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# TECHNICAL MEMORANDUM

(TM Series)

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Systems Division Program, for Space Systems Division, AFSC.

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Milestone 11	SYSTEM
Computer Utilization Reports (CUR)	DEVELOPMENT
by	CORPORATION
R. L. Thornton	2500 COLORADO AVE.
5 April 1963	SANTA MONICA
Approved	CALIFORNIA
G. L. Myers	

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#### **IDENTIFICATION**

- A. Title: Computer Utilization Reports (CUR)  
Ident 23C, Mod AA
- B. Programmed: 10 April 1962  
E. J. Rosenberg, R. L. Thornton, System Development Corporation
- C. Documented: 5 April 1963  
R. L. Thornton, System Development Corporation

#### **PURPOSE**

CUR is a 160-A program which uses punched cards as input and generates an accurate report of time utilization on all computing equipment within the CPDC.

#### **USAGE**

- A. Operating Procedures
  - 1. Clear the computer and load the CUR bootstrap at 7754g.
  - 2. Mount the CUR master on tape unit one.
  - 3. Ready the 088 Card Reader with the input deck.
  - 4. Clear the computer and run from 0000.
  - 5. Monitor the 161 typewriter.
    - a. When "REPORT NUMBER REQUESTED" is typed, type in the desired report number (1-8).
  - 6. The master tape will be searched for the appropriate report and "PERIOD ENDING" will be typed on the typewriter.
    - a. Type in the appropriate date following the format below.  
Weekly Reports: (1, 3, and 5)      Monthly Reports (2, 4, 6, 7  
EXAMPLE: 4-1-63                            EXAMPLE: November 1962<sup>and 8</sup>
  - 7. The input cards will be read and the appropriate report will be listed on the 1612 printer.
  - 8. When the computer types "REPORT NUMBER REQUESTED", CUR has completed the requested report. To run subsequent reports, repeat the sequence of operations starting at Step 4.

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B. Parameters

Only two parameters are needed for successful operation of the program. See steps 4 and 5a under Operating Procedures.

C. Halts and error returns

1. All halts in CUR are accompanied by an error message on the typewriter.
  - a. "ON TIME GREATER THAN OFF TIME". This indicates that there was an error in transmitting the on and off time to the input card.
  - b. "UNASSIGNED OP CODE". An operation code was encountered that is not in the legal list of operation codes. See Appendix A.

D. Tape Assignments

CUR Master on tape unit 1.

E. Data Formats

1. The format of the input card is described in Appendix B.
2. Appendix C is a list of sample reports.

RESTRICTIONS

- A. Input cards must be sorted according to EAM flow chart contained in Appendix D.
- B. The last card of the input deck must be an "X-80" card.
- C. Minimum hardware.

8K	160-A
161	Typewriter
163-2	Magnetic Tape Unit
088 or 533	Card Reader
1612	Printer

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#### TIMING

The operating time of CUR is governed by the quantity of inputs and the I/O equipment speed. All I/O is done via the normal channel.

#### STORAGE REQUIREMENTS

$100_8$  Cells of Bank 0 for constants.  
 $4113_8$  Cells of Bank 0 for the program.  
 $6000_8$  Cells of Bank 1 for storage.

#### VALIDATION TESTS

- A. Input decks were constructed with known errors in them. The program performed all legality checks and caught all errors.
- B. Reports were generated for monthly and weekly utilization. The results were checked against hand calculated figures and the answers were correct.

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APPENDIX A

LEGAL OPERATION CODES

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COMPUTER PROGRAM DEVELOPMENT CENTER

Computer Operation Codes

DOWN TIME CODES

- 01 Power OFF
- 02 Sched. Maintenance
- 03 Unsched. Maintenance
- 04 Power Failure
- 05 Air-Cond. Failure
- 06 Idle - No Work
- 07 Machine Failure (Explain in Comments Area)
- 08 Set-Up
- 09 Demonstrations (Time supplied free of charge by CDC)

REWORK OPERATIONS

- 11 Operator Error
- 12 Programmer Error
- 13 System Program Error
- 14 Other (Explain in Comments Area)

INDIVIDUAL PROGRAM DEVELOPMENT AND VALIDATION

- 21 Assembly and Checkout
- 22 Assembly
- 23 Program Checkout
- 24 Program Validation - Integration
- 25 Program Validation - Acceptance
- 26 Program Maintenance (error correction)

SUB-SYSTEM AND SYSTEM TEST

- 31 Sub-System Test
- 32 System Integration (Building a Master Tape and cycling it)
- 33 System Test (Full test of all options for acceptance)

PRODUCTION (NON-FLIGHT ORIENTED) AND TRAINING

- 41 Management Reports
- 42 General Production
- 43 Training

PERIPHERAL OPERATIONS

- 50 All Peripheral Operations (Record the Ident of the specific peripheral operation in (PER/SYSTEM ID))

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APPENDIX B

INPUT CARD FORMAT

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CPDC ACCOUNTING CARD  
(5082 Stock)

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NAME OF FIELD	COLUMNS				COMMENTS	
	FROM	TO	T. W.	G.D.	A/N	A/N
Control No.	1	4		X	X	Punch as coded - blank on Op. Codes 01-09.
First Initial	5	-		X	A	Space over if none
Last Name	6	18		X	A	Punch as coded - blank on Op. Codes 01, 04-06
Organization	19	22		X	A/N	Punch as coded
Work Order No.	23	27		X	N	Punch as coded - blank for Assoc. Cont. O/T MUSD
Vehicle	28	31		X	N	Punch as coded - may be blank
Program/System ID	34	41		X	A/N	Punch as coded - may be blank
Operation Code	42	43		X	N	Punch as coded - must be punched
Number Attending	44	-		X	N	Punch as coded
Operator Number	45	46		X	N	Punch as coded
Computer Used	48	-		X	N	1604 = 1, 160A #1 = 2, 160A #2 = 3, 160A #3 = 4
No. of 1607's Used	49	-		X	N	May be blank, 1, 2, 3, or 4
161 Operator	50	-		X	N	Punch as a "12" punch if checked
533/160A Reader Punch	51	-		X	N	Punch as a "12" punch if checked
166 Printer 15 160A-3	52	-		X	N	Number used, a "1" or "2"
1612 Printer 15 0/F 160A - 3	52	-		X	N	Punch as a "12" punch if checked
163-1 Tape Drives 15 160A - 3	53	-		X	N	Punch as a "12" punch if checked
163-2 Tape Drives 15 0/F 160A-3	53	-		X	N	
088/160A Card Reader	54	-		X	N	Punch as a "12" punch if checked
Program						
Control No.						
Master File						
Order No.						
Vehicle						
Program						
Date						
Year						
Month						
Day						
Time						
Elapsed Time						
Computer						
Operator No.						
Att.						
Op. Code						
Other No.						
Printer No.						
Programmer No.						
Control No.						
Master File						
Program						
Date						
Year						
Month						
Day						
Time						
Elapsed Time						
Computer						
Operator No.						
Att.						
Op. Code						
Other No.						
Printer No.						
Programmer No.						
Control No.						
Master File						
Program						
Date						
Year						
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Day						
Time						
Elapsed Time						
Computer						
Operator No.						
Att.						
Op. Code						
Other No.						
Printer No.						
Programmer No.						
Control No.						
Master File						
Program						
Date						
Year						
Month						
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Time						
Elapsed Time						
Computer						
Operator No.						
Att.						
Op. Code						
Other No.						
Printer No.						
Programmer No.						
Control No.						
Master File						
Program						
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Year						
Month						
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Time						
Elapsed Time						
Computer						
Operator No.						
Att.						
Op. Code						
Other No.						
Printer No.						
Programmer No.						
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Master File						
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Printer No.						
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Programmer No.						
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Printer No.						
Programmer No.						
Control No.						
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Computer						
Operator No.						
Att.						
Op. Code						
Other No.						
Printer No.						
Programmer No.						
Control No.						
Master File						
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Printer No.						
Programmer No.						
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Printer No.						
Programmer No.						
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Master File						
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Other No.						
Printer No.						
Programmer No.						
Control No.						
Master File						
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Computer						
Operator No.						
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Op. Code						
Other No.						
Printer No.						
Programmer No.						
Control No.						
Master File						
Program						
Date						
Year						
Month						
Day						
Time						
Elapsed Time						
Computer						
Operator No.						
Att.						
Op. Code						
Other No.						
Printer No.						
Programmer No.						
Control No.						

