTY')
                         (COL(COLUMN_START),A,A);
287    2        PUT PAGE FILE(LIFETOT) EDIT (CNTY_NAMES(COUNTY_NUM),' COUNTY')
                         (COL(COLUMN_START),A,A);
288    2        PUT SKIP(2) FILE(YRDIR) EDIT (LAST_YEAR,
                         ' EQUIPMENT DIRECT OPERATING COSTS')(COL(48),F(4),A);
289    2        PUT SKIP(2) FILE(LIFEDIR) EDIT
                     ('LIFETIME EQUIPMENT DIRECT OPERATING COSTS')(COL(46),A);
290    2        PUT SKIP    FILE(YRTOT) EDIT(LAST_YEAR,
                     ' EQUIPMENT TOTAL OPERATING COSTS')(COL(49),F(4),A);
291    2        PUT SKIP    FILE(LIFETOT) EDIT
                     ('LIFETIME EQUIPMENT TOTAL OPERATING COSTS')(COL(47),A);
292    2        PUT SKIP FILE(YRDIR) EDIT('TOTAL          DIRECT')(COL(110),A);
293    2        PUT SKIP FILE(YRDIR) EDIT('EQUIPMENT','MILES/','ANTI',
                     'EXPENDABLE   REPAIR   REPAIR','DIRECT        CPM/')
                     (COL(4),A,COL(31),A,COL(60),A,COL(76),A,COL(110),A);
294    2        PUT SKIP FILE(YRDIR) EDIT('NUMBER     MAKE & MODEL    HOURS     FUEL',
                     'LUBRICANTS FREEZE    TIRES    PARTS      PARTS    LABOR',
                     'COSTS          CPH')(COL(5),A,COL(48),A,COL(110),A);
295    2        PUT SKIP FILE(LIFEDIR) EDIT('TOTAL          DIRECT')(COL(110),A);
296    2        PUT SKIP FILE(LIFEDIR) EDIT('EQUIPMENT','MILES/','ANTI',
                     'EXPENDABLE   REPAIR   REPAIR','DIRECT        CPM/')
                     (COL(4),A,COL(31),A,COL(60),A,COL(76),A,COL(110),A);
297    2        PUT SKIP FILE(LIFEDIR) EDIT('NUMBER     MAKE & MODEL    HOURS     FUEL',
                     'LUBRICANTS FREEZE    TIRES    PARTS      PARTS    LABOR',
                     'COSTS          CPH')(COL(5),A,COL(48),A,COL(110),A);
298    2        PUT SKIP(2) FILE(YRTOT) EDIT('TOTAL        TOTAL',
                     'DIRECT +   DEPREC +')(COL(54),A,COL(111),A);
299    2        PUT SKIP FILE(YRTOT) EDIT ('EQUIPMENT',' MILES/   DOWN  TIMES',
                     'DIRECT      INDIRECT','TOTAL      DIRECT    INDIRECT  DIR + INDIR')
                     (COL(2),A,COL(27),A,COL(54),A,COL(91),A);
300    2        PUT SKIP FILE(YRTOT) EDIT ('NUMBER     MAKE & MODEL    HOURS',
                     'TIME REPAIRED','COSTS        COSTS    DEPRECIATION',
                     'COST    CPM/CPH','CPM/CPH    CPM/CPH')
                     (COL(3),A,COL(37),A,COL(54),A,COL(92),A,COL(111),A);
301    2        PUT SKIP(2) FILE(LIFETOT) EDIT('TOTAL        TOTAL',
                     'DIRECT +   DEPREC +')(COL(54),A,COL(111),A);
302    2        PUT SKIP FILE(LIFETOT) EDIT ('EQUIPMENT',' MILES/   DOWN  TIMES',
                     'DIRECT      INDIRECT','TOTAL      DIRECT    INDIRECT  DIR + INDIR')
                     (COL(2),A,COL(27),A,COL(54),A,COL(91),A);
303    2        PUT SKIP FILE(LIFETOT) EDIT ('NUMBER     MAKE & MODEL    HOURS',
                     'TIME REPAIRED','COSTS        COSTS    DEPRECIATION',
                     'COST    CPM/CPH','CPM/CPH    CPM/CPH')
                     (COL(3),A,COL(37),A,COL(54),A,COL(92),A,COL(111),A);
304    2        END HEADINGS;
```

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STMT LEVEL NEST

305    1        UPCNTYT:  PROC;
306    2        CNTY_FUEL = CNTY_FUEL + CLASS_FUEL;
307    2        CNTY_LUB = CNTY_LUB + CLASS_LUB;
308    2        CNTY_ANTIFZ = CNTY_ANTIFZ + CLASS_ANTIFZ;
309    2        CNTY_TIRES = CNTY_TIRES + CLASS_TIRES;
310    2        CNTY_EXPEN_PARTS = CNTY_EXPEN_PARTS + CLASS_EXPEN_PARTS;
311    2        CNTY_REPAIR_PARTS = CNTY_REPAIR_PARTS + CLASS_REPAIR_PARTS;
312    2        CNTY_REPAIR_LABOR = CNTY_REPAIR_LABOR + CLASS_REPAIR_LABOR;
313    2        CNTY_TOT_DIR= CNTY_TOT_DIR + CLASS_TOT_DIR;
314    2        CNTY_TOT_IND = CNTY_TOT_IND + CLASS_TOT_IND;
315    2        CNTY_DEPRECN = CNTY_DEPRECN + CLASS_DEPRECN;
316    2        CNTY_COST = CNTY_COST + CLASS_COST;
317    2        END UPCNTYT;
```

