REGION	PURPOSE	PACKAGE	PAGE NO.
AB	Small Buffer	B	
AB	Buffer	Operations	
AD	Add; Subtract	B	5 - 6
AL	Read Octal Cards	3	26 - 27
AL	Main Loop	Logic Trace	32 - 33
AT	Arc Tangent	B	14 - 15
AW	Alarm Word	B	2
BB	Large Buffer	B	
BT	T-digit	1	19 - 20
CP	Constant Pool	B	
CV	Conversion: Fl. Bin. to Fl. Dec.	1	17 - 18
DC	Dummy Commands	B	2 - 3
DV	Divide	B	7
EF	E.F. Command Interpretation	Logic Trace	34
EF	Write End of File	3	29
F	Load Fap	Operations	
FC	Punch Fl. Dec Cards	1	16 - 17
FF	Block Image	Operations	
FS	Fixed to Floating	B	7 - 8
GA	Read Binary Tape	3	27 - 28
GB	Write Binary Tape	3	28
GF	Block Image	Operations	
IP	Interpretation	B	3 - 5
IP	IP Command Interpretation	Logic Trace	35
KV	Constants	1	18
LA	Punch Octal Cards	3	26
LC	Logarithm Constants	B	13 - 14
LM	Alarm Print	B	9
LN	Logarithm	B	13
M	Core Offset for DUM	Octal Dump	
MA	Multiply Add	B	6
MG	Dummy Image	Octal Dump	
MP	Multiply	B	6
MS		Logic Trace	33
NB	Tape #N Buffer	Tape Dupe	
NC	Sin-Cos Constants	B	10
PC	Exponential Constants	B	12 - 13
PK	Store For R; Block Transfer	B	8
QD	Drum Control	B	15 - 16
RC	Square Root Constants	B	10
RF	Read Fl. Dec or Octal Tape	2	23 - 25
RJ	RJ Command Interpretation	Logic Trace	34
RP	RP Command Interpretation	Logic Trace	34 - 35
RR	Dummy for Square Root L (RR00) = L (RC02) - 16	B	
SF	Floating to Fixed	B	7
SN	Sine-Cosine	B	10 - 11
SR	Square Root	B	9 - 10
ST		Logic Trace	33

REGION	PURPOSE	PACKAGE	PAGE NO.
TB	Instruction Table	Logic Trace	37
TC	Constants	Logic Trace	36
TC	Arctangent Constants	B	15
TL	First Word Address Setup	Logic Trace	36 - 37
TM	Temporary	Tape Dupe	
TP	Typewrite	Logic Trace	35 - 36
TR		Logic Trace	33
TS	Operand Storage;	B	2
UU		Logic Trace	33
VK	Constants	2	23
VV	Conversion: Fl. Dec to Fl. ~~Dec~~ Binary	2	22 - 23
VV		Logic Trace	33
WF	Write Fl. Dec. Tape	1	18 - 19
WW	Write Octal Tape	3	28 - 29
X	Exit	Operations	
X	Load R; Load F and R; Exit	B	8 - 9
XP	Exponential	B	11 - 12
2B	Tape #2 Buffer	Tape Dupe	
5B	Tape #5 Buffer	Tape Dupe	
DAB	Buffer	Octal Dump	
DAS	Setup Program	Operations	51
DBL	Binary Load	Operations	52 - 53
DBS	Store Block	Operations	53
DCI	Drum Core Image	Operations	
DCN	Constants	Operations	53 - 54
DCP	Compare	Tape Dupe	58
DDD	Drum Start	Operations	50
DDP	Duplicate and/or Merge	Tape Dupe	58 - 59
DDR	Operations Routines Parameters	Operations	
DEF	End of File Test	Tape Dupe	60 - 61
DER	Error Print Out	Tape Dupe	61
DRR	Read Paper Tape	Paper Tape	48
DHK	Assembly	Operations	
DKN	Constants	Octal Dump	112 - 113
DLF	Load Fap	Operations	55
DMM	Drum Read	Operations	54 - 55
DMP	Parameters	Operations	54
DMQ	Check Sum	Operations	54
DRD	Read Tape	Tape Dupe	60
DRR	Read Tape	Operations	52
DST	Cold Start	Operations	52
DTP	Tape Mode	Tape Dupe	59 - 60
DTR		Logic Trace	31 - 32
DUM	Octal Dump Constants	Octal Dump	111 - 112
DWR	Write Tape	Tape Dupe	61
FAP	FAP	Operations	
PBT	Print Bin Tape	Print Bin Tape	115

	461	11	46101		B	SET F1
	461 1	45		46102	B	TO NEXT
	461 2	75	30160	101	B	PROGRAM TO
	461 3	11	46104	100	B	CORE AT 100
	1		100	261	B	MVE CONTROL WD
	1 1	15	100	103	B	WORD FOR MOVE
	1 2	16	100	151	B	SET TRM
	1 3	11		254	B	CURRENT WD B1
	1 4	11	126	255	B	BUMP CONST B2
	1 5	11	127	31000	B	CONTROL MSK
	1 6	51	241	240	B	ACTION MODIF
	1 7	21	240	132	B	SET ACTION
	110	15	106	111	B	SHIFT CURRENT
QES	111	55		3	B	CONTROL WORD
	112	11	136	31000	B	OUV MSK TO Q
	113	46	236	236	B	TO ACTION LOOP
	114	11	136	31000	B	OUV MASK TO Q
	115	21	106	133	B	BUMP CONTROL WD
	116	51	106	106	B	ADD MOD 10000
	117	45		105	B	WD ON NEW CONTR
	120	55	433	17	B	RESTORE CONT WD
QES	121	13	232	32000	B	MIN 1 TO A
	122	47	170	170	B	CONTINUE
	123		7777	7777	B	UV MASK
	124	15	167	256	B	CHANGE TO Uϒ
	125	47	144	144	B	TO MOVE
	126		161	161	B	BUMP CONST
	127			34	B	CONTROL MASK
	130	16	133	255	B	SET U ADV ONLY
QES	131	44	144	144	B	TO MOVE
	132	45		114	B	DUMMY JUMP
	133		1		B	U ADV TLY TST
	134	16	167	256	B	CHANGE TO Vϒ
	135	47	144	144	B	TO MOVE
	136	77	7777	7777	B	OUV MASK
	137		1	1	B	BUMP CONT CNST
	140	15	127	255	B	SET V ADV ONLY
QES	141	44	144	144	B	TO MOVE
	142	17	77777	77777	B	ARITHMETIC
	143	20			B	CONSTANTS
	144	11	256	31000	B	MASK TO Q
	145	51	254	32000	B	Uω V WD TO A
	146	35	255	256	B	BUMP UV
	147	53	256	254	B	ADD MOD 10000
	150	37	166	154	B	TO ARITH
QES	151	11	254		B	MOVE TO NEW LOC
	152	51	100	100	B	ADD MOD 10000
	153	46	101	101	B	MOVE NEXT WD
	154	71	142	254	B	WD 2E34 -1

	155	72	232	254	B	WD 1 EQ WD 2E
	156	73	143	254	B	2E34 EQ WD
	157	52	254	32000	B	WD IF REM EQ 0
	160	22	44	254	B	WD
QES	161	22	10044	254	B	WD
	162	27	31000	254	B	Q TO ZERO
	163	21	100	137	B	BUMP MOVE CONTR
	164	12	31000	32000	B	ZERO TO A
	165	11	136	31000	B	OUV MSK TO Q
	166	47	167		B	BACK TO STORE
	167	57	37777	37777	B	ERROR STOP
	170	33	32000		B	1 ↑ 2E72 - 2E36
QES	171	54	32000	44	B	ALL ONES IN AR
	172	31	32000		B	CLEAR AL
	173	74	32000	320	B	1 TO V NEXT
	174	31	32000		B	CLEAR AL
	175	36	143	32000	B	AR -2EOJ SHOULD
	176	43	142	200	B	EQ 2E34 - 1
	177	37	167	167	B	IF NOT ERROR
	2	23	233	100	B	TST - L F
	2 1	46	262	202	B	NEXT IF L F G 7
	2 2	23	100	133	B	L F - 1
	2 3	46	262	204	B	NEXT IF F EQ 0
	2 4	21	415	232	B	TALLY
	2 5	42	133	210	B	IF EQ 4096
	2 6	11	416	415	B	RESET TALLY
	2 7	56	10000	211	B	STOP ON 1 4096
	210	56	20000	211	B	STOP ON 2
QES	211	75	40	213	B	WD IN NEW LOC
	212	11	323	323	B	142 TO ITSELF
	213	75	32000	215	B	CORE LESS
	214	11	1	43217	B	TO DRUM
	215	23	32000	32000	B	ZERO ACCUM
	216	75	22000	220	B	FORM
	217	35	43217	254	B	CHECK SUM
	220	75	22000	222	B	MINUS ORIGINAL
QES	221	36	1	254	B	CORE
	222	31	32000		B	POSITIVE SUM
	223	41	32000	167	B	ERROR IF NOT 0
	224	75	30161	226	B	NEXT COPY
	225	13	261	62571	B	TO DRUM NEG.
	226	55	133	1	B	AFTER 20
	227	44	230	224	B	COPIES
	230	75	30161	262	B	COPY BACK ↑
QES	231	13	62571	261	B	AND GO TO NEXT
	232			1	B	V ADV
	233		7440	261	B	TST CONST
	234			70000	B	TALLY
	235			70000	B	TALLY RESET
	236	51	240	240	B	ADD MOD 10000

	237	11	123	256	B	UV MASK TO B3
	240				B	ACTION WORD
QES	241	33	31733	15433	B	CONTROL WD 1
	242	73	25573	73031	B	2
	243	73	27733	77037	B	3
	244	75	57333	33033	B	4
	245	31	66673	55433	B	5
	246	77	67573	33037	B	6
	247	33	32667	26033	B	7
	250	52	73666	17036	B	CONTROL WD 8
QES	251	36	77733	77425	B	9
	252	77	77774	40037	B	10
	253				B	NOT USED
	254				B	CURRENT WD
	255				B	BUMP
	256				B	MASK