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**C P D C      A C C O U N T I N G    C A R D**  
**(2001 Stock)**

NAME OF FIELD	COLUMNS			INTERPRET	A1-A2: A3-A4	COMMENTS
	FROM	TO	LINKE			
223/1604 Card Punch	55	-		X	X	Punch as a "12" punch if checked
Time Off	26	29		X	X	See Note
Date	60	64		X	X	MDY (e.g., 012522 for Jan. 25, 1962)
Time On	65	68		X	X	See Note
Elapsed Time	69	72		X	X	Not punched, calculated in EMM
161 Card Reader	73	-		X	X	Punch as a "12" punch if checked
169 Memory	75	-		X	X	Punch as a "12" punch if checked
Integration Controls	77	79		X	X	Not punched, Ganged in EM
Common Control Punch	80	-		X	X	Dupe a "12" punch in all cards.
 <b>NOTE:</b> It may be necessary to punch a total of three cards from each accounting card:						
1. SETUP TIME: From Job ON to Meter OFF if not identical or either entry missing. Cols. 42-43	= "00"; cols. 49-55 and 74-75 blank; other cols. per instructions.			2. RUN TIME: From Meter OFF to Meter OFF always punched.		
2. RUN TIME: From Meter OFF to Job OFF	3. AUDIT TIME: From Meter OFF to Job OFF if not identical or either entry missing. Cols. 42-43 = "00"; cols. 49-55 and 74-75 blank; other columns per instructions.					

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APPENDIX C

SAMPLE CUR REPORTS

## CPDC UTILIZATION BY OPERATION . . . WEEK ENDING 03-17-63

SAMPLE CUR 1

OPERATION	NO. OF JOBS
POWER OFF	17.43
SCHED. MAINTENANCE	15.92
UNSCHED. MAINTENANCE	.26
IDLE - NO WORK	1.85
SET - UP	9.77
	45.23*
REWORK - OPERATOR ERROR	.25
REWORK - PROGRAMMER ERROR	.17
ASSEMBLY AND CHECKOUT	13.37
ASSEMBLY	14.79
PROGRAM CHECKOUT	87.44
PROGRAM VALIDATION - INTEGRATION	.25
PROGRAM VALIDATION - ACCEPTANCE	.76
PROGRAM MAINTENANCE ERROR CORRECTION	.31
SUBSYSTEM TEST	3.36
SYSTEM INTEGRATION	2.07
	122.77*
	168.00**
	369***

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SUMMARY OF 1604 . . . UTILIZATION BY ORGANIZATION . . . FEBRUARY 1963 . . . SAMPLE CUR 2

ORGANIZATION	NO. OF JOBS
LTF	1604
MSVD	67.17
STL	26.35
8362	51.83
8363	2.43
8365	2.27
8372	25.92
8373	150.55
8374	107.78
SDC	45.25
	334.20*
	479.55**
	1400**

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CEDC UTILIZATION BY ORGANIZATION . . . WEEK ENDING 03-17-63 SAMPLE CUR 3

ORGANIZATION	1604	NO. OF JOBS
LFR	23.38	65
MSVD	12.61	12
STL	29.25	32
8362	.41	3
8363	.27	2
8365	7.24	62
8372	37.70	84
8373	18.12	99
8374	3.56	10
SDC	67.30*	260*
	132.54**	369**

## SUMMARY OF 1604 . . . UTILIZATION BY AREA OF WORK . . . FEBRUARY 1963      SAMPLE CUR 4

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V. O.	VEHICLE	1604	NO. OF JOBS
	1800	1.29	4
	1159	25.31	38
	1164	.77 26.08*	2 40*
	2314	15.29	26
	2353	9.78	14
		25.07*	40*
	3502	18.88	57
	3503	.22	1
		19.10*	58*
	4800	83.86	170
	4801	101.85	201
		185.71*	371*
			7
			88
			1
			9
			77
			38
			2
			43
			68
			25
			4
			3
			26
			9
			1
			3
662.09		.99	
662.21		44.21	
662.22		.22	
662.23		1.20	
662.33		29.30	
662.35		7.19	
662.36		.30	
662.37		15.85	
662.43		14.08	
662.45		4.94	
662.51		1.15	
662.52		.61	
662.53		11.53	
662.83		2.27	
663.15		.06	
663.16		1.94	

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SUMMARY OF 1604 . . . UTILIZATION BY AREA OF WORK . . FEBRUARY 1963 SAMPLE CUR 4

V. O.	VEHICLE	1604	NO. OF JOBS
663.17		4.34	5
663.25		.80	3
663.33		9.92	64
663.35		6.91	40
663.36		8.13	36
663.37		.18	1
663.43		.66	6
663.45		29.60	170
663.55		2.67	4
663.63		23.13	152
663.65		.12	2
	222.30*	887*	
	479.55**	1400**	

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W. O.	VEHICLE	1604	NO. OF JOBS	SAMPLE CUR 5
1164	2.49	8		
2314	.44	1		
2353	.38	3		
	.82*	4*		
4800	38.84	59		
4801	50.83	90		
	89.67*	149*		
662.09	.16	1		
662.21	3.56	10		
662.23	.73	4		
662.33	3.01	10		
662.35	.96	6		
662.36	.06	1		
662.37	1.50	7		
662.43	2.73	11		
662.45	.81	7		
662.53	2.13	10		
662.57	.12	1		
663.01	.27	2		
663.16	.33	2		
663.17	6.53	15		
663.25	.02	1		
663.26	.12	1		
663.33	.68	8		
663.35	1.12	9		
663.36	.33	3		
663.37	1.42	2		
663.45	2.62	17		
663.47	3.11	18		
663.57	1.04	2		
663.63	6.20	60		
	39.56*	208*		
	132.54**	369**		