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STMT LEVEL NEST

318     1          DONE:
                        CALL UPCNTYT;
319     1               CALL PRCLASST;
320     1               PUT SKIP(2) FILE(YRDIR) EDIT ('GRAND TOTALS',CNTY_FUEL,CNTY_LUB,
                             CNTY_ANTIFZ,CNTY_TIRES,CNTY_EXPEN_PARTS,CNTY_REPAIR_PARTS,
                             CNTY_REPAIR_LABOR,CNTY_TOT_DIR)(X(6),A,R(GRAND_DIR));
321     1               PUT SKIP(2) FILE(YRTOT) EDIT ('GRAND TOTALS',CNTY_TOT_DIR,
                             CNTY_TOT_IND,CNTY_DEPRECN,CNTY_COST)(X(6),A,R(GRAND_TOT));
322     1          END SMAIN;
```

Listing of Program CTYSUMRY

```
STMT LEVEL NEST
  1                EQCLSUM: PROC OPTIONS(MAIN);

                   /*      PROGRAM CNTYSUMRY                                    */

                   /*      THIS PROGRAM LISTS PAST YEAR AND LIFETIME CPM/CPH    */
                   /*      AVERAGES FOR EACH COUNTY, DISTRICT, AND FOR THE WHOLE */
                   /*      STATE, WITHIN EACH EQUIPMENT CLASS.                  */

                   /*      THIS PROGRAM IS ONE OF EIGHT COMPUTER PROGRAMS WHICH FORM */
                   /*      THE "COMPUTER BASED INFORMATION SYSTEM FOR COUNTY EQUIPMENT */
                   /*      COST RECORDS".                                       */

                   /*      WRITTEN BY                                           */
                   /*                SYSTEMS DIVISION                           */
                   /*                COLLEGE OF ENGINEERING                     */
                   /*                THE UNIVERSITY OF IOWA                     */
                   /*                IOWA CITY, IOWA                            */
                   /*                JULY 1975                                  */

  2     1           DCL UEMF FILE RECORD SEQUENTIAL;
  3     1           DCL OUT FILE PRINT;

                   /*      DECLARE THE STRUCTURE FOR THE EQUIPMENT COST RECORDS. */

  4     1           DCL 1 EQUIP_MSTR_FILE,
                        2 COUNTY_NO                  PIC'999',
                        2 DISTRICT_NO                PIC'99',
                        2 EQ_NUM                     CHAR(8),
                        2 CLASS_CODE                 PIC'99',
                        2 UNUSED_DATA_1              CHAR(42),
                        2 MILES_HRS_YEAR             PIC'999999',
                        2 FUEL_COST_YEAR             PIC'9999999',
                        2 LUBRICANTS_YEAR            PIC'99999',
                        2 TIRES_TUBES_YEAR           PIC'999999',
                        2 EXPEN_PARTS_YEAR           PIC'999999',
                        2 ANTIFREEZE_YEAR            PIC'99999',
                        2 PARTS_COST_YEAR            PIC'9999999',
                        2 LABOR_COST_YEAR            PIC'9999999',
                        2 INDIRECT_COST_YEAR         PIC'9999999',
                        2 MILES_HRS_LIFE             PIC'999999',
                        2 FUEL_COST_LIFE             PIC'9999999',
                        2 LUBRICANTS_LIFE            PIC'999999',
                        2 TIRES_TUBES_LIFE           PIC'999999',
                        2 EXPEN_PARTS_LIFE           PIC'999999',
                        2 ANTIFREEZE_LIFE            PIC'99999',
                        2 PARTS_COST_LIFE            PIC'9999999',
                        2 LABOR_COST_LIFE            PIC'9999999',
                        2 INDIRECT_COST_LIFE         PIC'9999999',
                        2 CLASS_DESC                 CHAR(20),
                        2 UNUSED_DATA_2              CHAR(84),
                        2 FILLER                     CHAR(26);

  5     1           DCL CNTY_NAMES(99) CHAR(13) VARYING
                      INIT('ADAIR','ADAMS','ALLAMAKEE','APPANOOSE','AUDUBON','BENTON',
                      'BLACK HAWK','BOONE','BREMER','BUCHANAN','BUENA VISTA','BUTLER',
                      'CALHOUN','CARROLL','CASS','CEDAR','CERRO GORDO','CHEROKEE',
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STMT LEVEL NEST

                    'CHICKASAW','CLARKE','CLAY','CLAYTON','CLINTON','CRAWFORD','DALLAS',
                    'DAVIS','DECATUR','DELAWARE','DES MOINES','DICKINSON','DUBUQUE',
                    'EMMET','FAYETTE','FLOYD','FRANKLIN','FREMONT','GREENE','GRUNDY',
                    'GUTHRIE','HAMILTON','HANCOCK','HARDIN','HARRISON','HENRY',
                    'HOWARD','HUMBOLDT','IDA','IOWA','JACKSON','JASPER','JEFFERSON',
                    'JOHNSON','JONES','KEOKUK','KOSSUTH','LEE','LINN','LOUISA','LUCAS',
                    'LYON','MADISON','MAHASKA','MARION','MARSHALL','MILLS','MITCHELL',
                    'MONONA','MONROE','MONTGOMERY','MUSCATINE','O''BRIEN','OSCEOLA',
                    'PAGE','PALO ALTO','PLYMOUTH','POCAHONTAS','POLK','POTTAWATTAMIE',
                    'POWESHIEK','RINGGOLD','SAC','SCOTT','SHELBY','SIOUX','STORY',
                    'TAMA','TAYLOR','UNION','VAN BUREN','WAPELLO','WARREN',
                    'WASHINGTON','WAYNE','WEBSTER','WINNEBAGO','WINNESHIEK','WOODBURY',
                    'WORTH','WRIGHT');