FAP DIRECTORY

	D	TS		00000
	D	DC	35	00043
QES	D	CP	46	00056
QES	D	AW	77	00115
QES	D	IP	87	00127
QES	D	AD	186	00272
QES	D	MP	210	00322
QES	D	MA	222	00336
QES	D	PM	234	00352
QES	D	DV	239	00357
QES	D	SF	257	00401
QES	D	FS	269	00415
QES	D	PK	282	00432
QES	D	X	314	00472
QES	D	LM	331	00513
QES	D	SR	360	00550
QES	D	RC	388	00604
QES	D	SN	406	00626
QES	D	NC	448	00700
QES	D	XP	458	00712
QES	D	PC	507	00773
QES	D	LN	524	01014
QES	D	LC	565	01065
QES	D	AT	571	01073
QES	D	TC	628	01164
QES	D	QD	646	01206
QES	D	QQ	684	01254
QES	D	RR	374	00566
QES	D	FC	684	01254
QES	D	CV	747	01353
QES	D	KV	774	01406
QES	D	WF	783	01417
QES	D	BT	849	01521
QES	D	BL	684	01254
QES	D	VV	753	01361
QES	D	VK	788	01424
QES	D	RF	796	01434
QES	D	LA	684	01254
QES	D	AL	723	01323
QES	D	GA	764	01374
QES	D	GB	793	01431
QES	D	WW	804	01444
QES	D	EF	844	01514
QES	D	AB	904	01610
QES	D	BB	928	01640
QES	D	DTS	40766	41376 FAP
QES	D	DFC	41450	PACK 1
QES	D	DBL	41666	
QES	D	DLA	41874	

QES
QES
QES
QES
BASIC FAP AND PACKAGE ONE


```
        TS          MJ                                  MACHINE F1
        TS 1        MJ              IP00                MACHINE F2
        TS 2        RJ                                  MACHINE F3
        TS 3                                    B       V EFFECTIVE
        TS 4                                    B       T DIGIT
        TS 5                                    B       R DIGIT
        TS 6                                    B       SCALE FACTOR
        TS 7                                    B       INDEX 0 ſZEROſ
        TS 8                                    B       INDEX 1
        TS 9                                    B       INDEX 2
        TS10                                    B       INDEX 3
        TS11                                    B       INDEX 4
        TS12                                    B       INDEX 5
        TS13                                    B       INDEX 6
        TS14                                    B       INDEX 7
        TS15                                    B       OPERAND MANT
        TS16                                    B       FL ACC MANT
        TS17                                    B       RO MANT
        TS18                                    B       R1 MANT
        TS19                                    B       R2 MANT
        TS20                                    B       R3 MANT
        TS21                                    B       R4 MANT
        TS22                                    B       R5 MANT
        TS23                                    B       R6 MANT
        TS24                                    B       R7 MANT
        TS25                                    B       OPERAND CHAR
        TS26                                    B       FL ACC CHAR
        TS27                                    B       RO CHAR
        TS28                                    B       R1 CHAR
        TS29                                    B       R2 CHAR
        TS30                                    B       R3 CHAR
        TS31                                    B       R4 CHAR
        TS32                                    B       R5 CHAR
        TS33                                    B       R6 CHAR
        TS34                                    B       R7 CHAR


        DC          10      77777   31000   B           OBTAIN ſYſ
        DC 1        TP      TS07    A                   ſIOſ TO A
        DC 2        TP              TS15                TO OP MANT
        DC 3        LA      TS16    32000               FOR FL TO FXD
        DC 4        TP      TS17    TS16                RO MANT TO FL M
        DC 5        PR              CP17                FOR ALARM PRINT
        DC 6                  12      12    B           MANT-CHAR DIFF.
        DC 7                TS35            BRB         LſR7 CHARſ + 1
        DC 8                                B           MACHINE Q
        DC 9                                B           MACHINE AR
```