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DETAILED 1604 UTILIZATION BY ORGANIZATION . . .				FEBRUARY 1962	SAMPLE CUR 6
ORGANIZATION	REQUESTOR	ID	OP. CODE	1604	NO. OF JOBS
XXXX	SMITH	COP	22	.14	1
			23	5.12	14
				5.26*	15*
				2.14	5
				2.14*	5*
				7.40**	20**
JONES	ANTRACK	22	.10	1	
			.10*	1*	
COP		14	.22	2	
		22	.08	1	
		23	2.06	7	
			2.36*	10*	
COP/IMSC		08	.02		
		23	.36	1*	
			.38*	1*	
PASS		22	.06	1	
			.06*	1*	
			2.90**	13**	
DOE		22	.57	5	
		23	7.25	15	
			7.82*	20*	
POSTPASS		22	.22	1*	
			.22*	1*	
REDUCE		14	.15	1	
		22	.11	1	
		23	.58	2	
			.84*	4*	
				8.88**	25**
				19.18***	58***

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SUMMARY OF 1604		SYSTEM UTILIZATION		FEBRUARY 1963	SAMPLE CUR 7
OPERATION	NO. JOBS	1604	1607	533/1610A	1612
POWER OFF		84.00			
SCHED. MAINTENANCE		72.17			
UNSCHED. MAINTENANCE		4.58			
POWER FAILURE		.17			
IDLE - NO WORK		30.04			
MACHINE FAILURE		1.49			
SET - UP		42.32			
		234.77*			
REWORK - OPERATOR ERROR	29	5.47	12.14	5.47	5.47
REWORK - PROGRAMMER ERROR	11	2.33	5.93	2.33	2.33
REWORK - SYSTEM ERROR	1	1.54	3.08	1.54	1.54
REWORK - OTHER	3	.36	1.02	.36	.36
ASSEMBLY AND CHECKOUT	74	31.17	74.74	31.17	31.17
ASSEMBLY	318	47.79	94.77	47.79	47.79
PROGRAM CHECKOUT	854	276.23	616.52	276.13	276.17
PROGRAM VALIDATION - INTEGRATION	15	9.53	24.69	9.53	9.53
PROGRAM VALIDATION - ACCEPTANCE	6	1.13	2.83	1.13	1.13
PROGRAM MAINTENANCE ERROR CORRECTION	4	.96	2.14	.96	.96
SUBSYSTEM TEST	4	.92	2.18	.92	.92
SYSTEM INTERACTION	71	55.33	135.56	55.33	55.33
MANAGEMENT REPORTS	1	.14	.14	.14	.14
HARDWARE QUALITY CONTROL	9	4.33	2.77	1.61	1.79
	1400*	437.23*	978.51*	434.41*	434.63*
		672.00**			

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SUMMARY OF 160A-1		SYSTEM UTILIZATION			FEBRUARY 1963			SAMPLE CUR 8	
OPERATION	NO. JOBS	160A-1	163-2	161	1612	088	523	1610A	169
POWER OFF		97.82							
SCHED. MAINTENANCE		21.52							
UNSCHED. MAINTENANCE		.31							
IDLE - NO WORK		428.49							
SET - UP		6.66							
DEMONSTRATIONS		2.58							
		557.38*							
REWORK - OPERATOR ERROR	8	.83	.83	.83	.83	.83	.36	.36	.36
ASSEMBLY AND CHECKOUT	4	3.87	3.87	1.75	3.87	3.87	.44	.44	.387
ASSEMBLY	26	7.44	7.02	5.37	7.44	7.06	6.60	7.44	.34
PROGRAM CHECKOUT	30	18.66	10.05	8.36	8.85	9.99	4.78	9.99	3.15
SUBSYSTEM TEST	4	7.31	7.31	5.86	7.31	7.31	1.45	7.31	1.67
MANAGEMENT REPORTS	3	.77	.77	.77	.77	.77	.77	.77	
PERIPHERAL OPERATIONS	398	75.74	72.63	72.61	65.79	11.51	3.61	13.71	
	473*	114.62*	102.48*	95.55*	94.86*	40.87*	16.88*	43.45*	5.16*
		672.00**							