  6    1          DCL (DIR_COST_YR,DIR_COST_LIFE)FIXED DEC (9) INIT (0);
  7    1          DCL (TOT_DIR_COST_CTY_YR,TOT_DIR_COST_CTY_LIFE)FIXED DEC (9)
                      INIT (0);
  8    1          DCL (DIST_COST_YR,DIST_COST_LIFE)FIXED DEC (9) INIT(0);
  9    1          DCL (STATE_COST_YR,STATE_COST_LIFE)FIXED DEC (10) INIT(0);
 10    1          DCL (M_H_CTY_YR,M_H_CTY_LIFE)FIXED DEC (9) INIT (0);
 11    1          DCL (M_H_DIST_YR,M_H_DIST_LIFE)FIXED DEC (9) INIT (0);
 12    1          DCL (M_H_ST_YR,M_H_ST_LIFE)FIXED DEC (9) INIT (0);
 13    1          DCL (VEH_CTY,VEH_DIST,VEH_STATE)FIXED DEC (10) INIT (0);
 14    1          DCL (CTY_CPM_YR,CTY_CPM_LIFE,DIST_CPM_YR,DIST_CPM_LIFE,ST_CPM_YR,
                      ST_CPM_LIFE)FIXED DEC (6,3) INIT (0);
 15    1          DCL OLD_COUNTY FIXED DEC (3);
 16    1          DCL OLD_DISTRICT FIXED DEC (2);
 17    1          DCL OLD_EQUIP_CLASS FIXED DEC (2);

 18    1          DCL 1 TODAYS_DATE,
                      2 C_YEAR                          CHAR(2),
                      2 C_MON_DAY                       CHAR(4);
 19    1          DCL C_Y FIXED DEC (2);
 20    1          DCL PAST_YEAR FIXED DEC (4);
 21    1          TODAYS_DATE = DATE;
 22    1          C_Y = C_YEAR;
 23    1          PAST_YEAR = 1900 + C_Y - 1;

 24    1          ON ENDFILE(UEMF) GO TO DONE;

 26    1          ON ENDPAGE(OUT) BEGIN;
 28    2            PUT FILE(OUT) PAGE;
 29    2            PUT FILE(OUT) SKIP(2) EDIT('DIRECT OPERATING COSTS')(COL(56),A);
 30    2            PUT FILE(OUT) SKIP(2) EDIT('COST PER MILE OR HOUR BY EQUIPMENT',
                       ' CLASS, DISTRICT, AND COUNTY')(COL(35),A,A);
 31    2            PUT FILE(OUT) SKIP(2) EDIT('COUNTY',PAST_YEAR,'LIFE','PIECES OF')
                       (COL(23),A,COL(43),F(4),COL(53),A,COL(60),A);
 32    2            PUT FILE(OUT) SKIP EDIT('CODE','NAME','CPM/CPH','CPM/CPH',
                       'EQUIPMENT')
                       (COL(20),A,COL(28),A,COL(41),A,COL(51),A,COL(60),A);
 33    2            END;

 34    1          OPEN FILE(OUT) PAGESIZE(60) LINESIZE(132) OUTPUT;
 35    1          OPEN FILE(UEMF) INPUT;
```

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STMT LEVEL NEST

 36    1          SIGNAL ENDPAGE(OUT);

 37    1         REPEAT: READ FILE(UEMF) INTO(EQUIP_MSTR_FILE);
 38    1          IF EQUIP_MSTR_FILE.CLASS_CODE = 0
 39    1            THEN GO TO REPEAT;

 40    1          PUT FILE(OUT) SKIP(2) EDIT('EQUIPMENT CLASS - ',CLASS_DESC)
                    (COL(11),A,A(20));
 41    1          PUT FILE(OUT) SKIP(2) EDIT('DISTRICT ',DISTRICT_NO)
                    (COL(14),A,F(2));

 42    1         LOOP: M_H_CTY_YR = M_H_CTY_YR + MILES_HRS_YEAR;
 43    1          M_H_CTY_LIFE = M_H_CTY_LIFE + MILES_HRS_LIFE;
 44    1          DIR_COST_YR = FUEL_COST_YEAR + LUBRICANTS_YEAR + TIRES_TUBES_YEAR +
                    EXPEN_PARTS_YEAR + ANTIFREEZE_YEAR + PARTS_COST_YEAR +
                    LABOR_COST_YEAR;
 45    1          DIR_COST_LIFE = FUEL_COST_LIFE + LUBRICANTS_LIFE + TIRES_TUBES_LIFE +
                    EXPEN_PARTS_LIFE + ANTIFREEZE_LIFE + PARTS_COST_LIFE +
                    LABOR_COST_LIFE;
 46    1          TOT_DIR_COST_CTY_YR = TOT_DIR_COST_CTY_YR + DIR_COST_YR;
 47    1          TOT_DIR_COST_CTY_LIFE = TOT_DIR_COST_CTY_LIFE + DIR_COST_LIFE;
 48    1          VEH_CTY = VEH_CTY + 1;
 49    1          OLD_COUNTY = COUNTY_NO;
 50    1          OLD_DISTRICT = DISTRICT_NO;
 51    1          OLD_EQUIP_CLASS = CLASS_CODE;

 52    1          READ FILE(UEMF) INTO (EQUIP_MSTR_FILE);

 53    1          IF (OLD_COUNTY ¬= COUNTY_NO) |
                    (OLD_EQUIP_CLASS < CLASS_CODE)
 54    1            THEN DO;
 55    1    1       IF M_H_CTY_YR ¬= 0
 56    1    1            THEN CTY_CPM_YR = TOT_DIR_COST_CTY_YR/M_H_CTY_YR;
 57    1    1            ELSE CTY_CPM_YR = 0;
 58    1    1       IF M_H_CTY_LIFE ¬= 0
 59    1    1            THEN CTY_CPM_LIFE = TOT_DIR_COST_CTY_LIFE/M_H_CTY_LIFE;
 60    1    1            ELSE CTY_CPM_LIFE = 0;
 61    1    1       DIST_COST_YR = DIST_COST_YR + TOT_DIR_COST_CTY_YR;
 62    1    1       DIST_COST_LIFE = DIST_COST_LIFE + TOT_DIR_COST_CTY_LIFE;
 63    1    1       TOT_DIR_COST_CTY_YR,TOT_DIR_COST_CTY_LIFE = 0;
 64    1    1       M_H_DIST_YR = M_H_DIST_YR + M_H_CTY_YR;
 65    1    1       M_H_DIST_LIFE = M_H_DIST_LIFE + M_H_CTY_LIFE;
 66    1    1       M_H_CTY_YR,M_H_CTY_LIFE = 0;
 67    1    1       VEH_DIST = VEH_DIST + VEH_CTY;
 68    1    1       PUT FILE(OUT) SKIP EDIT(OLD_COUNTY,CNTY_NAMES(OLD_COUNTY),
                         CTY_CPM_YR,CTY_CPM_LIFE,VEH_CTY)
                         (COL(20),F(3),COL(25),A,COL(42),F(6,3,-2),COL(52),F(6,3,-2),
                         COL(63),F(2));
 69    1    1       VEH_CTY = 0;
 70    1    1       END;

 71    1          IF (OLD_DISTRICT ¬= DISTRICT_NO) | (OLD_EQUIP_CLASS < CLASS_CODE)
 72    1            THEN DO;
 73    1    1       IF M_H_DIST_YR ¬= 0
 74    1    1            THEN DIST_CPM_YR = DIST_COST_YR/M_H_DIST_YR;
```