DC10				B	BCW
CP		77777		B	U MASK
CP 1			77777	B	V MASK
CP 2		7		B	I MASK
CP 3		1		B	U ADV ∫1Σ15∫
CP 4			1	B	V ADV ∫1ΣO∫
CP 5			2	B	2ΣO
CP 6			3	B	3ΣO
CP 7			4	B	FLEX SPACE ∫4ΣO
CP 8			5	B	5ΣO
CP 9			6	B	6ΣO
CP10			7	B	7ΣO
CP11			13	B	11ΣO
CP12			44	B	36ΣO
CP13			45	B	CAR RET ∫37ΣO∫
CP14			47	B	SFT UP ∫39ΣO∫
CP15			57	B	SFT DOWN∫47ΣO∫
CP16			110	B	72ΣO
CP17			37	B	FLEX 0 ∫31ΣO∫
CP18			52	B	FLEX 1 ∫42ΣO∫
CP19			74	B	FLEX 2 ∫60ΣO∫
CP20			70	B	FLEX 3 ∫56ΣO∫
CP21			64	B	FLEX 4 ∫52ΣO∫
CP22			62	B	FLEX 5 ∫50ΣO∫
CP23			66	B	FLEX 6 ∫54ΣO∫
CP24			72	B	FLEX 7 ∫58ΣO∫
CP25			60	B	FLEX 8 ∫48ΣO∫
CP26			33	B	FLEX 9 ∫27ΣO∫
CP27			201	B	129ΣO
CP28			243	B	163ΣO
CP29			400	B	256ΣO
CP30	77	77777	77734	B	35ΣO
AW	13	3032	63415	B	GOOFUP
AW 1	22	14172	12022	B	DIVZED
AW 2	3	56261	10331	B	O-FLOW
AW 3	1	31032	33022	B	TWOBAD
AW 4	20	27150	30312	B	EXPOOR
AW 5	11	3130	62013	B	LOGNEG
AW 6	23	14302	42022	B	BIASED
AW 7	24	14062	63411	B	SINFUL
AW 8	6	3243	720		NOSAME
AW 9	6	3243	53012		NOSQAR
AW10	12	3311	60311		ROWCOL
IP	TP	TS00	X16		SET EXIT
IP 1	TP	Q	DC08		STORE Q

```
IP 2     TP   A       DC09          STORE AR
IP 3     SP    TS00     15          Y+1 TO USAS
IP 4     AT    DC00    IP05          SET OBTAIN SYS
IP 5                        B       SYS TO Q
IP 6     QT    CP02    TS17          I TO USAS
IP 7     AT    DC01    IP08          SET OBTAIN SIS
IP 8                        B       SIS TO A
IP 9     QA    CP01    A             SIS+V
IP10     TV    A       TS03          V EFFECTIVE
IP11     LQ    Q         6           POSITION FOR IP
IP12     QT    CP00    A             TRIXX TO A
IP13     LT       9    TS04          STORE T DIGIT
IP14     SP    A         3
IP15     LT            TS05          STORE R DIGIT
IP16     QJ    IP17    IP23          START OP INTERP
IP17     TP    QQ00    A             CONTROL WORD
IP18     QJ    IP19    IP69           TO A FOR OP ß
IP19     QJ    IP20    IP84           OR EQ TO 40
IP20     QJ    IP21    IP91
IP21     QJ    IP22    IP94
IP22     QJ     X09    QD35          NO OP.WRITE EOF
IP23     QJ    IP54    IP24          IF OP IS α 20ρ
IP24     SP    TS03      15          V TO USAS
IP25     TJ    DC07    IP35          UNPACK OR NOT
IP26     TP    Q       TS17          SAVE Q
IP27     TU    A       IP28          SET OBTAIN SVS
IP28     TP            A             SV EFFS TO A
IP29     LT       9    TS25          CHAR
IP30     TM    TS25    TS25          POSITIVE CHAR
IP31     LQ    A         35          POSITION MANT
IP32     TP    Q       TS15          STORE MANT
IP33     TP    TS17    Q             RESTORE Q
IP34     MJ            IP39          CONT INTERP
IP35     AT    DC02    IP37          SET STORE MANT
IP36     AT    DC06    IP38          SET STORE CHAR
IP37                        B       STORE
IP38                        B        OPERAND
IP39     QJ    IP40    IP43
IP40     QJ    IP41    IP50
IP41     QJ    IP42    IP53
IP42     QJ    IP95    IP95          17ρ16
IP43     QJ    IP44    IP46
IP44     QJ    IP45    IP49
IP45     QJ    DV00    PM00          DIVIDEρPOLY MPY
IP46     QJ    IP47    IP48
IP47     QJ    AD00    AD01          SUBTRACTρADD
IP48     QJ     X00     X02          LOAD F-RρLOAD R
IP49     QJ    MA00    MP00          MULT ADDρMULT
IP50     QJ    IP51    IP52
IP51     QJ    XP00    SN00          EXPρCOS
IP52     QJ    SN04    SR01          SINEρSQ ROOT
IP53     QJ    AT00    LN00          ARCTANρLOG
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IP54    QJ    IP55    IP58
IP55    QJ    IP56    IP65
IP56    QJ    IP57    IP68
IP57    QJ    IP95    IP95      37ρ36
IP58    QJ    IP59    IP61
IP59    QJ    IP60    IP64
IP60    QJ    IP95    IP95      27ρ26
IP61    QJ    IP62    IP63
IP62    QJ    FS00    SF00      FXD-FLρFL-FXD
IP63    QJ    PK24    PK00      BLK TRANSρSTORE
IP64    QJ    IP95    IP95      25ρ24
IP65    QJ    IP66    IP67
IP66    QJ    IP95    IP95      33ρ32
IP67    QJ    IP95    IP95      31ρ30
IP68    QJ    IP95    IP95      35ρ34
IP69    QJ    IP70    IP73
IP70    QJ    IP71    IP80
IP71    QJ    IP72    IP83
IP72    QJ    IP95    IP95      57ρ56
IP73    QJ    IP74    IP76
IP74    QJ    IP75    IP79
IP75    QJ    IP95    IP95      47ρ46
IP76    QJ    IP77    IP78
IP77    QJ    IP95    IP95      43ρ42
IP78    QJ    IP95    IP95      41ρ40
IP79    QJ    IP95    IP95      45ρ44
IP80    QJ    IP81    IP82
IP81    QJ    IP95    IP95      53ρ52
IP82    QJ    IP95    IP95      51ρ50
IP83    QJ    IP95    IP95      55ρ54
IP84    QJ    IP85    IP87
IP85    QJ    IP86    IP90
IP86    QJ    IP95    IP95      67ρ66
IP87    QJ    IP88    IP89
IP88    QJ    QD09    QD06      RD TAPE OCTρFD
IP89    QJ    QD03    QD00      RD CDSρOCTρFD
IP90    QJ    IP95    QD12      65ρRD BIN TAPE
IP91    QJ    IP92    IP93
IP92    QJ    QD24    QD21      WR TAPE OCTρFD
IP93    QJ    QD18    QD15      PCH CDS OCTρFD
IP94    QJ    QD34    QD27      PRINTρWR BIN TP
IP95    TP    IP05    IP96      FOR FALSE OP
IP96                    B        SENDSYS TO Q
IP97    RJ    LM21    LM00      ALARM
IP98    MJ              X14       AND EXIT


AD      TN    TS15    TS15      ENTRY SUBTRACT
AD 1    TP    TS25    A         CHAR OP TO A
AD 2    ST    TS26    A          CHAR FL ACC
AD 3    SJ    AD04    AD16      TST SIGN DIFF
AD 4    TJ    CP30    X03        35ρDIFF EXIT
AD 5    TN    A       A         SHIFT
```

```
AD 6    TV   A       AD07
AD 7    LA    TS16                 POSITION FL ACC
AD 8    AT    TS15   A             FORM SUM
AD 9    SF   A        TS06         NORMALIZE
AD10    TP   A        TS16         STORE MANT
AD11    SP    TS06                 CT TO A
AD12    TJ    CP12     AD14        36βCT
AD13    SS    CP16                  IF NOTP CT-72
AD14    AT    TS25     TS26        CHAR
AD15    MJ              X03        EXIT
AD16    TJ    CP12     AD18        IF DIFF β ORQ36
AD17    MJ              X00         EXIT TO LOAD F
AD18    TV   A         AD19        SET SHIFT
AD19    LA    TS15                 POSITION OP
AD20    AT    TS16   A             FORM SUM
AD21    ZJ    AD22     DV15        EXIT IF ZERO
AD22    TP    TS26     TS25        SMALLER CHAR
AD23    MJ             AD09        TO NORMALIZE

MP      TV    AD15     MP11        SET EXIT
MP 1    RA    TS26     TS25        CJFJ   CJOPJ
MP 2    MP    TS16     TS15        MJFJΔMJXJΣ7O
MP 3    ZJ    MP07     MP04        IF ZERO
MP 4    TP    TS07     TS16         SET FLOATING
MP 5    TP    TS07     TS26         ACCUMULATOR
MP 6    MJ             MP11         AND EXIT
MP 7    SF   A         TS06        NORMALIZE
MP 8    TP   A         TS16        STORE MANT!SSA
MP 9    RA    TS26     TS06        CHAR SUM   CT
MP10    ST    CP28     TS26         163EQCHAR
MP11    MJ                        EXIT

MA      TP    TS16     TS17        FL ACC
MA 1    TP    TS26     TS27         TO RO
MA 2    SP    TS05       15        R TO UJAJ
MA 3    AT    DC04     MA05        SET COMMANDS
MA 4    AT    DC06     MA06         FOR TRM
MA 5                          B    JRJTO FL
MA 6                          B    ACCUM
MA 7    RJ    MP11     MP01        EXECUTE JRJΔJVJ
MA 8    TP    TS07     TS05        SET R ZERO
MA 9    TP    TS17     TS15        OBTAIN OPERAND
MA10    TP    TS27     TS25         TO BE ADDED
MA11    MJ             AD01        EXECUTE ADD

PM      TP    TS15     TS17        JVJ TO
```

```
PM 1        TP      TS25      TS27                    RO
PM 2        TP      TS16      TS15                    FL ACC
PM 3        TP      TS26      TS25                     TO OPERAND
PM 4        MJ                MA02                    TO MA

                                        FOLLOWING SEQUENCE  ALARMS ONLY IF NUM≠0 AND DEN=0   THUS, 0/0 = 0 WITHOUT ALARM.

DV          TP      TS15      A         TP  TS07  A       DIVISOR TO A        ZERO TO A
DV 1        ZJ      DV02      DV13      EJ  TS16  DV15    ALARM IF ZERO       EXIT IF NUM=0
DV 2        LA      TS16      32034     EJ  TS15  DV13    MSFS TO AΣ69        ALARM IF DEN=0
DV 3        ZJ      DV04      DV15      LA  TS16  32034   EXIT IF ZERO        M(F) TO A : 69
DV 4        DV      TS15      TS16                        QUOT IN FΣ34
DV 5        RS      TS26      TS25                        CSFS-CSXS
DV 6        AT      CP27      TS26                         129
DV 7        QJ      DV08      DV09                        NEG OR POS
DV 8        QJ      DV10      X03                         IS QUOTIENT
DV 9        QJ      X03       DV10                         NORMALIZED
DV10        LQ      TS16      1                           LEADING ZERO
DV11        RS      TS26      CP04                        ADJUST CHAR
DV12        MJ                X03                         EXIT
DV13        TP      AW01      LM29                        ALARM WORD
DV14        RJ      LM21      LM00                        TO ALARM
DV15        TP      TS07      TS26                        ZERO CHAR
DV16        TP      TS07      TS16                        ZERO MANT
DV17        MJ                X03                         EXIT

                                                                    IT IN 48 μs
                                                                    SLOWER
                                                                    THAN FIRST SQR
                                                                    IN NORMAL CASE

SF          SP      TS04      3                           TΣ3
SF 1        SA      TS05                                   REQN
SF 2        AT      TS26      A                            C
SF 3        SS      CP27                                   129EQN P-1
SF 4        SJ      SF05      SF07                        IF NEG ZERO
SF 5        TP      TS07      A                            TO A AND
SF 6        MJ                SF09                         STORE
SF 7        AT      DC03      SF08                        SET FOR AND
SF 8                                    B                 POSITION NUMBER
SF 9        TV      TS03      SF10                        SET STORE
SF10        LT      2                                     STORE
SF11        MJ                X14                         EXIT

FS          SP      TS03      15                          V TO USAS
FS 1        TU      A         FS02
FS 2        SF                TS06                        NORMALIZE
FS 3        TP      A         TS16                        STORE MANT
FS 4        ZJ      FS05      FS11                        EXIT IF ZERO
FS 5        LA      TS04      3                           TΣ3 TO A AND T
FS 6        SS      TS06                                   CT
FS 7        EJ      TS04      FS09                        IF CT IS NOT
FS 8        SA      CP16                                   ZEROP  72
FS 9        SA      TS05                                   R
FS10        SS      CP28                                   163EQ NEG CHAR
```

```
FS11    TM   A     TS26          STORE CHAR
FS12    MJ         X14           EXIT


PK      TV   PK27   PK23          SET EXIT STORE
PK 1    TP   TS16   TS17          FL ACC
PK 2    TP   TS26   TS27           TO RO
PK 3    SP   TS05     15         R TO USAS
PK 4    AT   MA09   PK06          SET TRM
PK 5    AT   DC06   PK07           COMMANDS
PK 6                    B        SRS TO
PK 7                    B         OPERAND
PK 8    TV   TS03   PK22          SET STORE
PK 9    TP   TS25   A             CSXS TO A
PK10    SJ   PK11   PK13          IF NEG
PK11    TP   TS07   A              SET ZERO
PK12    MJ         PK22           AND EXIT
PK13    TJ   CP29   PK17          IF 256 NOT ß P
PK14    TP   TS03   Q              V TO Q
PK15    TP   AW02   LM29           ALARM WD
PK16    RJ   LM21   LM00           AND ALARM
PK17    TP   TS15   Q             MSXS TO Q
PK18    QJ   PK19   PK20          IF NEGATIVE
PK19    TN   A      A              CHANGE SIGN C
PK20    LA   A        35          POSITION CHAR
PK21    AT   TS15   A              MSXS
PK22    LT     28                 STORE
PK23    MJ                        EXIT
PK24    TP   TS05   AB02          BK TR ENTßSET X
PK25    TP   TS07   TS05          ZERO TO R
PK26    IJ   AB02   PK28          TST INDEX
PK27    MJ         X09            EXIT
PK28    RA   TS05   CP04          BUMP R
PK29    RJ   PK23   PK03          PACK CURRENT R
PK30    RA   TS03   CP04          BUMP V
PK31    MJ         PK26           PACK ANOTHER


X       TP   TS15   TS16          OPERAND TO
X 1     TP   TS25   TS26           FL ACC
X 2     TU   X00    MA00          ENTRY LOAD R
X 3     SP   TS05                 NORMAL ENTRY
X 4     AT   MA00   X06           SET TRM
X 5     AT   DC06   X07            OF F TO R
X 6                     B         FL ACC SOR OPS
X 7                     B           TO R
X 8     TU   PM02   MA00          RESTORE WORD
X 9     TP   DC10   Q             SBCWS TO Q
X10     QT   CP10   A             DIGIT TO A
X11     ZJ   X12      X14         EXIT IF ZERO
```

```
X12     TJ    TS04    QD30          BREAK IF T β
X13     EQ    TS04    QD30           OR EQUAL BCW
X14     TP    DC08    Q             RESTORE Q
X15     TP    DC09    A             RESTORE AR
X16                       B         EXIT


LM      PR            CP13          CARRIAGE RETURN
LM 1    PR    AB00    CP14          SHIFT UP
LM 2    TP    Q       AB01          SAVE Q
LM 3    TP    A       AB02          SAVE AR
LM 4    TP    CP08     X06          SET IND-1 TO 5
LM 5    LQ    LM29        6         POSITION
LM 6    PR              Q            AND TYPE
LM 7    IJ     X06     LM05          ALARM WORD
LM 8    RJ    LM27    LM27          FOUR SPACES
LM 9    TP    CP05     X07          SET IND-2 TO 2
LM10    PR            CP15          SHIFT DOWN
LM11    LQ    IP05    31006         POSITION Y
LM12    TP    Q       AB00          SAVE Y