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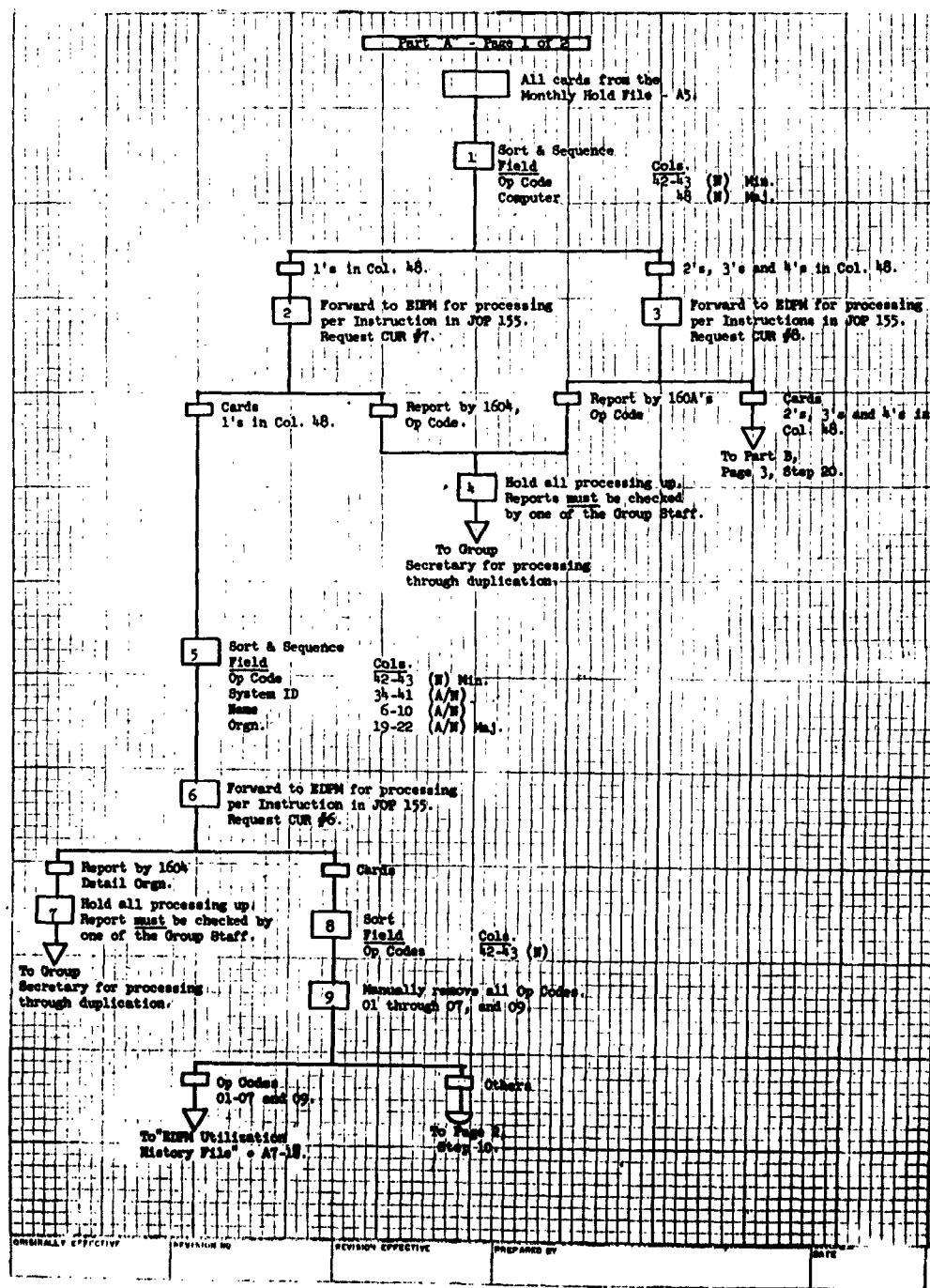
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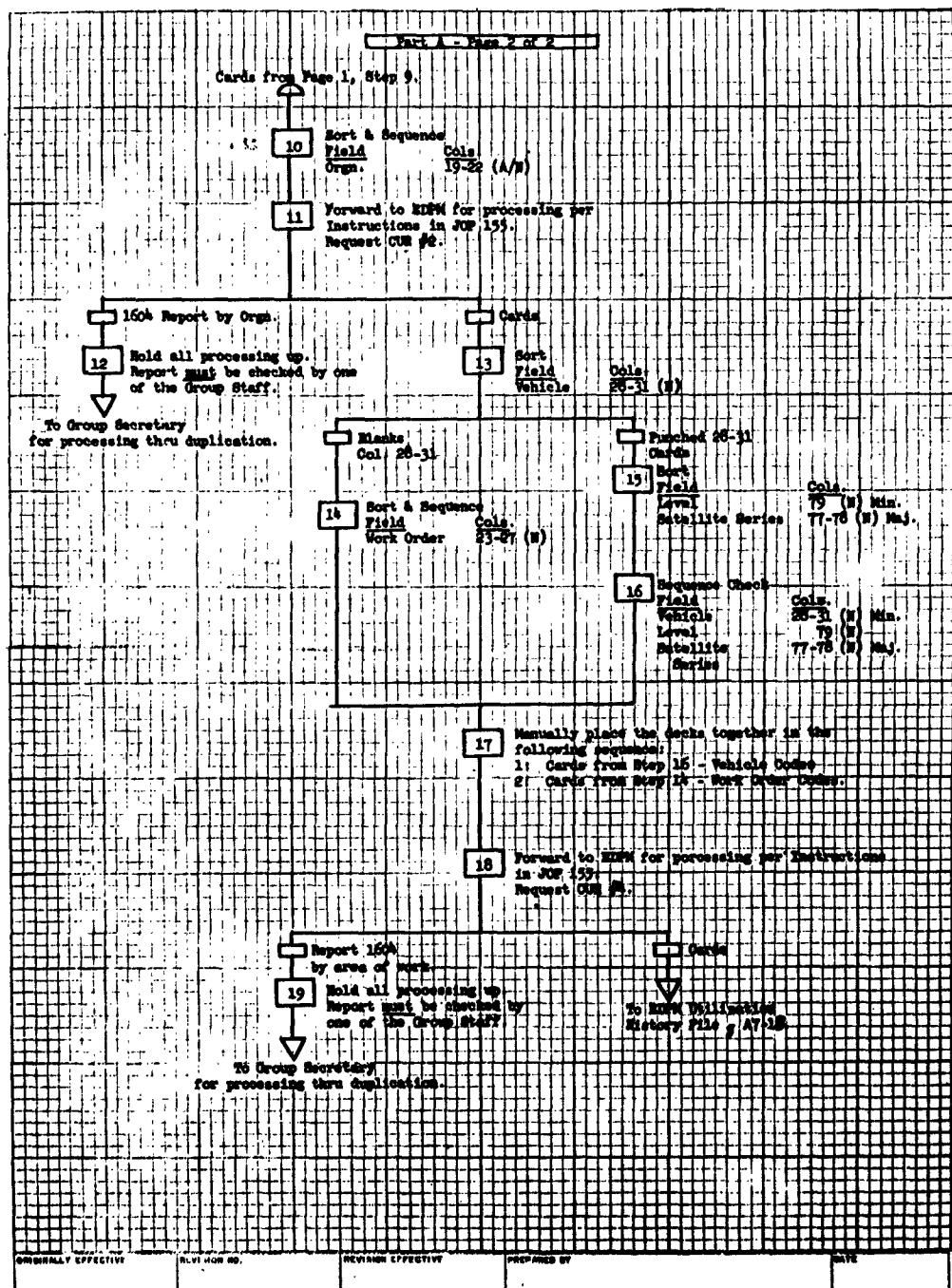
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APPENDIX D