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STMT LEVEL NEST

 75    1    1            ELSE DIST_CPM_YR = 0;
 76    1    1        IF M_H_DIST_LIFE ¬= 0
 77    1    1            THEN DIST_CPM_LIFE = DIST_COST_LIFE/M_H_DIST_LIFE;
 78    1    1            ELSE DIST_CPM_LIFE = 0;
 79    1    1        STATE_COST_YR = STATE_COST_YR + DIST_COST_YR;
 80    1    1        STATE_COST_LIFE = STATE_COST_LIFE + DIST_COST_LIFE;
 81    1    1        DIST_COST_YR,DIST_COST_LIFE = 0;
 82    1    1        M_H_ST_YR = M_H_ST_YR + M_H_DIST_YR;
 83    1    1        M_H_ST_LIFE = M_H_ST_LIFE + M_H_DIST_LIFE;
 84    1    1        M_H_DIST_YR,M_H_DIST_LIFE = 0;
 85    1    1        VEH_STATE = VEH_STATE + VEH_DIST;
 86    1    1        PUT FILE(OUT) SKIP EDIT('AVERAGE FOR DISTRICT ',OLD_DISTRICT,
                          DIST_CPM_YR,DIST_CPM_LIFE,VEH_DIST)
                          (COL(17),A,F(2),COL(42),F(6,3,-2),COL(52),F(6,3,-2),COL(62),
                          F(3));
 87    1    1        VEH_DIST = 0;
 88    1    1        IF OLD_EQUIP_CLASS = CLASS_CODE
 89    1    1            THEN PUT FILE(OUT) SKIP(2) EDIT('DISTRICT ',DISTRICT_NO)
                              (COL(14),A,F(2));
 90    1    1        END;

 91    1           IF OLD_EQUIP_CLASS < CLASS_CODE
 92    1             THEN DO;
 93    1    1        IF M_H_ST_YR ¬= 0
 94    1    1            THEN ST_CPM_YR = STATE_COST_YR/M_H_ST_YR;
 95    1    1            ELSE ST_CPM_YR = 0;
 96    1    1        IF M_H_ST_LIFE ¬= 0
 97    1    1            THEN ST_CPM_LIFE = STATE_COST_LIFE/M_H_ST_LIFE;
 98    1    1            ELSE ST_CPM_LIFE = 0;
 99    1    1        STATE_COST_YR,STATE_COST_LIFE = 0;
100    1    1        M_H_ST_YR,M_H_ST_LIFE = 0;
101    1    1        PUT FILE(OUT) SKIP(2) EDIT('AVERAGE COST FOR STATE',ST_CPM_YR,
                          ST_CPM_LIFE,VEH_STATE)(COL(14),A,COL(42),F(6,3,-2),COL(52),
                          F(6,3,-2),COL(61),F(4));
102    1    1        VEH_STATE = 0;
103    1    1        PUT FILE(OUT) SKIP(2) EDIT('EQUIPMENT CLASS - ',CLASS_DESC)
                          (COL(11),A,A(20));
104    1    1        PUT FILE(OUT) SKIP(2) EDIT('DISTRICT ',DISTRICT_NO)
                          (COL(14),A,F(2));
105    1    1        END;

106    1           GO TO LOOP;