LM13    TP    CP07     X06          SET IND-1 TO 4
LM14    TU    LM01    LM22          RESET ADDRESS
LM15    RJ    LM27    LM22          TYPE WORD
LM16    RA    LM22    CP03          BUMP ADDRESS
LM17    TP    CP11     X06          SET IND-1 TO 11
LM18    IJ     X07    LM15          TST END TYPE
LM19    PR            CP13          CARRIAGE RETURN
LM20    TP    AW00    LM29          SET ALARM WORD
LM21    MS                          EXIT
LM22    LQ               3          OCTAL TWR OUTPT
LM23    QT    CP10    A             DIGIT TO A
LM24    AT    DC05    LM25          SET UP AND
LM25                        B        TYPE DIGIT
LM26    IJ     X06    LM22          TST END TYPE
LM27    RP       4                   FOUR SPACES
LM28    PR            CP07           AND RETURN
LM29                        B       CODE WORD


SR 1    TP    TS15    A             MʃXʃ    A
SR 2    SJ    SR03     SR05         ALARM IF NEG
SR 3    TP    AW03    LM29          ALARM WDρ TO LM
SR 4    MJ            SN12           SET ZEROρCONT
SR 5    ZJ    SR06    DV15          EXIT IF ZERO
SR 6    LT       6    A             FIRST FIVE BITS
SR 7    SP    A          15         POSITION
SR 8    AT    RC00    SR09          SET TBL MPY
SR 9                        B       MΔXΣ70
SR10    LT            A             PREVΣ34
SR11    LQ    Q          18         POSITION 6
SR12    AT    Q        TS16         FIRST APPROXΣ34
SR13    SP    TS15       34         MʃXʃΣ68
```

```
SR14    DV    TS16    A                 MγFA
SR15    SA    TS16                       FAΣ34
SR16    LT      35    TS16              END NEWTON
SR17    LA    TS25    31035             LAST BIT C TO Q
SR18    LT            A                 C OR C-1 γ2
SR19    AT    RC01    TS26               65EQCHAR
SR20    QJ     X03    SR21              EXIT IF ODD FLD
SR21    MP    PC04    TS16              2EJ-1γ2JΔMΣ70
SR22    LT       1    TS16              NORMAL SCALE
SR23    LT       1    Q
SR24    QJ     X03    SR25              CHECK UNDERFLOW
SR25    LT            TS16              STORE MANT
SR26    RS    TS26    CP04              ADJUST CHAR
SR27    MJ             X03              EXIT


RC      MP    RR00    TS15              TABLE DUMMY
RC 1                   101   B           65ΣO
RC 2    37    40751    764   B          MΣ36ρ6Σ16 1ST
RC 3    36    46351   2726   B          Mρ6  2ND
RC 4    35    60611   4635   B          Mρ6  3RD
RC 5    34    77211   6511   B          Mρ6  4TH
RC 6    34    21341  10335   B          Mρ6  5TH
RC 7    33    46661  12133   B          Mρ6  6TH
RC 8    32    77101  13705   B          Mρ6  7TH
RC 9    32    31761  15434   B          Mρ6  8TH
RC10    31    67101  17140   B          Mρ6  9TH
RC11    31    26251  20623   B          Mρ6 10TH
RC12    30    67331  22267   B          Mρ6 11TH
RC13    30    32161  23714   B          Mρ6 12TH
RC14    27    76441  25322   B          Mρ6 13TH
RC15    27    44251  26713   B          Mρ6 14TH
RC16    27    13311  30267   B          Mρ6 15TH
RC17    26    63511  31626   B          Mρ6 16TH


SN      TM    TS15    TS15              COSINE ENTRY
SN 1    TU    SN22    SN17              SET FOR SMALL
SN 2    TV    XP06    SN09               ANGLE EXIT AND
SN 3    MJ            SN06               FOR QUADRANT
SN 4    TU    NC00    SN17              SINE ENTRY
SN 5    TV    SN13    SN09
SN 6    TM    TS15    TS16              ABS VALVE OF
SN 7    TP    TS25    TS26               ARG TO FL ACC
SN 8    RS    TS25    CP27              C-129EQP
SN 9    TJ    TC16                       11ρP EXIT
SN10    TJ    NC03    SN14              ULρP
SN11    TP    AW07    LM29               IF NOTρ TO
SN12    RJ    LM21    LM00               ALARM AND
SN13    MJ            DV15               SET ANS ZERO
```

```
SN14    AT    NC01    SN16          SET SHIFT
SN15    MP    NC02    TS16          2γ ΔMΣ69
SN16                      B         N ZΣ34
SN17    AT              Q         M ZΣ34
SN18    QT    NC04    TS16        ZΣ34
SN19    QJ    SN20    SN21        IF M OR M-1  2
SN20    TN    TS15    TS15         IS ODDρSET SGN
SN21    QJ    SN22    SN24        IF M IS ODD
SN22    SP    PC00                 SET FOR
SN23    ST    TS16    TS16         1-ZΣ34
SN24    MP    TS16    TS16        ZE2Σ68
SN25    LT       2    Q           ZE2Σ34
SN26    MP    Q       NC05        ZE2ΔA9Σ71
SN27    LT       1    A
SN28    AT    NC06    TS17         A7Σ36
SN29    MP    Q       TS17        ZE2ΔSUMΣ70
SN30    LT       1    A
SN31    AT    NC07    TS17         A5Σ35
SN32    MP    Q       TS17        ZE2ΔSUMΣ69
SN33    LT       2    A
SN34    AT    NC08    TS17         A3Σ35
SN35    MP    Q       TS17        ZE2ΔSUMΣ69
SN36    LT       1    A
SN37    AT    NC09    Q            A1Σ34
SN38    MP    Q        TS16       POLYΔZΣ68
SN39    ZJ     SN40    DV15       EXIT IF ZERO
SN40    LA    A          2        SINʃ Zγ2ʃΣ70
SN41    MJ               AT52     TO NORMALIZE


NC              TS07    XP41  BRR   SET EXIT SNρXP
NC 1    SS      A         37        SFT COMMAND
NC 2    24      27630   15562  B    2γ Σ35
NC 3            12      12     B    POWER LIMIT
NC 4    17      77777   77777  B    Z MASK
NC 5            1173    27564  B    A9Σ37
NC 6    77      54666   31633  B    A7Σ36
NC 7     2      43150   53663  B    A5Σ35
NC 8    53      25041   75124  B    A3Σ35
NC 9    31      10375   52202  B    A1Σ34


XP      MP      TS15    PC08         MʃXʃΔLOGB2E
XP 1    LT         1    TS15         MʃYʃΣ34
XP 2    TP      PC11    AB00         TW
XP 3    SJ      XP04    XP05         IF NEG
XP 4    TP      PC12    AB00          SET TW-
XP 5    RS      TS25    CP27         C-129EQP-1
XP 6    TJ      PC14    XP43          30ρP-1 EXIT
XP 7    TJ      CP10    XP09         7ρP-1
XP 8    QJ      DV15    XP46          NO UND-ρ OV
XP 9    TJ      CP09    XP13         6ρP-1
```

```
XP10    TM    TS15    A                    NO 1MJXJ1 TO A
XP11    TJ    AB00     XP13                TW ØABS MANT
XP12    MJ           XP08                  NO TO ALARM
XP13    TN    PC14    A                   30 TO A
XP14    SA    TS25       15                P-1EQ29 P
XP15    TU    A        XP20                SET SHIFT TO Q
XP16    TN    TS25    A                    JP-1J TO A
XP17    AT    PC15     XP18                SET 129 SFT
XP18                          B            129 SFTD TO A
XP19    AT    TS15    A                   129 YΣ34-P
XP20    LT            Q                   N ZΣ27 TO Q
XP21    LA    Q          9                NEQCJEXJ TO A
XP22    LT             TS26               STORE N
XP23    TV    NC00     XP40                SET NORMAL EXIT
XP24    LQ    Q          35                POSITION Z
XP25    SP    Q           4                2EX ENTRY
XP26    LT            A                   FIRST 3 BITS
XP27    AT    PC13     XP38                SET TABLE MPY
XP28    QT    PC16    Q                    WΣ35 TO Q
XP29    MP    Q        PC10                WΔA2Σ71
XP30    LT            A
XP31    AT    PC09     IP96                A1Σ35
XP32    MP    Q        IP96                WΔSUMΣ70
XP33    LT            A                   PREVΣ34
XP34    AT     PC08    IP96                DENΣ34
XP35    SP    Q          33                WΣ68
XP36    DV     IP96    A
XP37    AT     PC00    Q                   2EWΣ34
XP38                          B            2EWΔTBLΣ68
XP39    LT        2    A                   2EYΣ34
XP40    MJ                                 EXIT 2EX
XP41    TP    A          TS16               MJEXJ TO FL ACC
XP42    MJ            X03                  EXIT
XP43    TP     PC00     TS16                ONE TO FL
XP44    TP     CP27     TS26                 ACCUM AND
XP45    MJ             X03                  EXIT
XP46    TP     AW04     LM29                OV WD TO TWR
XP47    RJ     LM21     LM00                TO ALARM
XP48    MJ             X03                  EXIT


PC      20                          B       1Σ34
PC 1    21    34534      7440      B       2EJ1Y8JΣ34
PC 2    23     1577      1214      B       2EJ1Y4JΣ34
PC 3    24    57755     32516      B       2EJ3Y8JΣ34
PC 4    26    50117     14640      B       2EJ1Y2JΣ34
PC 5    30    53162     50212      B       2EJ5Y8JΣ34
PC 6    32    72117     63126      B       2EJ3Y4JΣ34
PC 7    35    26014     33477      B       2EJ7Y8JΣ34
PC 8    27     5243     54513      B       LOG BS2 EΣ34
PC 9    60        1     71150      B       A1Σ35
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```
PC10      3    54402    62675  B      A2Σ36
PC11     17    70000           B      1-2EJ-7JΣ34 TW
PC12     20    10000           B      1 2EJ-7JΣ34 TW-
PC13     MP    Q         PC00         TABL MPY
PC14     77    77777    77741  B       30Σ0
PC15     SP     PC12        6         SFT DUMMY
PC16      3    77777    77777  B      W MASK


LN       TP     TS15    A             MJXJ TO A
LN 1     SJ     LN39     LN02         ALARM IF NEG
LN 2     ZJ     LN03     LN39          OR ZERO
LN 3     RP    20007     LN05         TABLE LOOK UP
LN 4     TJ     PC01     LN06          FOR 2EJM↑8J
LN 5     TP     LC00    Q             OCT DIGIT 7
LN 6     SP     LC01
LN 7     ST    Q         AB00         FIRST OCT DIGIT
LN 8     SA     PC13       15          TBL START
LN 9     TU    A         LN13         SET TBL ENTRY
LN10     TP     TS25    A             CJXJ TO A
LN11     SS     CP27        3         129Σ3
LN12     AT     AB00     TS25          FIRST OCT DIG
LN13     TP              Q            2EJM↑8J
LN14     SP    Q
LN15     SA     TS15       35         DEN GAMMAΣ69
LN16     LT               AB00         DENΣ33
LN17     SP     TS15
LN18     SS    Q           37         NUM GAMMAΣ71
LN19     DV     AB00     TS15         GAMMAΣ38
LN20     MP     TS15     TS15         GAMMAE2Σ76
LN21     SS    A           31         GE2Σ35 IN AR
LN22     MP    A          LC02         GE2Δ1↑5Σ70
LN23     LT        1     A
LN24     AT     LC03     AB01          1↑3Σ35
LN25     MP    Q         AB01         GE2ΔSUMΣ70
LN26     LT              A
LN27     AT     PC00    Q             POLYΣ34
LN28     MP    Q         TS15         POLYΔGΣ72
LN29     LT        3     A            FJGAMMAJΣ38
LN30     MA     TS25     LC04         LNXΣ38
LN31     ZJ     LN32     DV15         EXIT IF ZERO
LN32     SF    A         TS06         NORMALIZE
LN33     TP    A         TS16         STORE MANT
LN34     TP     TS06    A             CT TO A
LN35     TJ     CP12     LN37         36ßCT
LN36     SS     CP16                  CT-72
LN37     AT     LC05     TS26          125EQCHAR
LN38     MJ               X03         EXIT
LN39     TP     AW05     LM29         ALARM WORD
LN40     MJ               SN12         ALARM


LC                       17777  B      FOR OCT DIG 7
```

```
LC 1                      20006  B      OCT DIG CONST
LC 2          6   31463   14632  B      1Y5Σ35
LC 3         12   52525   25253  B      1Y3Σ35
LC 4         26   13441   37676  B      LOG BSE 2Σ35
LC 5                       175  B       125ΣO


AT           TM    TS15    TS16         1MJXJ1 AND
AT 1         TP    TS25    TS26          CJXJ TO FL ACC
AT 2         RS    TS25    CP27         C-129EQP
AT 3         TJ    TC16    AT07-         11ØP EXIT
AT 4         TJ    CP17    AT11         31ØP
AT 5         TP    CP27    TS26          IF NOT SET
AT 6         TP    TC11    TS16          ARCTAN EQ Y2
AT 7         TP    TS15    Q            TEST
AT 8         QJ    AT09    AT10          SIGN
AT 9         TN    TS16    TS16         ADJUST
AT10         MJ             X03         EXIT
AT11         TN    CP06    AB00          3 TO N STORE
AT12         TJ    AB00    AT20          3ØPØBYPASS
AT13         TP    CP06    AB00          3 TO N STORE
AT14         TJ    AB00    AT16         IF 3ØPØ
AT15         MJ            AT20          BYPASS
AT16         TP    A       AB00         SAVE N
AT17         SP     TS16                1MJXJ1 TO A
AT18         TJ    TC12    AT20         TW Ø1MJXJ1
AT19         RA    AB00    CP04          IF NOTØSET N
AT20         LA    AB00   32015         POSITION N
AT21         AT    TC13    AT50         SET TABLE ENTRY
AT22         TP    AB00    A            N TO A
AT23         ST    TS25    A             PEQN→P
AT24         AT    TC14    AT35         SET 1 SFT NUM
AT25         RA    TS25    AB00         N P
AT26         SJ    AT28    AT27         IF POSITIVE
AT27         TN    CP04    A             REPLACE BY -1
AT28         AT    TC15    AT33         SET X SFT DEN
AT29         ST    AB00    AT37         SET X SFT NUM
AT30         TN    TS25    A             JN PJ
AT31         AT    TC14    AT32         SET 1 SFT DEN
AT32                             B       1 SFTD
AT33                             B        X
AT34         LT              AB01        DENOMINATOR
AT35                             B       1 SFTD
AT36         TN    A         A           NEGATE
AT37                             B        X POSITIONED
AT38         DV     AB01     TS16        QUOTΣ36
AT39         MP    Q         Q           YE2Σ72
AT40         LT              Q           YE2Σ36
AT41         MP    Q         TC00        YE2ΔK7Σ70
AT42         LT              A
AT43         AT     TC01     AB00         K5Σ34
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```
AT44    MP   Q      AB00          YE2ΔSUMΣ70
AT45    LT          A
AT46    AT   TC02   AB00           K3Σ34
AT47    MP   Q      AB00          YE2ΔSUMΣ70
AT48    LT          A
AT49    AT   TC03   Q              K1Σ34
AT50                       B      TABLE ENTRY
AT51    MA   Q      TS16           POLYΣ70
AT52    SF   A      TS06          NORMALIZE
AT53    TP   A      TS16          STORE MANTISSA
AT54    TP   TC17   A             93 TO A
AT55    AT   TS06   TS26           CTEQCHAR
AT56    MJ          AT07          EXIT


TC      75   65161   1356   B     K7Σ34