CUR TABULATING FLOW CHARTS

## Monthly Machine Utilization

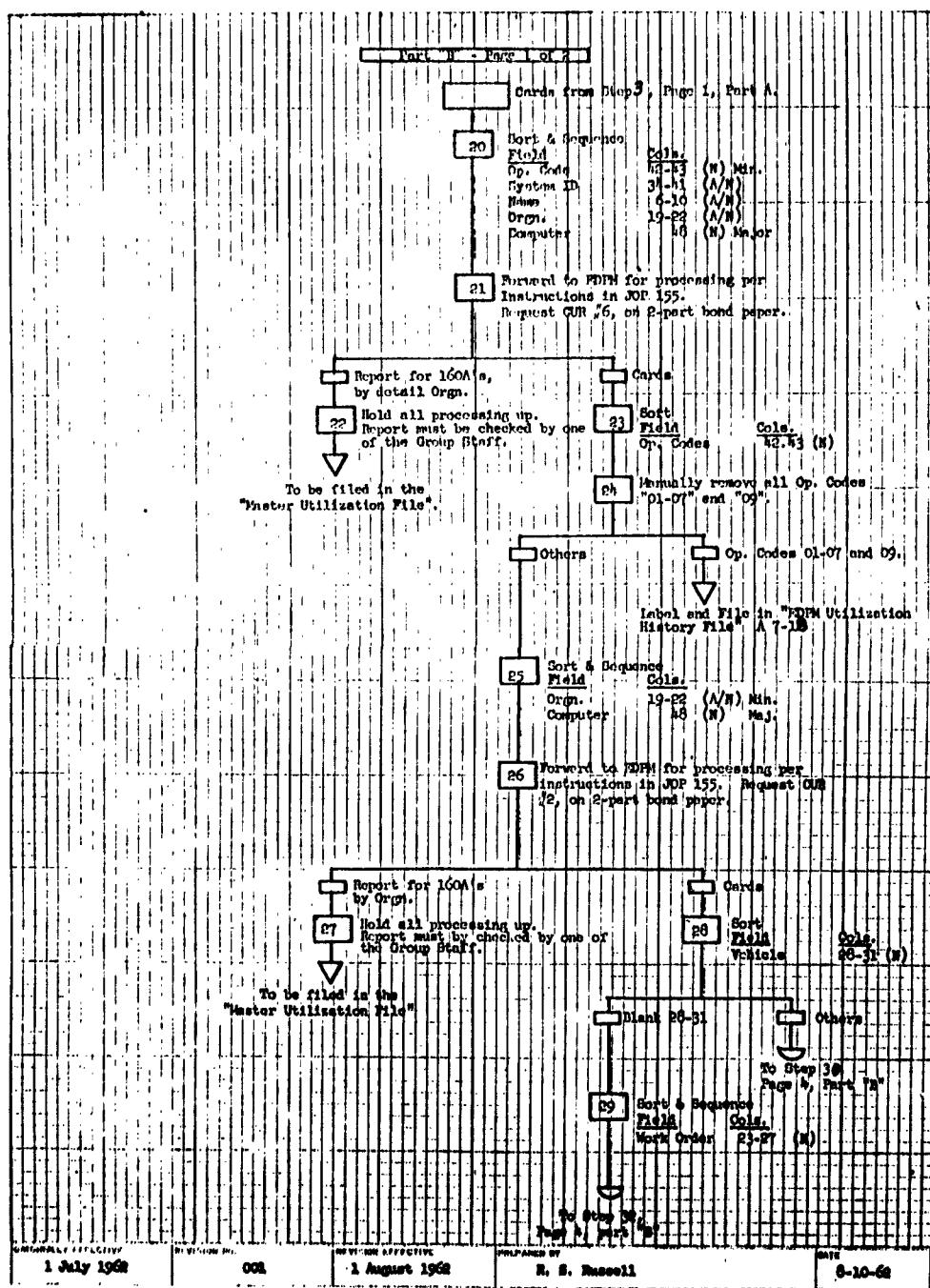




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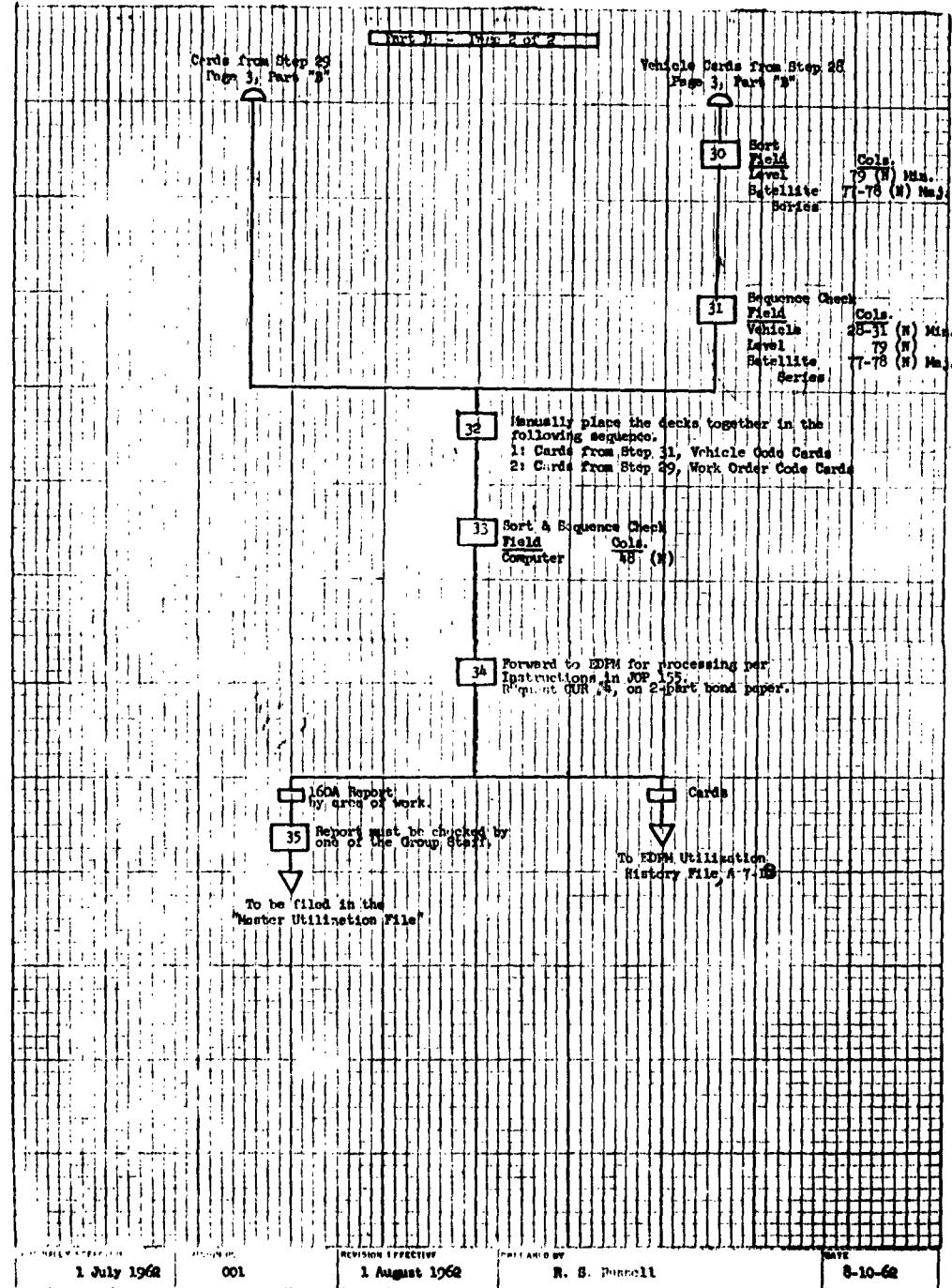
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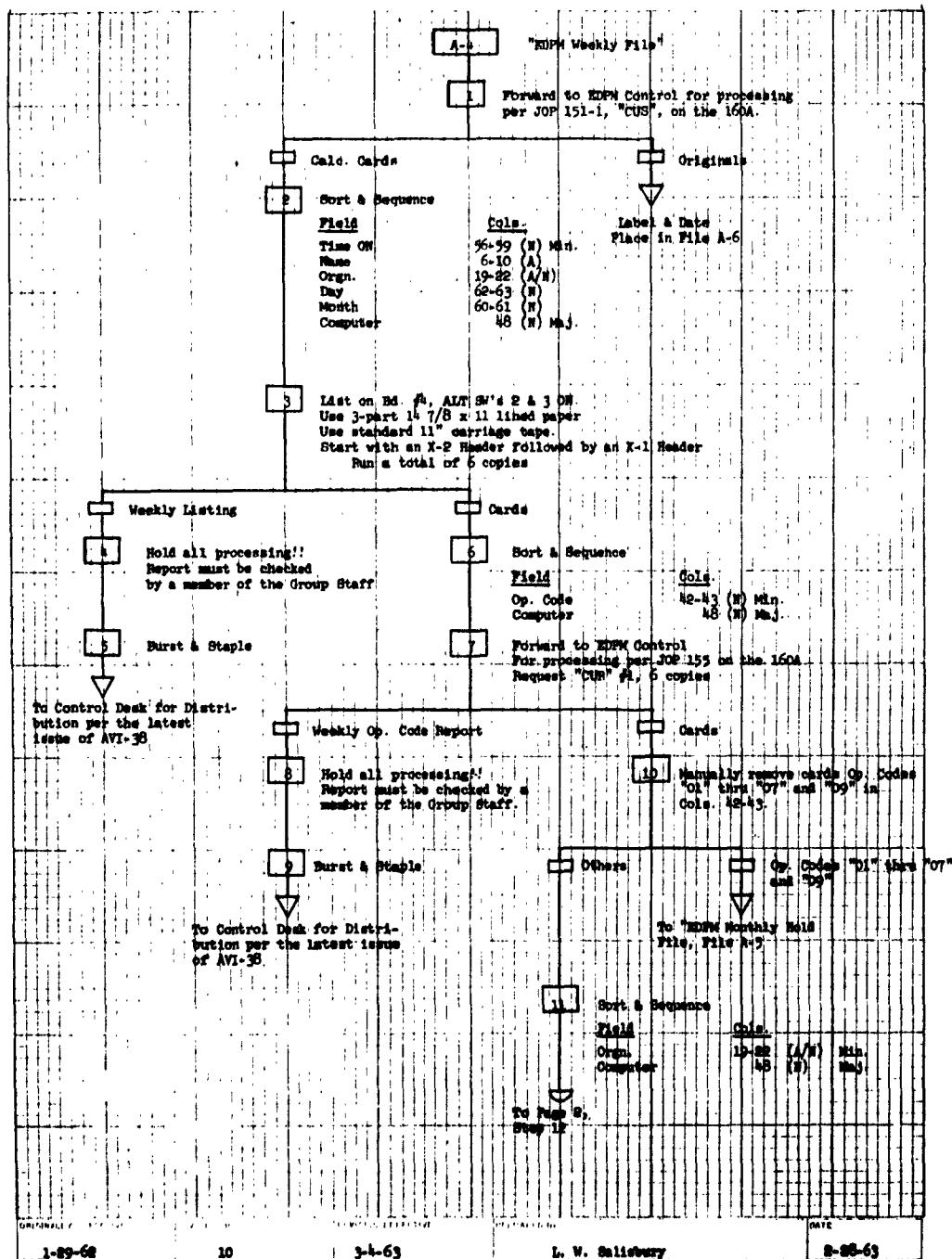