107    1           DONE: IF M_H_CTY_YR ¬= 0
108    1              THEN CTY_CPM_YR = TOT_DIR_COST_CTY_YR/M_H_CTY_YR;
109    1              ELSE CTY_CPM_YR = 0;
110    1            IF M_H_CTY_LIFE ¬= 0
111    1              THEN CTY_CPM_LIFE = TOT_DIR_COST_CTY_LIFE/M_H_CTY_LIFE;
112    1              ELSE CTY_CPM_LIFE = 0;
113    1            DIST_COST_YR = DIST_COST_YR + TOT_DIR_COST_CTY_YR;
114    1            DIST_COST_LIFE = DIST_COST_LIFE + TOT_DIR_COST_CTY_LIFE;
115    1            M_H_DIST_YR = M_H_DIST_YR + M_H_CTY_YR;
116    1            M_H_DIST_LIFE = M_H_DIST_LIFE + M_H_CTY_LIFE;
117    1            VEH_DIST = VEH_DIST + VEH_CTY;
118    1            IF M_H_DIST_YR ¬= 0
```

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STMT LEVEL NEST

119    1          THEN DIST_CPM_YR = DIST_COST_YR/M_H_DIST_YR;
120    1          ELSE DIST_CPM_YR = 0;
121    1        IF M_H_DIST_LIFE ¬= 0
122    1          THEN DIST_CPM_LIFE = DIST_COST_LIFE/M_H_DIST_LIFE;
123    1          ELSE DIST_CPM_LIFE = 0;
124    1        STATE_COST_YR = STATE_COST_YR + DIST_COST_YR;
125    1        STATE_COST_LIFE = STATE_COST_LIFE + DIST_COST_LIFE;
126    1        M_H_ST_YR = M_H_ST_YR + M_H_DIST_YR;
127    1        M_H_ST_LIFE = M_H_ST_LIFE + M_H_DIST_LIFE;
128    1        VEH_STATE = VEH_STATE + VEH_DIST;
129    1        IF M_H_ST_YR ¬= 0
130    1          THEN ST_CPM_YR = STATE_COST_YR/M_H_ST_YR;
131    1          ELSE ST_CPM_YR = 0;
132    1        IF M_H_ST_LIFE ¬= 0
133    1          THEN ST_CPM_LIFE = STATE_COST_LIFE/M_H_ST_LIFE;
134    1          ELSE ST_CPM_LIFE = 0;
135    1        PUT FILE(OUT)SKIP EDIT(OLD_COUNTY,CNTY_NAMES(OLD_COUNTY),
                  CTY_CPM_YR,CTY_CPM_LIFE,VEH_CTY)(COL(20),F(3),COL(25),A,
                  COL(42),F(6,3,-2),COL(52),F(6,3,-2),COL(63),F(2));
136    1        PUT FILE(OUT) SKIP EDIT('AVERAGE FOR DISTRICT ',OLD_DISTRICT,
                  DIST_CPM_YR,DIST_CPM_LIFE,VEH_DIST)(COL(17),A,F(2),COL(42),
                  F(6,3,-2),COL(52),F(6,3,-2),COL(62),F(3));
137    1        PUT FILE(OUT) SKIP(2) EDIT('AVERAGE COST FOR STATE',ST_CPM_YR,
                  ST_CPM_LIFE,VEH_STATE)(COL(14),A,COL(42),F(6,3,-2),COL(52),
                  F(6,3,-2),COL(61),F(4));
138    1        END EQCLSUM;
```