TC 1     3   14503  45451   B     K5Σ34
TC 2    72   52526   3356   B     K3Σ34
TC 3    17   77777  77773   B     K1Σ34
TC 4     1   77255  65152   B     ARCTAN2EJ-?JΣ34
TC 5     3   72667  27711   B           J-2JΣ34
TC 6     7   32614  70126   B           J-1JΣ34
TC 7    14   44176  65211   B            JOJΣ34
TC 8    21   55560  62273                JIJΣ34
TC 9    25   35506  22510   B            J2JΣ34
TC10    27   11117  65246   B            J3JΣ34
TC11    31   10375  52421   B          2Σ34
TC12    26   14631  46315   B     TEST WORD
TC13    SP    TC07     36         TABLE DUMMY
TC14    SP    CP04     34         1 SFT DUMMY
TC15    SA    TS16     36         X SFT DUMMY
TC16    77   77777  77764   B      11Σ0
TC17                135   B      93Σ0


QD      EJ    CP05   BL01         READ FLOATING
QD 1    RP   30206   BL01          DECIMAL
QD 2    TP   DBL00   BL00          CARDS
QD 3    EJ    CP06   AL00         READ
QD 4    RP   30166   AL00          OCTAL
QD 5    TP   DLA00   LA00          CARDS
QD 6    EJ    CP05   RF02         READ FLOATING
QD 7    RP   30206   RF02          DECIMAL
QD 8    TP   DBL00   BL00          TAPE
QD 9    EJ    CP05   RF00         READ
QD10    RP   30206   RF00          OCTAL
QD11    TP   DBL00   BL00          TAPE
QD12    EJ    CP06   GA00         READ
QD13    RP   30166   GA00          BINARY
QD14    TP   DLA00   LA00          TAPE
QD15    EJ    CP04   FC01         PUNCH FLOATING
QD16    RP   30216   FC01          DECIMAL
```

```
QD17        TP    DFC00     FC00          CARDS
QD18        EJ     CP06     LA01        PUNCH
QD19        RP    30166     LA01          OCTAL
QD20        TP    DLA00     LA00          CARDS
QD21        EJ     CP04     WF00      WRITE FLOATING
QD22        RP    30216     WF00          DECIMAL
QD23        TP    DFC00     FC00          TAPE
QD24        EJ     CP06     WW00        WRITE
QD25        RP    30166     WW00          OCTAL
QD26        TP    DLA00     LA00          TAPE
QD27        EJ     CP06     GB00        WRITE
QD28        RP    30166     GB00          BINARY
QD29        TP    DLA00     LA00          TAPE
QD30        TP     QQ00     A           CHECK
QD31        EJ     CP04     BT00          FOR
QD32        RP    30216     BT00          T-DIGIT
QD33        TP    DFC00     FC00          ACCESS
QD34        MJ              IP95        ALARM FOR OP 75
QD35        EJ     CP06     EF00        WRITE
QD36        RP    30166     EF00          END OF
QD37        TP    DLA00     LA00          FILE


FC                          1   B       PACKAGE NUMBER
FC 1        SP     TS04      3          TΣ3
FC 2        AT     TS05     TS05         REQN
FC 3        SP     TS03      15        POSITION V
FC 4        TU     A        FC12       SET FIRST WD
FC 5        IJ     TS05     FC07       TST CARD PUNCH
FC 6        MJ               X14        EXIT
FC 7        RP    10024     FC09       RESET BUFFER
FC 8        TP     TS07     AB00         STORAGES
FC 9        EF              FC58       PICK PUNCH CD
FC10        TP     CP05      X06       HALF CD IND 2
FC11        LQ     FC59      35        SET STROBE
FC12        LQ              32000      CURRENT WORD
FC13        SJ     FC14     FC15       IF NEGATIVE
FC14        RA     AB02     FC59         SET SIGN IMAGE
FC15        TM     Q        A          CONVERT
FC16        RJ     CV26     CV00         NUMBER TO DEC
FC17        LT    10001     TS17       M10Σ36
FC18        TP     CP10      X07       MANT IND TO 7
FC19        LQ     FC59      35        POSITION STROBE
FC20        SP     TS17       2        MANTISSA
FC21        SA     TS17       1          TIMES 10
FC22        TP     A         TS17
FC23        SS     A          52        DIGITΔ2 TO USAS
FC24        AT     FC60      FC25       STORE DIGIT
FC25                             B        IMAGE
FC26        IJ      X07      FC19       TST END MANT
FC27        LQ     FC59       35        SET STROBE
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```
FC28        TP      TS27     A                    POWER TO A
FC29        SJ      FC30      FC32                IF NEGATIVE
FC30        RA      AB02      FC59                 SET SIGN IMAGE
FC31        TN      TS27     A                     SET POSITIVE
FC32        LQ      FC59        35                POSITION STROBE
FC33        DV      KV03     Q                    P↑10
FC34        TP      A         TS27                LOW DIGIT
FC35        SP      Q           16                HIGHΔ2 TO U↓A↓
FC36        AT      FC60      FC37
FC37                                  B           IMAGE
FC38        SP      TS27        16                LOWΔ2 TO U↓A↓
FC39        LQ      FC59        35                SET STROBE
FC40        AT      FC60      FC41
FC41                                  B           IMAGE
FC42        RA      FC12      CP03                BUMP V
FC43        IJ       X06      FC11                TST HALF CD
FC44        RA      FC14      FC61                SET FOR
FC45        RA      FC30      FC61                 OTHER
FC46        RA      FC60      FC61                 HALF CARD
FC47        TN      FC61      FC61                SET FLIP-FLOP
FC48        TP      FC61     A                    TST IF CARD
FC49        SJ      FC10      FC50                 IMAGE COMPLETE
FC50        TP      CP11       X06                WR IND TO 11
FC51        TP      FC62      FC54                SET FIRST WRITE
FC52        EW                TS07                COPY
FC53        RP    10002       FC55                 ONE
FC54        EW    10000                            ROW
FC55        RS      FC54      CP05                NEXT ROW
FC56        IJ       X06      FC52                TST END PUNCH
FC57        MJ                FC05                TO TST N
FC58        40                  12  B             PUNCH CODE
FC59                            1   B             STROBE
FC60        RA       AB04     FC59                IMAGE DUMMY
FC61                  1                 B         FLIP-FLOP
FC62        EW    10000       AB22                COPY DUMMY


CV          LT          9     TS27                CHAR
CV 1        LQ      A           35                MANT
CV 2        TP      Q         TS17                SAVE M2Σ36
CV 3        ZJ       CV04     CV26                EXIT IF ZERO
CV 4        RS       TS27     KV02                C2-127EQP2
CV 5        MP       KV00     TS27                LOGBS102ΔP2Σ35
CV 6        LT          1     TS27                INT PARTEQΓ10
CV 7        LQ      A           35                POSITION FRACT
CV 8        SJ       CV09     CV12                IF NEGATIVE
CV 9        RS       TS27     CP04                 P10-1
CV10        SP       PC00        1                 FRACTION
CV11        AT ~~ST~~ Q          Q                    1
CV12        MP      Q           KV01                FRACTΔLGB210Σ68
CV13        LT          1     A                   PRODΣ33
CV14        LT      10003     Q                   F 36 IN Q
CV15        LT                A.                  SFT CONST
```

```
CV16        AT      NC01      CV19              SET SHIFT
CV17        RJ      XP40      XP24              2EFΣ34 IN A
CV18        MP      A         TS17              2EFΔM2Σ7O
CV19                                    B       M1OΣ35
CV20        SA      KV05                        ROUND
CV21        EJ      A         CV25              IF M1O IS ø1
CV22        DV      KV03      Q                   Mγ1O
CV23        RA      TS27      CP04                P1O 1
CV24        TP      Q         A                   MΣ35
CV25        TP      A         TS17              STORE M1OΣ35
CV26        MJ                                  EXIT


KV          11      50404     65024   B         LOG BS1O 2Σ35
KV 1        32      44647     41135   B         LOG BS2 1OΣ33
KV 2                            177   B         127ΣO
KV 3                             12   B         1OΣO
KV 4                            144   B         1OOΣO
KV 5                            253   B         ROUNDING FACTOR
KV 6        52      52525     25252   B         ODD-EVEN IND
KV 7                          10101   B         OOOBBB
KV 8         1       1010             B         BBBOOO


WF          LA      TS04        12              POSITION T
WF 1        AT      WF65       X07              SET WRITE
WF 2        IJ      TS05       WF04             TEST INDEX R
WF 3        MJ                 X14              EXIT
WF 4        TV      WF64       WF58             SET FIRST STORE
WF 5        TP      CP15       X06              47 TO LOOP INDX
WF 6        SP      TS03        15              V TO UſAſ
WF 7        TU      A          WF09             SET OBTAIN OPND
WF 8        TP      TS07       BB94             RESET MANT SIGN
WF 9        TP                 A                ſVſ TO A
WF10        SJ      WF11       WF13             IF NEGATIVE
WF11        TP      CP04       BB94              SET SIGN M
WF12        TN      A          A                 SET POSITIVE
WF13        RJ      CV26       CV00             CONVERT NUMBER
WF14        LT      10001      Q                M1OΣ36
WF15        RA      BB94       CP04             SIGN MANT
WF16        TP      CP07       BB95             INDEX TO 4
WF17        LA      BB94          6             POSITION NO
WF18        SP      Q             2             MANTISSA
WF19        SA      Q             1              TIMES 10
WF20        TP      A          Q
WF21        LT                 A                DIGIT
WF22        SA      CP06                          3
WF23        AT      BB94       BB94              PREVIOUS
WF24        IJ      BB95       WF17             SXXXXX IN BB94
WF25        TP      CP05       IP37             INDEX TO 2
```

```
WF26    SP   Q          2        REM OF
WF27    SA   Q          1         MANT TIMES 10
WF28    TP   A     Q
WF29    LT        A              DIGIT
WF30    AT    BB95  A               PREVIOUS
WF31    SA    CP06      6         3
WF32    TP   A       BB95        STORE
WF33    IJ    IP37    WF26       OOXXXO
WF34    TP    TS27  A            P10 TO A
WF35    SJ    WF36    WF38       IF NEGATIVE
WF36    RA    BB95    CP04        SET SIGN
WF37    TN    TS27  A             P10 POSITIVE
WF38    DV    KV03  Q            P10 10
WF39    TP   A       TS27        SAVE LOW DIGIT
WF40    TP    CP04  A            SIGN
WF41    SA    BB95      6         POWER
WF42    SA   Q                    HIGH DIGIT
WF43    SA    CP06      6         3
WF44    SA    TS27                LOW DIGIT
WF45    AT    CP06    BB95       XXXSXX IN BB95
WF46    LQ    KV06      1        ODD-EVEN IND
WF47    QJ    WF50    WF48       EVEN OR ODD
WF48    RP   30002    WF60       SXXXXX
WF49    TP    BB94    BB91        AND XXXSXX
WF50    LA    BB94      18       SPLIT WD
WF51    LT        A
WF52    AT    KV08    BB93       BBBSXX
WF53    LA    BB95      18       SPLIT WD
WF54    LT        A
WF55    AT    BB94    BB94       XXXXXX
WF56    RA    BB95    KV07       SXXBBB
WF57    RP   30005    WF59       STORE1IN
WF58    TP    BB91                BUFFER
WF59    RA    WF58    CP08       BUMP STORE
WF60    RA    TS03    CP04       BUMP V
WF61    IJ     X06    WF06       LOOP TEST
WF62    EF             X07       START TAPE
WF63    RP   10120    WF02       COPY AND GO
WF64    EW   10000    AB00        TO TST INDEX
WF65     2     646       1  B    WRITE CODE


BT      TP    BT50    LM19       SET EXIT LM
BT 1    PR            CP13       CARRIAGE RETURN
BT 2    SP    TS04               T DIGIT TO A
BT 3    EJ    CP10    BT45       SPECIAL IF TEQ7
BT 4    TP    CP04     X07       SET IND-2 TO 1
BT 5    TU    IP05    BT06       Y TO U ADD
BT 6    TP            AB01       JYJ TO STORE
BT 7    RJ    LM19    LM10       TO TYPE YP JYJ
BT 8    TP    TS26    TS27       CJFJ
BT 9    TP    TS16  A            MJFJ TO A
BT10    TV    LM28    BT14       SET PR SIGN
```

```
BT11    SJ    BT12    BT14          IF NEGATIVE
BT12    TV    AT41    BT14           SET PR SIGN -
BT13    TN    A       A              CHANGE TO
BT14    PR                          TYPE SIGN
BT15    TP    A       TS17          M2Σ36
BT16    RJ    CV26    CV03          CONVERT FL ACC
BT17    LT    10001   Q             MANT TO QΣ36
BT18    TP    KV03    X06           SET INDEX TO 10
BT19    SP    Q       2             MANTISSA
BT20    SA    Q       1              TIMES 10
BT21    TP    A       Q
BT22    LT            A             DIGIT
BT23    AT    DC05    BT24          SET UP
BT24                        B        AND PRINT
BT25    IJ    X06     BT19          TST END MANT
BT26    TP    TS27    A             POWER TO A
BT27    TV    LM28    BT31          SET PR SIGN
BT28    SJ    BT29    BT31          IF NEGATIVE
BT29    TV    AT41    BT31           SET PR SIGN -
BT30    TN    A       A              CHANGE TO
BT31    PR                          PRINT SIGN
BT32    DV    KV04    AB00          PγlOOEQHIGH DIG
BT33    DV    KV03    AB01          SECOND DIG
BT34    TP    A       AB02          THIRD DIGIT
BT35    TP    CP05    X06           SET INDEX TO 2
BT36    TU    LM01    BT37          SET FIRST WD
BT37    TP            A             DIGIT TO A
BT38    AT    DC05    BT39          SET UP
BT39                        B        AND TYPE
BT40    RA    BT37    CP03          BUMP ADDRESS
BT41    IJ    X06     BT37          TST LOOP
BT42    TP    LM00    LM19          RESTORE LM
BT43    PR            CP13          CARRIAGE RETURN
BT44    MJ            X14           EXIT
BT45    TP    TS07    X07           SET IND-2 TO 0
BT46    RJ    LM19    LM10          TYPE LOCATION
BT47    TP    DC10    Q             BCW TO Q
BT48    MS            BT49          HALT
BT49    TP    Q       DC10          Q TO BCW
BT50    MJ            BT42          EXIT
```