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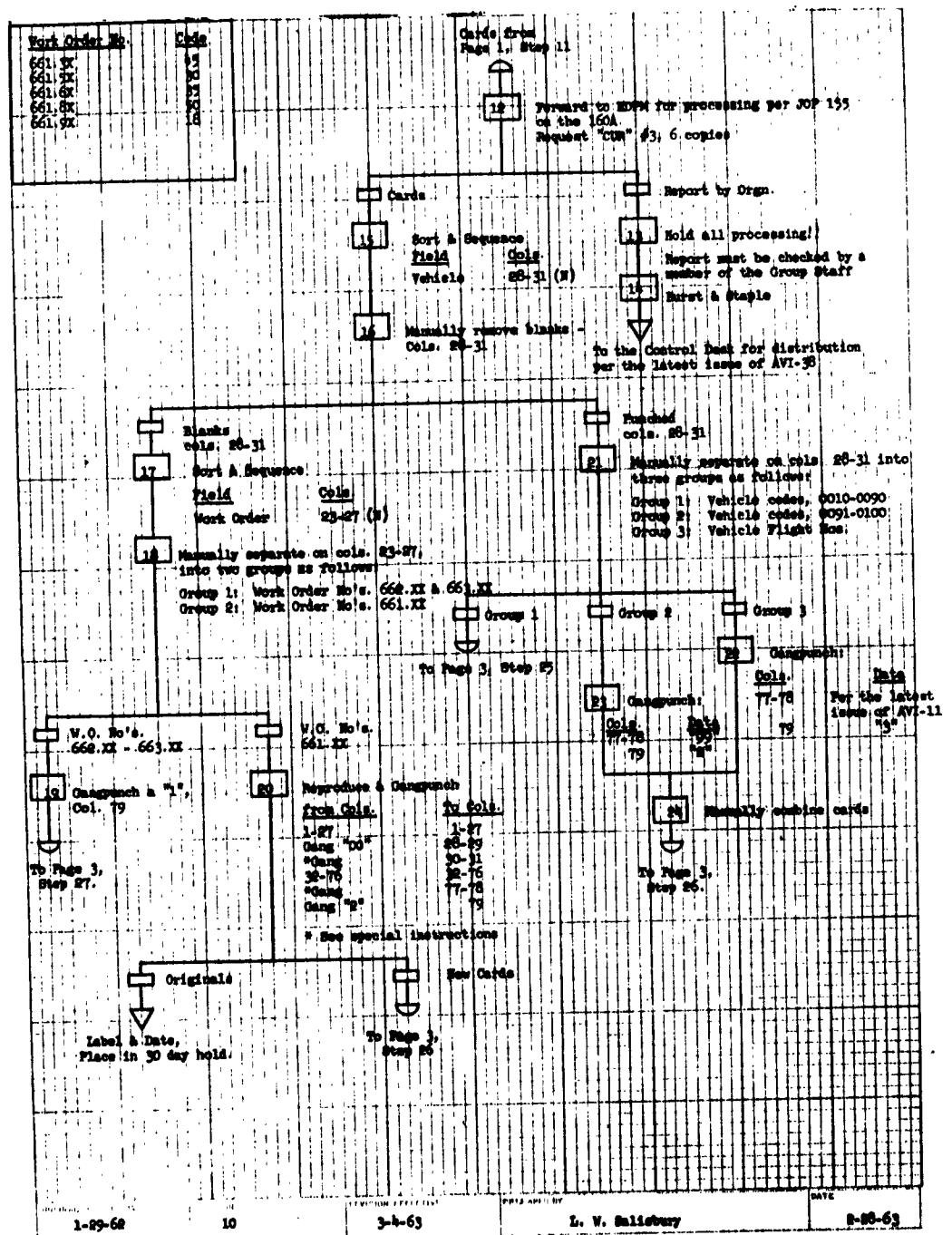
Weekly Machine Utilization