Listing of Program MFGAGE

```
STMT LEVEL NEST
 1                MFRAGE: PROC OPTIONS(MAIN);

                  /*      PROGRAM MFGAGE                                          */

                  /*      THIS PROGRAM LISTS PAST YEAR AND LIFETIME CPM/CPH       */
                  /*      AVERAGES FOR VARIOUS EQUIPMENT AGE GROUPINGS BY EQUIPMENT */
                  /*      MANUFACTURERS WITHIN EACH EQUIPMENT CLASS.              */

                  /*      THIS PROGRAM IS ONE OF EIGHT COMPUTER PROGRAMS WHICH FORM */
                  /*      THE "COMPUTER BASED INFORMATION SYSTEM FOR COUNTY EQUIPMENT */
                  /*      COST RECORDS".                                          */

                  /*      WRITTEN BY                                              */
                  /*                SYSTEMS DIVISION                              */
                  /*                COLLEGE OF ENGINEERING                        */
                  /*                THE UNIVERSITY OF IOWA                        */
                  /*                IOWA CITY, IOWA                               */
                  /*                JULY 1975                                     */

 2     1           DCL UEMF FILE RECORD SEQUENTIAL;
 3     1           DCL MFR FILE;
 4     1           DCL OUT FILE PRINT;

                  /*      DECLARE THE STRUCTURE FOR THE EQUIPMENT COST RECORDS.   */

 5     1           DCL 1 EQUIP_MSTR_FILE,
                         2 COUNTY_NO                  PIC'999',
                         2 DISTRICT_NO                PIC'99',
                         2 EQ_NUM                     CHAR(8),
                         2 CLASS_CODE                 PIC'99',
                         2 YR_MFR                     PIC'99',
                         2 MFR_CODE                   PIC'999',
                         2 UNUSED_DATA_1              CHAR(37),
                         2 MILES_HRS_YEAR             PIC'999999',
                         2 FUEL_COST_YEAR             PIC'99999V99',
                         2 LUBRICANTS_YEAR            PIC'999V99',
                         2 TIRES_TUBES_YEAR           PIC'9999V99',
                         2 EXPEN_PARTS_YEAR           PIC'9999V99',
                         2 ANTIFREEZE_YEAR            PIC'999V99',
                         2 PARTS_COST_YEAR            PIC'99999V99',
                         2 LABOR_COST_YEAR            PIC'99999V99',
                         2 INDIRECT_COST_YEAR         PIC'99999V99',
                         2 MILES_HRS_LIFE             PIC'999999',
                         2 FUEL_COST_LIFE             PIC'99999V99',
                         2 LUBRICANTS_LIFE            PIC'9999V99',
                         2 TIRES_TUBES_LIFE           PIC'9999V99',
                         2 EXPEN_PARTS_LIFE           PIC'9999V99',
                         2 ANTIFREEZE_LIFE            PIC'999V99',
                         2 PARTS_COST_LIFE            PIC'99999V99',
                         2 LABOR_COST_LIFE            PIC'99999V99',
                         2 INDIRECT_COST_LIFE         PIC'99999V99',
                         2 CLASS_DESC                 CHAR(20),
                         2 UNUSED_DATA_2              CHAR(84),
                         2 FILLER                     CHAR(26);

 6     1           DCL ARRAY_ELMT FIXED DEC(3);
```

```
STMT LEVEL NEST

  7     1          DCL NAMES CHAR(23);
  8     1          DCL NO_MFR FIXED DEC(3) INIT(20);
  9     1          DCL MFR_NAMES(*) CHAR(23) VARYING CONTROLLED;
 10     1          DCL MI_HR_VEH(5,3) FIXED DEC(10) INIT((15) 0);
 11     1          DCL COSTS_YR_LIFE(5,2) FIXED DEC(10) INIT((10) 0);
 12     1          DCL TOTALS(5,2) FIXED DEC(5,3) INIT((10) 0);
 13     1          DCL OLD_EQUIP_CLASS FIXED DEC(2);
 14     1          DCL OLD_MFR_CODE FIXED DEC(3);
 15     1          DCL AGE(5) CHAR(7) VARYING
                     INIT('0-3','4-6','7-9','10-12','OVER 12');
 16     1          DCL TODAYS_DATE CHAR(6);
 17     1          DCL C_YEAR CHAR (2) DEFINED TODAYS_DATE POS(1);
 18     1          DCL PAST_YEAR FIXED DEC(4);

 19     1          TODAYS_DATE = DATE;
 20     1          PAST_YEAR = 1900 + C_YEAR - 1;

 21     1          OPEN FILE(UEMF) INPUT;
 22     1          OPEN FILE(MFR) INPUT;
 23     1          OPEN FILE(OUT) PAGESIZE(60) LINESIZE(132) OUTPUT;

 24     1          ON ENDFILE(MFR) GO TO NEXT;
 26     1          ON ENDFILE(UEMF) GO TO DONE;

 28     1          GET FILE(MFR) EDIT(NO_MFR)(COL(1),F(3));
 29     1          ALLOCATE MFR_NAMES(0:NO_MFR);

 30     1          ON ENDPAGE(OUT) BEGIN;
 32     2            PUT FILE(OUT) PAGE;
 33     2            PUT FILE(OUT) SKIP(2) EDIT('DIRECT OPERATING COSTS')
                       (COL(56),A);
 34     2            PUT FILE(OUT) SKIP(2) EDIT('COST PER MILE OR HOUR BY',
                       ' EQUIPMENT CLASS, MANUFACTURER, AND, AGE')
                       (COL(34),A,A);
 35     2            PUT FILE(OUT) SKIP(2) EDIT('MANUFACTURER',PAST_YEAR, 'LIFE')
                       (COL(14),A,COL(35),F(4),COL(45),A);
 36     2            PUT FILE(OUT) SKIP EDIT('AGE','CPM/CPH','CPM/CMH','NUMBER')
                       (COL(23),A,COL(33),A,COL(43),A,COL(53),A);
 37     2            END;

 38     1          SIGNAL ENDPAGE(OUT);

                  /*      READ IN A LIST OF THE MANUFACTURER NAMES.                    */

 39     1          HERE: GET FILE(MFR) EDIT(ARRAY_ELMT,NAMES)
                       (COL(1),F(3),A(23));
 40     1          MFR_NAMES(ARRAY_ELMT) = NAMES;
 41     1          GO TO HERE;

                  /*      READ A RECORD FROM THE MASTER FILE.                          */

 42     1          NEXT: READ FILE(UEMF) INTO (EQUIP_MSTR_FILE);
 43     1          IF CLASS_CODE = 0
 44     1            THEN GO TO NEXT;
 45     1          PUT FILE(OUT) SKIP(2) EDIT('EQUIPMENT CLASS - ',CLASS_DESC)
```

```
STMT LEVEL NEST

                    (COL(11),A,A(20));

 46     1          LOOP: IF C_YEAR - YR_MFR <= 3
 47     1             THEN I = 1;
 48     1             ELSE IF C_YEAR - YR_MFR <= 6
 49     1             THEN I = 2;
 50     1             ELSE IF C_YEAR - YR_MFR <= 9
 51     1             THEN I = 3;
 52     1             ELSE IF C_YEAR - YR_MFR <= 12
 53     1             THEN I = 4;
 54     1             ELSE I = 5;

 55     1           MI_HR_VEH(I,3) = MI_HR_VEH(I,3) + 1;
 56     1           MI_HR_VEH(I,1) = MI_HR_VEH(I,1) + MILES_HRS_YEAR;
 57     1           MI_HR_VEH(I,2) = MI_HR_VEH(I,2) + MILES_HRS_LIFE;

 58     1           COSTS_YR_LIFE(I,1) = COSTS_YR_LIFE(I,1) + FUEL_COST_YEAR +
                      LUBRICANTS_YEAR + TIRES_TUBES_YEAR + EXPEN_PARTS_YEAR +
                      ANTIFREEZE_YEAR + PARTS_COST_YEAR + LABOR_COST_YEAR;
 59     1           COSTS_YR_LIFE(I,2) = COSTS_YR_LIFE(I,2) + FUEL_COST_LIFE +
                      LUBRICANTS_LIFE + TIRES_TUBES_LIFE + EXPEN_PARTS_LIFE +
                      ANTIFREEZE_LIFE + PARTS_COST_LIFE + LABOR_COST_LIFE;

 60     1           OLD_EQUIP_CLASS = CLASS_CODE;
 61     1           OLD_MFR_CODE = MFR_CODE;

                   /*      READ A RECORD FROM THE MASTER FILE.                    */

 62     1           READ FILE(UEMF) INTO (EQUIP_MSTR_FILE);

 63     1           IF(OLD_MFR_CODE ¬= MFR_CODE) |
                      (OLD_EQUIP_CLASS < CLASS_CODE)
 64     1             THEN DO;
 65     1     1       DO I = 1 TO 5;
 66     1     2       DO J = 1 TO 2;
 67     1     3             IF MI_HR_VEH(I,J) ¬= 0
 68     1     3                  THEN TOTALS(I,J) = COSTS_YR_LIFE(I,J)/MI_HR_VEH(I,J);
 69     1     3                  ELSE TOTALS(I,J) = 0;
 70     1     3       END;
 71     1     2       END;
 72     1     1       PUT FILE(OUT) SKIP(2) EDIT(MFR_NAMES(OLD_MFR_CODE))
                            (COL(14),A);
 73     1     1       DO I = 1 TO 5;
 74     1     2             IF MI_HR_VEH(I,3) > 0
 75     1     2                  THEN PUT FILE(OUT) EDIT(AGE(I),
                                  (TOTALS(I,J) DO J = 1 TO 2), MI_HR_VEH(I,3))
                                  (COL(23),A,COL(34),F(6,3),COL(44),F(6,3),COL(53),F(4));
 76     1     2                  ELSE;
 77     1     2       END;
 78     1     1       MI_HR_VEH = 0;
 79     1     1       COSTS_YR_LIFE = 0;
 80     1     1       END;

 81     1           IF OLD_EQUIP_CLASS < CLASS_CODE
 82     1             THEN DO;
```