FAP PACKAGE TWO

```
BL                              2  B      PACKAGE NUMBER
BL 1        SP      TS04        3         TΣ3
BL 2        AT      TS05        TS05       REQN
BL 3        IJ      TS05        BL05      TST CARD REAP
BL 4        MJ                  X14       EXIT
BL 5        RP      10024       BL07      RESET BUFFER
BL 6        TP      TS07        AB00       STORAGES
BL 7        EF                  VK02      START CD READER
BL 8        TP      VK00        X06       ROW INDEX TO 8
BL 9        ER                  X07       READ
BL10        ER      10000       Q          ONE
BL11        ER      10000       X07        ROW
BL12        TP      BL66        BL26      SET FOR
BL13        TP      BL67        BL27       FIRST WORD
BL14        TP      CP04        MA05      SET RT-LT IND 1
BL15        TP      CP05        MA06      SET WD IND 2
BL16        TP      CP04        IP96      HALF WD IND 1
BL17        TP      VK00        IP37      MANT-CHAR IND 8
BL18        TP      TS07        IP38      ZERO TO IMAGE
BL19        SP      IP38          2       IMAGE
BL20        SA      IP38          1        TIMES 10
BL21        QJ      BL22        BL23      ADD ONE
BL22        SA      CP04                   IF CARD PNCHED
BL23        TP      A           IP38      IMAGE
BL24        IJ      IP37        BL19      TST END IMAGE
BL25        TP      IP38        A
BL26                                B      PREV IMAGE
BL27                                B      PREV SUM
BL28        TP      CP05        IP37      M-C IND TO 2
BL29        RA      BL26        VK03      BUMP IMAGE
BL30        RA      BL27        VK03       AND SUM
BL31        IJ      IP96        BL18      WHICH HALF
BL32        IJ      MA06        BL16      WHICH WORD
BL33        TP      X07         Q         RIGHT TO LEFT
BL34        IJ      MA05        BL15      TST END ROW
BL35        IJ      X06         BL09      TST END LOOP
BL36        TP      CP04        X06       ROW INDEX TO 1
BL37        ER                  X07       IGNORE
BL38        ER      10000       Q          ROW ZERO AND
BL39        ER      10000       X07        READ ROW
BL40        IJ      X06         BL37       ELEVEN
BL41        TP      BL68        BL47      SET FIRST WD
BL42        TP      CP04        MA05      SET R-L IND 1
BL43        TP      CP05        MA06      SET WD IND 2
BL44        TP      CP04        IP96      HALF WD IND 1
BL45        TV      VK00        BL48      SET SHIFT 8
BL46        QJ      BL47        BL48      IF MINUS SIGN
BL47                                B      NEGATE
BL48        LQ      Q                     SHIFT
BL49        TV      CP05        BL48      SET SHIFT ?
```

```
BL50    RA    BL47    VK03     BUMP
BL51    IJ    IP96    BL46     WHICH HALF
BL52    IJ    MA06    BL44     WHICH WORD
BL53    TP     X07    Q        RIGHT TO LEFT
BL54    IJ    MA05    BL43     TST END ROW
BL55    ER            A        IGNORE
BL56    ER    10000   A         TWELVE
BL57    ER    10000   A         ROW
BL58    TP    CP08     X06     STORE INDX TO 5
BL59    TV    TS03    VV33     SET STORE
BL60    RJ    VV34    VV00     PACK AND STORE
BL61    RA    TS03    CP04     BUMP STORE
BL62    RP    30010   BL64     BUMP
BL63    TP    AB02    AB00      WORDS
BL64    IJ     X06    BL59     TST END STORING
BL65    MJ            BL03     GO TST CARDS
BL66    AT    AB12    AB12     DUMMY 1
BL67    AT    AB00    AB00     DUMMY 2
BL68    TN    AB00    AB00     DUMMY 3


VV      RS    AB01    VK00     P-8EQQ
VV 1    MP    VK01    AB01     LOGBS210ΔQΣ33
VV 2    LT       3    AB01     INTEGER
VV 3    LQ    A         35     POSITION FRACT
VV 4    SJ    VV05    VV08     IF NEGATIVE
VV 5    RS    AB01    CP04      INT -1
VV 6    SP    PC00       1      FRACTION
VV 7    AT    Q       Q         PLUS 1
VV 8    RJ    XP40    XP25     2EF IN A
VV 9    MP    A       AB00     2EFΔMANTΣ35
VV10    ZJ    VV11    VV17     EXIT IF ZERO
VV11    SF    A       TS06     NORMALIZE
VV12    TP    A       A        POSITION
VV13    LT       28   AB00      MANTISSA
VV14    RA    AB01    CP27     INT 129
VV15    AT    TS06    AB01      SFEQCHAR
VV16    SJ    VV17    VV19     IF NEGATIVE
VV17    ST    A       Q         SET FOR ZERO
VV18    MJ            VV33      AND STORE
VV19    TJ    CP29    VV29     IS 256 ßCHAR
VV20    TP    AW02    LM29      OV WD
VV21    TP    TS03    Q         V TO Q
VV22    RJ    LM21    LM00      TO ALARM
VV23    TN    VK02    A         MAX TO A
VV24    TP    AB00    Q         MANT TO Q
VV25    QJ    VV26    VV27      IF NEG
VV26    TN    A       A          CHANGE SIGN
VV27    TP    CP08    Q         FIVE TO Q
VV28    MJ            VV31       AND EXIT
VV29    LT    10027   Q        POSITION CHAR
```

```
VV30     TP     AB00     A                    MANT TO A
VV31     SJ     VV32      VV33                IF NEGATIVE
VV32     TN   Q          Q                     ADJUST CHAR
VV33     AT   Q                               PACKßSTORE
VV34     MJ                                    AND EXIT


VK                              10   B        8Σ0
VK 1     32     44647    41135   B           LOG B52 10Σ33
VK 2     40                5   B           NEG MAXßCARD RD
VK 3              1        1   B           BUMP U AND V
VK 4      2       1    50000   B           NORMAL BIAS
VK 5      2       1    60000   B           LOW BIAS
VK 6                      77   B           MASK ß63Σ0ß
VK 7      3    3030    30303   B           XXXXXX


RF       TV     RF93     RF41               OCTAL ENTRY
RF 1     MJ              RF03
RF 2     TV     RF90     RF41               FD ENTRY
RF 3     LA     TS04       12               POSITION T
RF 4     AT     RF90      X06               SET READ
RF 5     IJ     TS05     RF07               TST INDEX R
RF 6     MJ               X14               EXIT
RF 7     EF     BB00     VK04              SET NORMAL BIAS
RF 8     TP     CP05      X07              SET BIAS INDEX
RF 9     EF               X06              READ ONE BLOCK
RF10     TV     RF42     RF13              SET FIRST STORE
RF11     TP     RF91     IP37              BLK INDEX TO 23
RF12     RP    30004     RF14              STORE
RF13     TP     BB92                         FOUR WORDS
RF14     RP    10004     RF16              READ
RF15     ER    10000     BB92                FOUR WORDS
RF16     LA     BB94       18              POSITION THIRD
RF17     LA     BB95       18              SPLIT FOURTH
RF18     LT              A
RF19     AT     BB94      BB94             THIRD STANDARD
RF20     ER    10000     A                 FIFTH FROM TAPE
RF21     LT       18      A                 POSITION
RF22     AT     BB95      BB95             FOURTH STANDARD
RF23     RA     RF13      CP07             BUMP STORE
RF24     IJ     IP37      RF12             TST END OF BLK
RF25     ER              A                  IOA TO A
RF26     ZJ     RF27      RF39             ERROR CHECK
RF27     IJ      X07      RF32             YESß TST BIAS
RF28     TP     AW06      LM29             ALARM ON
RF29     RJ     LM21      LM00               THIRD FAILURE
RF30     RA     TS03      CP25             BUMP V BY 48
RF31     MJ               RF05             TRY ANOTHER
RF32     SP   A             12             SET UP
RF33     AT     VK05      IP38               AND CHANGE
RF34     EF                IP38               BIAS
```

```
RF35    TP    TS04    A
RF36    AT    RF92    IP38      SET BACKSPACE
RF37    EF            IP38
RF38    MJ            RF09      REREAD
RF39    TP    CP15    IP38      SET CONV IND 47
RF40    TU    RF07    RF42      SET FIRST WD
RF41    RP    30002             CURRENT
RF42    TP            AB20       WORD
RF43    TV    TS03    VV33      SET STORE FD
RF44    TV    BL06    RF76      FIRST WD
RF45    SP    AB20       6
RF46    TP    A       Q         M TO Q
RF47    LT       1    AB02      SIGN M DOUBLED
RF48    TP    CP07     X07      INDEX TO 4
RF49    RJ    RF77    RF67      PART OF M
RF50    TM    IP37    IP37
RF51    TP    CP05     X07      INDEX TO 2
RF52    TP    AB21    Q
RF53    RJ    RF77    RF67      OBTAIN M
RF54    SP    Q          6
RF55    LT            AB02      SIGN OF POWER
RF56    TP    A       Q
RF57    TP    TS07    IP37      CLEAR SUM
RF58    RA    RF76    CP04      BUMP STORE
RF59    TP    CP04     X07      INDEX TO 1
RF60    RJ    RF77    RF67      OBTAIN POWER
RF61    RJ    VV34    VV00      PACK AND STORE
RF62    RA    TS03    CP04      BUMP STORE
RF63    SP    CP03       1
RF64    AT    RF42    RF42      BUMP BY TWO
RF65    IJ    IP38    RF41      TST END
RF66    MJ            RF05      TST R
RF67    LQ    Q          6      POLYNOMIAL EVAL
RF68    SP    IP37       2      SUM
RF69    SA    IP37       1       TIMES TEN
RF70    QA    VK06    A          DIGIT
RF71    ST    CP06    IP37       XS THREE
RF72    IJ     X07    RF67      TST INDEX
RF73    RS    AB02    CP05      SIGN
RF74    ZJ    RF75    RF76       TEST FOR M
RF75    TN    IP37    IP37       AND P
RF76    TP    IP37              STORE
RF77    MJ                      RETURN
RF78    TV    TS03    RF88      SET STORE
RF79    RP    20002   RF94      SUBTRACT
RF80    RS    AB00    VK07       THREES
RF81    TP    AB01    AB00      SECOND HALF
RF82    TP    CP10    AB04      INDEX 1 TO 5
RF83    LQ    AB00       6      POSITION
RF84    SP    AB02       3      PREV
RF85    QA    CP10    AB02      +DIGIT
RF86    IJ    AB04    RF83      TST END HALF
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Date	Approved	LOCKHEED AIRCRAFT CORP. MISSILE SYSTEMS DIVISION	Title	Report No.	Model	Page


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RF87        IJ      AB03      RF81                TST END WD
RF88        TP      AB02                          STORE
RF89        MJ                RF62              BUMP AND TEST
RF90         2       602      RF43   BBR        RD FWD DMY
RF91                           27    B          23 0
RF92         2       614       1    B          BACKSPACE DMY
RF93        RP     30002      RF78              OCTAL DMY
RF94        TP      CP04      AB03              INDEX 2 TO 1
RF95        MJ                RF82              BACK
```