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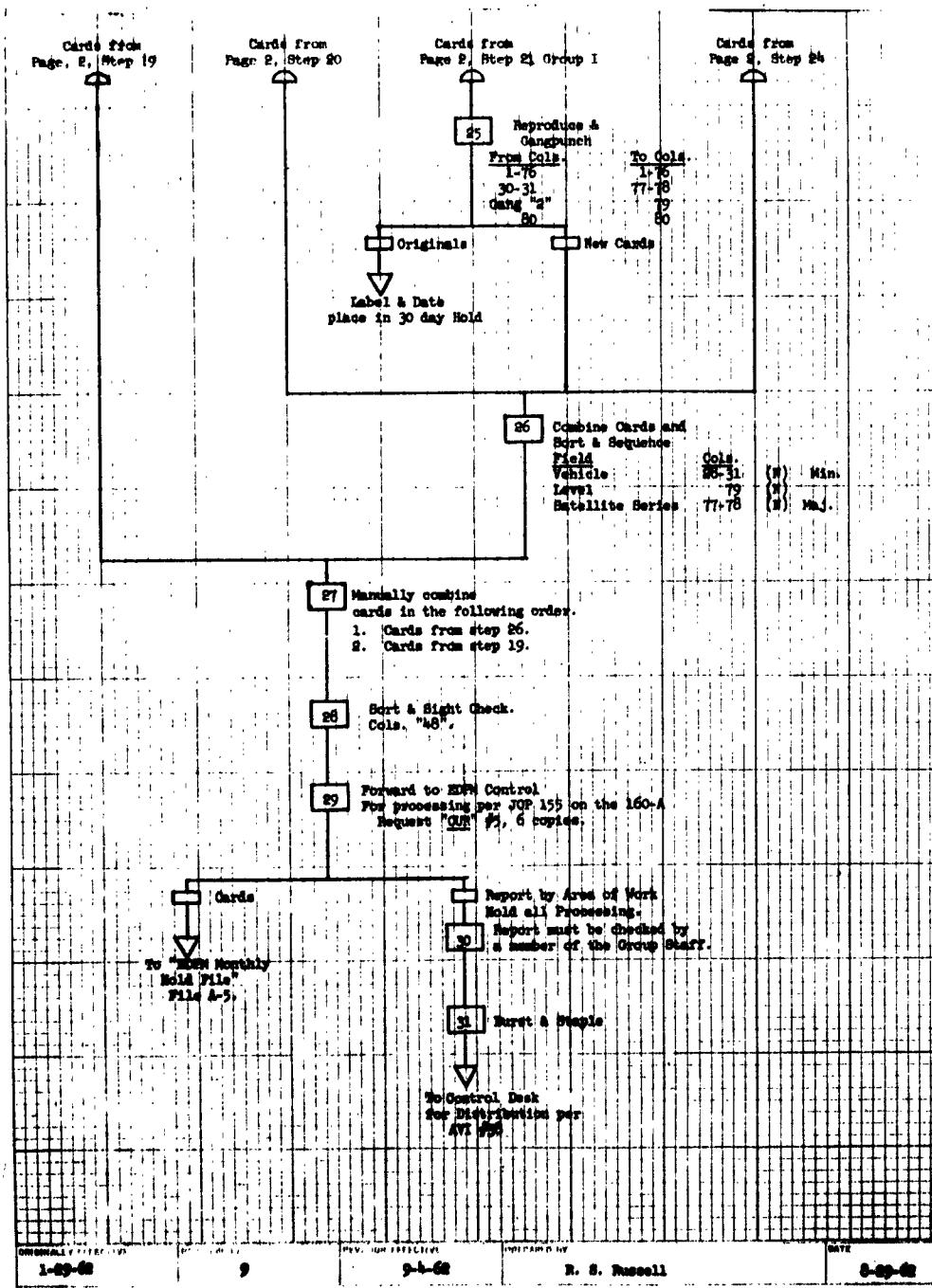
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APPENDIX E