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STMT LEVEL NEST

 83     1    1        PUT FILE(OUT) SKIP(2) EDIT('EQUIPMENT CLASS - ',
                          CLASS_DESC)(COL(11),A,A(20));
 84     1    1        END;
 85     1           GO TO LOOP;

 86     1          DONE: DO I = 1 TO 5;
 87     1    1      DO J = 1 TO 2;
 88     1    2        IF MI_HR_VEH(I,J) ¬= 0
 89     1    2             THEN TOTALS(I,J) = COSTS_YR_LIFE(I,J)/MI_HR_VEH(I,J);
 90     1    2             ELSE TOTALS(I,J) = 0;
 91     1    2      END;
 92     1    1      END;
 93     1           PUT FILE(OUT) SKIP(2) EDIT(MFR_NAMES(OLD_MFR_CODE))
                       (COL(14),A);
 94     1           DO I = 1 TO 5;
 95     1    1        IF MI_HR_VEH(I,3) > 0
 96     1    1             THEN PUT FILE(OUT) SKIP EDIT(AGE(I),
                                 (TOTALS(I,J) DO J = 1 TO 2),MI_HR_VEH(I,3))
                                 (COL(23),A,COL(34),F(6,3),COL(44),F(6,3),COL(53),F(4));
 97     1    1             ELSE;
 98     1    1      END;
 99     1           END MFRAGE;
```

Listing of Program UPDATE

```
STMT LEVEL NEST
  1                UMF: PROC OPTIONS(MAIN);

                   /*      PROGRAM UPDATE                                          */

                   /*      THIS PROGRAM UPDATES THE EQUIPMENT MASTER FILE BY REMOVING  */
                   /*      THE RECORDS OF EQUIPMENT DISPOSED OF IN THE PAST YEAR.      */

                   /*      THIS PROGRAM IS ONE OF EIGHT COMPUTER PROGRAMS WHICH FORM   */
                   /*      THE "COMPUTER BASED INFORMATION SYSTEM FOR COUNTY EQUIPMENT */
                   /*      COST RECORDS".                                              */

                   /*      WRITTEN BY                                                  */
                   /*                SYSTEMS DIVISION                                  */
                   /*                COLLEGE OF ENGINEERING                            */
                   /*                THE UNIVERSITY OF IOWA                            */
                   /*                IOWA CITY, IOWA                                   */
                   /*                JULY 1975                                         */

                   /*      DECLARE THE STRUCTURE FOR THE EQUIPMENT COST RECORDS.       */

  2     1            DECLARE OLDMST FILE RECORD SEQUENTIAL,
                       1 UPDATED_EQ_MSTR_FILE,
                            2 COUNTY_NUMBER                PIC'999',
                            2 DISTRICT_NUMBER              CHAR(2),
                            2 EQUIPMENT_NUMBER             CHAR(8),
                            2 CLASS_CODE                   CHAR(2),
                            2 OTHER_INFO1                  CHAR(98),
                            2 LIFE_M_H                     PIC'999999',
                            2 FUEL_COST                    PIC'9999999',
                            2 LUB_COST                     PIC'999999',
                            2 TIRES_TUBES_COST             PIC'999999',
                            2 EXP_PARTS_COST               PIC'999999',
                            2 ANTIFREEZE_COST              PIC'99999',
                            2 PART_COST                    PIC'9999999',
                            2 LABOR_COST                   PIC'9999999',
                            2 INDIRECT_COST                PIC'9999999',
                            2 CLASS_DESCRIPTION            CHAR(20),
                            2 MAKE_MODEL_DESCRIPTION       CHAR(14),
                            2 OTHER_INFO2                  CHAR(46),
                            2 DATE_SOLD,
                                 3 MONTH                   CHAR(2),
                                 3 DAY                     CHAR(2),
                                 3 YEAR                    CHAR(2),
                            2 DISPOSAL_METHOD              CHAR(1),
                            2 OTHER_INFO3                  CHAR(43);