FAP PACKAGE THREE

```
LA                          3   B       PACKAGE NUMBER
LA 1        SP     TS04     3           TΣ3
LA 2        AT     TS05     TS05         REQN
LA 3        SP     TS03     15          SET FOR
LA 4        TU     A        LA11         FIRST WORD
LA 5        IJ     TS05     LA07        TST END CDS
LA 6        MJ              X14         EXIT
LA 7        RP     10024    LA09        RESET BUFFER
LA 8        TP     TS07     AB00         STORAGES
LA 9        EF              LA34        START PUNCH
LA10        TP     CP05     X06         HALF CD IND 2
LA11        TP              TS27        CURRENT WORD
LA12        TP     CP11     X07         WORD IND TO 11
LA13        LQ     LA35     35          POSITION STROBE
LA14        SP     TS27     3           EXTRACT
LA15        TP     A        TS27         DIGIT
LA16        SS     A        52          DIGITΔ2 IN UʃAʃ
LA17        AT     LA36     LA18        SET UP
LA18                        B            IMAGE
LA19        IJ     X07      LA13        TEST IMAGE
LA20        RA     LA11     CP03        BUMP V
LA21        IJ     X06      LA11        TST HALF CD
LA22        RA     LA36     LA37        SET OTHER HALF
LA23        TN     LA37     LA37        SET FLIP-FLOP
LA24        TP     LA37     A           TST COMPLETION
LA25        SJ     LA10     LA26         OF CARD IMAGE
LA26        TP     CP11     X06         PCH IND TO 11
LA27        TP     LA38     LA30        SET FIRST ROW
LA28        EW              TS07        PUNCH
LA29        RP     10002    LA31         ONE
LA30                        B            ROW
LA31        RS     LA30     CP05        NEXT ROW
LA32        IJ     X06      LA28        TST END PCH
LA33        MJ              LA05        TO NEW CD
LA34        40              12  B       PUNCH CODE
LA35                        1   B       STROBE
LA36        RA     AB04     LA35        IMAGE DUMMY
LA37                1       B           FLIP-FLOP
LA38        EW     10000    AB22        PUNCH DUMMY


AL          SP     TS04     3           TΣ3
AL 1        AT     TS05     TS05         REQN
AL 2        IJ     TS05     AL04        TST CARD READ
AL 3        MJ              X14         EXIT
AL 4        EF              AL40        START READER
AL 5        TV     TS03     AL11        STARTING
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```
AL 6     SP    TS03      15          LOCATION FOR
AL 7     TU    A         AL24        SET UP
AL 8     TP    CP10      TS04      SET ROW TO 7
AL 9     TP    CP04      AB03      SET R-L IND 1
AL10     RP    10006     AL12      SET INITIAL AND
AL11     TP    TS07                FIVE STGS ZERO
AL12     TP    CP05      AB04      SET READ IND 2
AL13     ER              AB09      SKIP ROWS
AL14     ER    10000     Q          8 AND 9ßTHEN
AL15     ER    10000     AB08       READ ONE
AL16     IJ    AB04      AL13       ROW
AL17     TP    CP05      AB02      SET IND-2 TO 2
AL18     TP    CP11      AB01      SET IND-1 TO 11
AL19     SP    AB05        3       POSITION SUM
AL20     QJ    AL21      AL22      IF A PUNCH
AL21     SA    TS04                ADD IN ROW NO
AL22     TP    A         AB05      STORE SUM
AL23     IJ    AB01      AL19      TST END WORD
AL24     RA              AB05      ADD IN ROW SUM
AL25     RA    AL24      CP03      BUMP STORE
AL26     IJ    AB02      AL18      TST END HALF CD
AL27     TP    AB08      Q         RIGHT HALF
AL28     IJ    AB03      AL17      TST END ROW
AL29     RS    AL24      AL39      RESET FIRST ADD
AL30     RS    TS04      CP04      PREPARE NEXT RW
AL31     ZJ    AL13      AL32      NOT ZEROßRD NXT
AL32     TP    CP05      AB04      SET READ IND 2
AL33     ER              AB09      SKIP ROWS
AL34     ER    10000     Q          ZEROßELEVEN
AL35     ER    10000     AB08       AND TWELVE
AL36     IJ    AB04      AL33
AL37     RA    TS03      CP09      SET FOR
AL38     MJ              AL02       NEXT CARD
AL39             6             B
AL40     40              5   B     START CARD RDR


GA       LA    TS04        12      POSITION T
GA 1     AT    GA24      X06       SET READ
GA 2     IJ    TS05      GA04      TST INDEX R
GA 3     MJ              X14       EXIT
GA 4     EF              GA25      NORMAL BIAS
GA 5     TP    CP05      X07       BIAS INDEX TO 2
GA 6     EF              X06       START TAPE
GA 7     TV    TS03      GA09      SET FIRST STORE
GA 8     RP    10120     GA10      RECORD
GA 9     ER    10000                BLOCK
GA10     ER              A         IOA TO A
GA11     ZJ    GA12      GA15      CHECK ERROR
GA12     IJ    X07       GA17      YESßTST BIAS
GA13     TP    AW06      LM29       ALARM ON
GA14     RJ    LM21      LM00       THIRD FAILURE
GA15     RA    TS03      GA28      BUMP V BY 120
```