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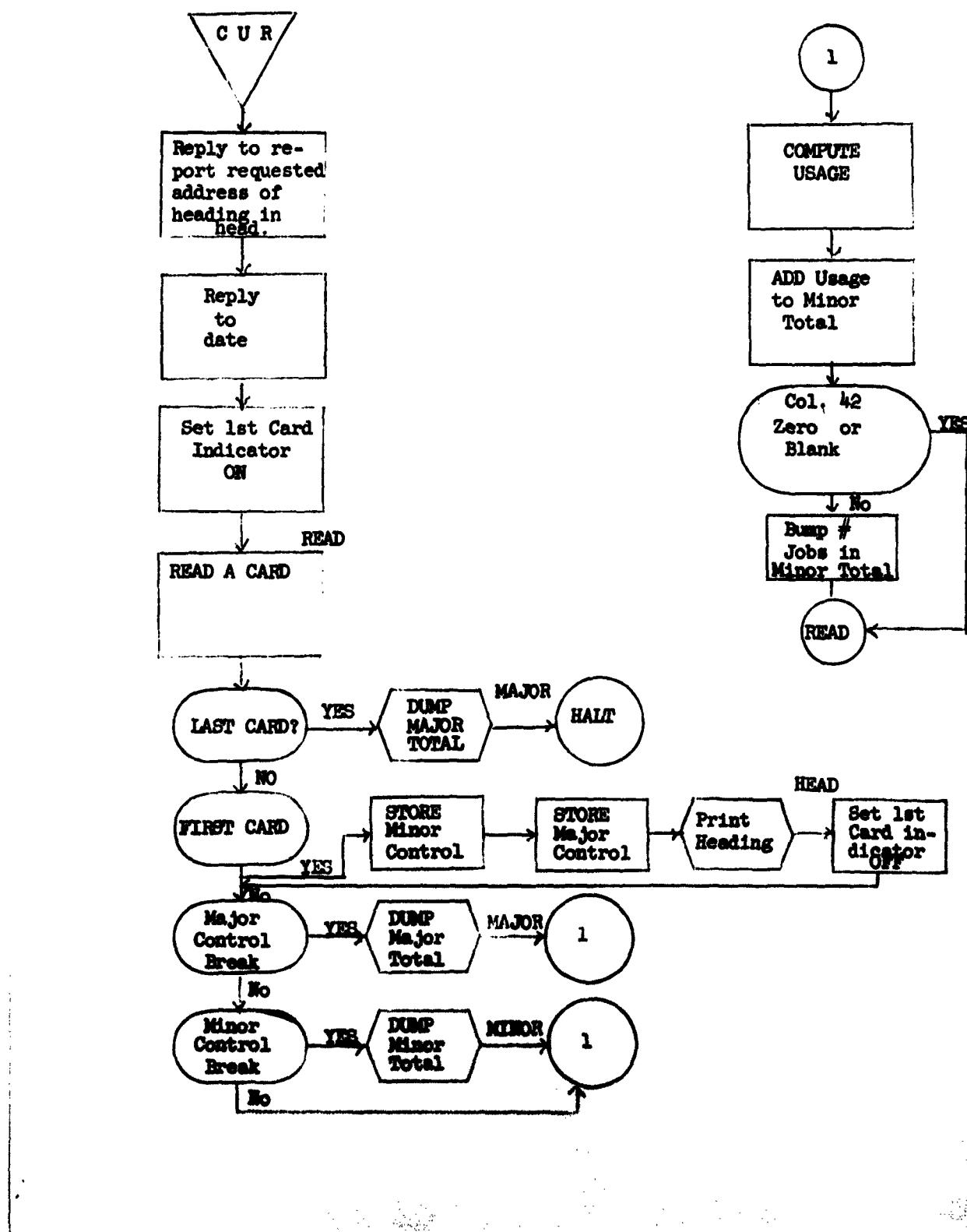
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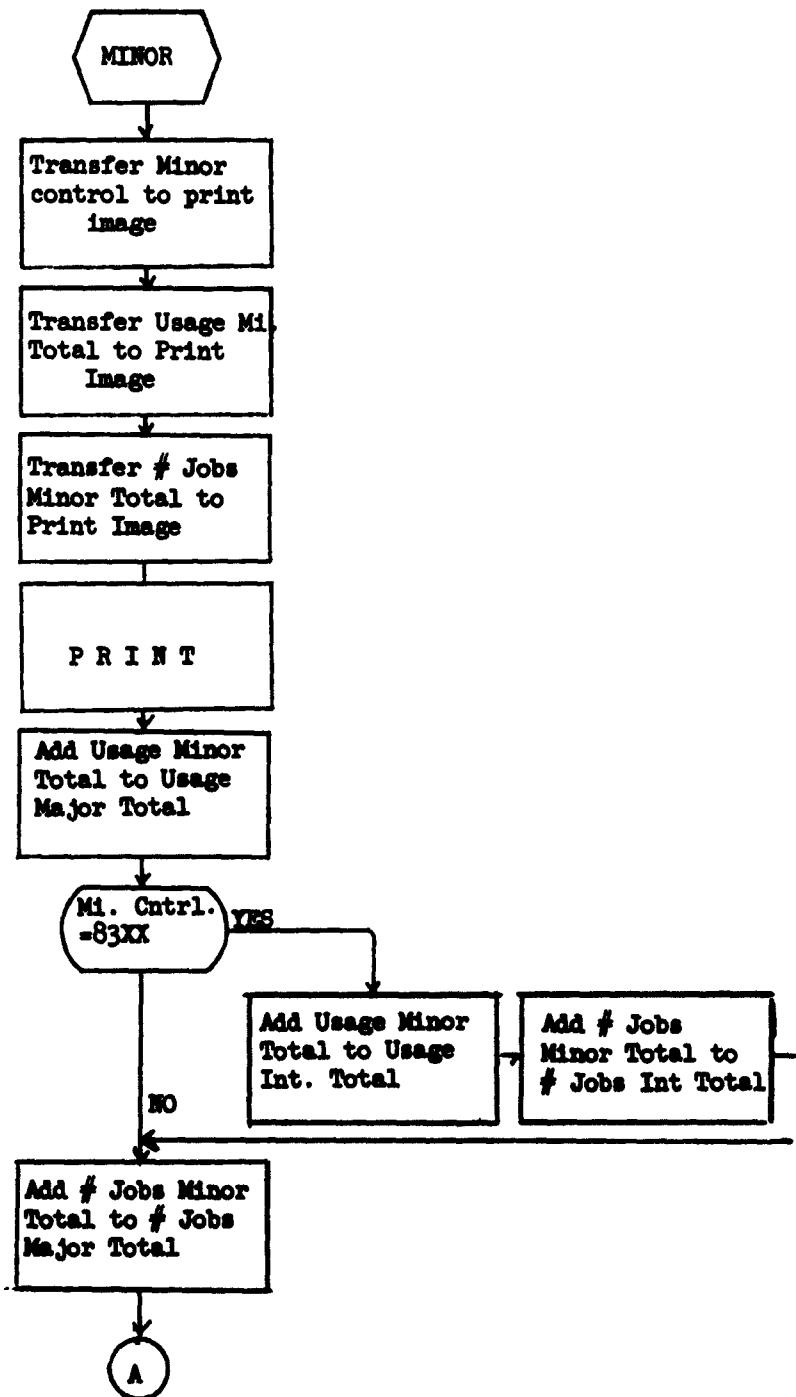
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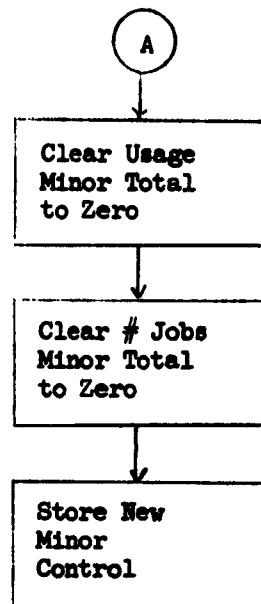
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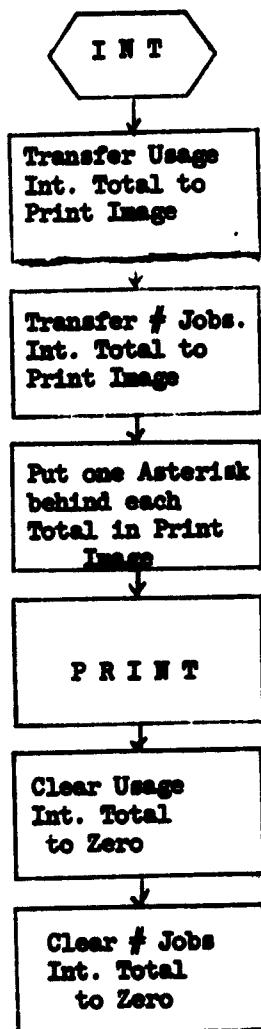
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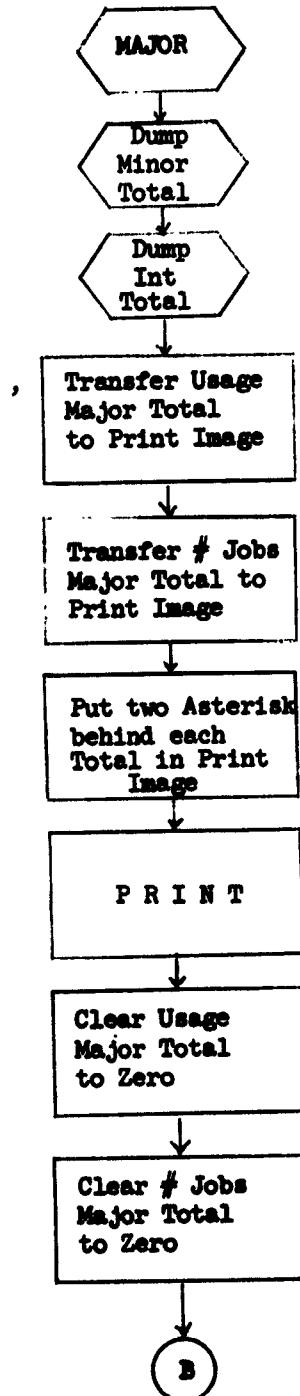
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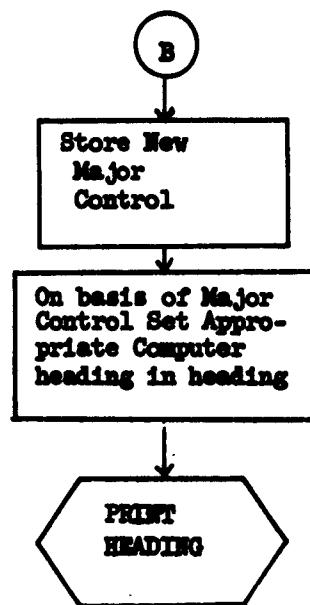
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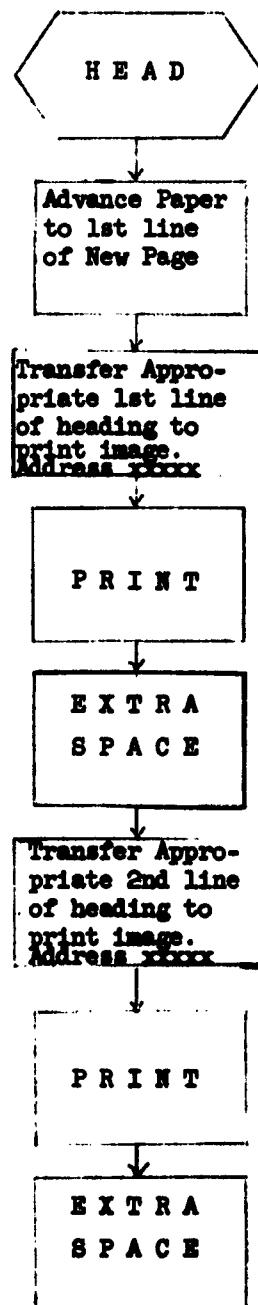
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