  3     1            DECLARE LETTERS FIXED DEC(5);
  4     1            DECLARE NEWMST FILE RECORD SEQUENTIAL;
  5     1            DECLARE TOTAL_DIRECT_COST PIC'999999999' INIT(0);
  6     1            DECLARE CPM FIXED DEC(5,3);

  7     1            DECLARE COUNTY_NAME(99) CHAR(13) VARYING
                       INIT('ADAIR','ADAMS','ALLAMAKEE','APPANOOSE','AUDUBON','BENTON',
                       'BLACK HAWK','BOONE','BREMER','BUCHANAN','BUENA VISTA','BUTLER',
                       'CALHOUN','CARROLL','CASS','CEDAR','CERRO GORDO','CHEROKEE',
                       'CHICKASAW','CLARKE','CLAY','CLAYTON','CLINTON','CRAWFORD','DALLAS',
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STMT LEVEL NEST

                    'DAVIS','DECATUR','DELAWARE','DES MOINES','DICKINSON','DUBUQUE',
                    'EMMET','FAYETTE','FLOYD','FRANKLIN','FREMONT','GREENE','GRUNDY',
                    'GUTHRIE','HAMILTON','HANCOCK','HARDIN','HARRISON','HENRY',
                    'HOWARD','HUMBOLDT','IDA','IOWA','JACKSON','JASPER','JEFFERSON',
                    'JOHNSON','JONES','KEOKUK','KOSSUTH','LEE','LINN','LOUISA','LUCAS',
                    'LYON','MADISON','MAHASKA','MARION','MARSHALL','MILLS','MITCHELL',
                    'MONONA','MONROE','MONTGOMERY','MUSCATINE','O''BRIEN','OSCEOLA',
                    'PAGE','PALO ALTO','PLYMOUTH','POCAHONTAS','POLK','POTTAWATTAMIE',
                    'POWESHIEK','RINGGOLD','SAC','SCOTT','SHELBY','SIOUX','STORY',
                    'TAMA','TAYLOR','UNION','VAN BUREN','WAPELLO','WARREN',
                    'WASHINGTON','WAYNE','WEBSTER','WINNEBAGO','WINNESHIEK','WOODBURY',
                    'WORTH','WRIGHT');

  8     1          DECLARE DISP_METH CHAR(6) VAR;
  9     1          DECLARE NEW_COUNTY PIC'999' INIT(0);

 10     1          OPEN FILE(OLDMST) INPUT;
 11     1          OPEN FILE(NEWMST) OUTPUT;

 12     1          ON ENDFILE(OLDMST) GO TO DONE;
```

```
STMT LEVEL NEST

                  /*      READ A RECORD FROM THE MASTER FILE, AND CHECK TO SEE IF IT   */
                  /*      IS FLAGGED FOR DELETION.                                     */

 14     1         NEXT: READ FILE(OLDMST) INTO (UPDATED_EQ_MSTR_FILE);

 15     1          IF DISPOSAL_METHOD = ' '
 16     1          THEN DO;
 17     1    1       WRITE FILE(NEWMST) FROM (UPDATED_EQ_MSTR_FILE);
 18     1    1       GO TO NEXT;
 19     1    1       END;

 20     1          ELSE IF DISPOSAL_METHOD = 'T' THEN DISP_METH = 'TRADED';
 22     1          ELSE IF DISPOSAL_METHOD = 'J' THEN DISP_METH = 'JUNKED';
 24     1          ELSE DISP_METH = 'SOLD';

 25     1          IF NEW_COUNTY ¬= COUNTY_NUMBER
 26     1          THEN DO;
 27     1    1       LETTERS = LENGTH(COUNTY_NAME(COUNTY_NUMBER));
 28     1    1       PUT PAGE;
 29     1    1       PUT SKIP EDIT(COUNTY_NAME(COUNTY_NUMBER),' COUNTY')
                         (COL((125-LETTERS)/2),A,A);
 30     1    1       PUT SKIP(2) EDIT('LIST OF EQUIPMENT DISPOSED OF IN 19',YEAR)
                         (COL(47),A,A);
 31     1    1       PUT SKIP(2) EDIT('TOTAL      TOTAL') (COL(30),A);
 32     1    1       PUT SKIP EDIT(' EQUIPMENT                    MILES/    DIRECT    ',
                      'DISPOSAL       DISPOSAL','LIFE')(A,A,X(6),A);
 33     1    1       PUT SKIP EDIT('  NUMBER    MAKE & MODEL      HOURS     COSTS    ',
                      '   DATE          METHOD','CPM/CPH')(A,A,X(5),A);
 34     1    1       PUT SKIP(1);
 35     1    1       NEW_COUNTY = COUNTY_NUMBER;
 36     1    1       END;

 37     1          TOTAL_DIRECT_COST = FUEL_COST + LUB_COST + TIRES_TUBES_COST +
                      EXP_PARTS_COST + ANTIFREEZE_COST + PART_COST + LABOR_COST;
 38     1          IF LIFE_M_H ¬= 0
 39     1            THEN CPM = TOTAL_DIRECT_COST/(100*LIFE_M_H);
 40     1            ELSE CPM = 0;

 41     1          PUT SKIP EDIT(EQUIPMENT_NUMBER,MAKE_MODEL_DESCRIPTION,LIFE_M_H,
                      TOTAL_DIRECT_COST,MONTH,'-',DAY,'-',YEAR,DISP_METH,CPM)
                      (COL(3),A,X(2),A,X(2),F(7,0),X(2),F(9,2,-2),X(3),A,A,A,A,A,
                      X(7),A,X(6),F(6,3));
 42     1          GO TO NEXT;

 43     1         DONE: END UMF;
```