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GA16      MJ                GA02          AROUND AGAIN
GA17      SP    A             12          SET UP
GA18      AT      GA26      IP37            AND
GA19      EF                IP37            CHANGE BIAS
GA20      TP      TS04      A             T TO A
GA21      AT      GA27      IP37          BACKSPACE
GA22      EF                IP37            TAPE
GA23      MJ                GA06          REREAD
GA24      2         602       1   B       READ FWD DUMMY
GA25      2           1   50000   B       NORMAL BIAS
GA26      2           1   60000   B       LOW BIAS
GA27      2         614       1   B       BACKSPACE DUMMY
GA28                        170   B       120Σ0


GB        LA      TS04        12          POSITION T
GB 1      AT      GB10       X06          SET WRITE
GB 2      IJ      TS05      GB04          TST R INDEX
GB 3      MJ                 X14          EXIT
GB 4      EF                 X06          START TAPE
GB 5      TV      TS03      GB07          SET COPY
GB 6      RP     10120      GB08          WRITE
GB 7      EW     10000                      ONE BLOCK
GB 8      RA      TS03      GA27          BUMP V
GB 9      MJ                GB02          TO TST
GB10      2         646       1   B       WRITE CODE


WW        LA      TS04        12          POSITION T
WW 1      AT      GB10       X06          SET WRITE
WW 2      IJ      TS05      WW04          TST R INDEX
WW 3      MJ                 X14          EXIT
WW 4      TV      WW35      WW29          SET FIRST STORE
WW 5      TP      CP15       X07          LOOP IND TO 47
WW 6      SP      TS03        15          V TO USAS
WW 7      TU    A           WW08          SET OBTAIN OPND
WW 8      TP                TS17          CURRENT WORD
WW 9      TN      CP06      A               3 TO A
WW10      SA      CP06        6           XS3 POSITIONED
WW11      LQ      TS17        3           POSITION AND
WW12      QA      CP10      A               ADD DIGIT
WW13      LQ      WW36        1           LOOP
WW14      QJ      WW10      WW15            TEST
WW15      AT      CP06      BB95            3 TO STORE RT
WW16      LT                BB94          STORE LEFT
WW17      LQ      WW37        1           ODD-EVEN IND
WW18      QJ      WW21      WW19          EVEN OR ODD
WW19      RP     30002      WW31          FIRST AND
WW20      TP      BB94      BB91            SECOND
WW21      LA      BB94        18          SPLIT WORD
```

```
WW22        LT          A
WW23        AT    WW39  BB93          BBBXXX THIRD
WW24        LA    BB95    18          SPLIT WD
WW25        LT          A
WW26        AT    BB94  BB94          FOURTH
WW27        RA    BB95  WW38          XXXBBB FIFTH
WW28        RP   30005  WW30          STORE IN
WW29        TP    BB91                 BUFFER
WW30        RA    WW29  CP08          BUMP STORE
WW31        RA    TS03  CP04          BUMP V
WW32        IJ     X07  WW06          LOOPTEST
WW33        EF          X06          START TAPE
WW34        RP   10120  WF02          COPY AND GO
WW35        EW   10000  AB00           TO TST INDEX
WW36        37   77377  73777  B      LOOP TST WD
WW37        52   52525  25252  B      ODD-EVEN IND
WW38             52525  10101  B      000BBB
WW39         1    1010      B         BBB000


EF          SP    TS04    12          POSITION T DIGT
EF 1        AT    GB10  MA05
EF 2        EF          MA05          WRITE ONE BLK
EF 3        RP     120   X14
EF 4        EW   10000  EF05          WRITE
EF 5        60   60606  6060          CONSTANT
```

LOGIC TRACE DIRECTORY

	D	DTR00	40308	40464 DRUM SET
	D	DAL00	40376	40570 UP
QES	D	DTB00	40595	41123 REGIONS
QES	D	AL00		00000 MAIN LOOP
QES	D	ST00	32	00040 INTERPRET
QES	D	TR00	41	00051 REGIONS
QES	D	UU00	49	00061 FOLLOW
QES	D	VV00	55	00067
QES	D	MS00	58	00072
QES	D	RJ00	67	00103
QES	D	EF00	77	00115
QES	D	RP00	82	00122
QES	D	IP00	132	00204
QES	D	TP00	141	00215 TYPEWRITE
QES	D	TC00	176	00260 CONSTANTS
QES	D	TL00	199	00307 FWA SETUP
QES	D	TB00	219	00333 INST TBL

QES
QES
QES
QES
LOGIC TRACE


```
DTR      TV   Q       DTR32          SET TRACE LOAD
DTR 1    LQ   Q         15            LOCATION
DTR 2    TP   Q       DTR43
DTR 3    SP   DTR45                  SET UP DUMMY
DTR 4    SA   Q         15            JUMP COMMAND
DTR 5    SA   Q         15
DTR 6    LT       6   DTR44
DTR 7    MS           DTR08          STOP FOR LOC
DTR 8    QJ   DTR19    DTR09          TEST FOR FWA
DTR 9    LQ   Q         35
DTR10    TP   Q       DTB00          LOC TO TABLE
DTR11    TV   Q       DTR15
DTR12    LA   Q         15
DTR13    TU   Q       DTR14
DTR14    TP           DTB01          INSTR TO TABLE
DTR15    TP   DTR44                  DUMMY JUMP
DTR16    RA   DTR10    DTR51          TO CORE AND
DTR17    RA   DTR14    DTR51          MODIFY LOOP
DTR18    MJ           DTR07          RECYCLE
DTR19    TV   DTR46    DTR10          RESET
DTR20    TV   DTR47    DTR14          LOOP
DTR21    LQ   Q         35
DTR22    TV   Q       DTR40          SET EXIT
DTR23    TP   DTR53    DTR41          N  TO INDEX 1
DTR24    TP   DTR52    DTR42          15 TO INDEX 2
DTR25    TP   DTR55    Q              BITS TO Q     X
DTR26    SP   DAL00                   COMPUTE CORE  X
DTR27    QJ   DTR28    DTR29          ADDRESSES
DTR28    SA   DTR43
DTR29    LA   A         15
DTR30    QJ   DTR31    DTR32
DTR31    SA   DTR43
DTR32    LT      21                   STORE IN CORE X
DTR33    RA   DTR26    DTR54          MODIFY
DTR34    RA   DTR32    DTR50          LOOP
DTR35    IJ   DTR42    DTR26          RECYCLE
DTR36    RA   DTR25    DTR54          MODIFY LOOP
DTR37    IJ   DTR41    DTR25          RECYCLE
DTR38    TU   DTR49    DTR25          RESET LOOP
DTR39    TU   DTR48    DTR26
DTR40    MJ                           EXIT SET BY 22
DTR41                        B        INDEX 1
DTR42                        B        INDEX 2
DTR43                        B        LOAD MODIFIER
DTR44                        B        DUMMY JUMP
DTR45    RJ    TL15    TL00           BASE DUMMY JUMP
DTR46    TP           DTB00          LOOP
DTR47    TP           DTB01          RESET
DTR48    TP   DAL00                   CONSTANTS
DTR49    TP   DTR55
```

```
DTR50                          1  B
DTR51                          2  B
DTR52                         21  B
DTR53                         14  B
DTR54              1              B
DTR55        21  77777     77777  B      START OF Q BITS
DTR56        77  76045     44522  B       AL  ST  TR
DTR57        40   3777     72767  B       UU  VV  MS
DTR58         7  37721     53746  B       RJ  EF  RP
DTR59        40  66061     64552  B       IP  TP  TC
DTR60        71  13562     65754  B       TL  TB
DTR61        77  35707     57752  B
DTR62        15   1503     67527  B       REGIONS TO BE
DTR63        77  53255     55555  B       IN ORDER WITH
DTR64        27  75325     46000  B       RESPECT TO
DTR65                          B           ABOVE PATTERN
DTR66         7  56736     43561  B       HORIZONTALLY
DTR67        60              B


 AL          TP   Q          ST08          STORE Q
 AL 1        TP              Q             CURRENT COMMAND
 AL 2        TP   Q          AL24           TO Q AND XQT
 AL 3        QJ    AL04      AL13
 AL 4        QJ    AL05      AL06
 AL 5        QJ    AL07      AL23          HI ORDR 6 EXIT
 AL 6        QJ    AL10      TR00          4X EXIT
 AL 7        QJ    AL08      AL23
 AL 8        QJ    AL23      AL09
 AL 9        QJ    RP00      AL23          75 EXIT
 AL10        QJ    AL11      AL23
 AL11        QJ    AL12      AL23
 AL12        QJ    AL23      MS00          56 EXIT
 AL13        QJ    AL14      AL18
 AL14        QJ    AL15      AL23          HI ORDER 2 EXIT
 AL15        QJ    AL16      AL23
 AL16        QJ    AL17      AL23
 AL17        QJ    RJ00      AL23          37 EXIT
 AL18        QJ    AL19      AL23
 AL19        QJ    AL20      AL23
 AL20        QJ    AL21      AL22
 AL21        QJ    EF00      AL23          17 EXIT
 AL22        QJ    AL23      IP00          14 EXIT
 AL23        TP    ST08      Q             RESTORE Q
 AL24                               B      X XQT
 AL25        TP    A          ST07          SAVE AR
 AL26        SS    A                        MODIFY
 AL27        SA     AL01                     LOCATION
 AL28        AT     TC18      AL01           COUNTER
 AL29        SS    A
 AL30        SA     ST07                    RESTORE AR
```

```
AL31        MJ              AL00                    RECYCLE


ST          LT              ST06                    SAVE    LEFTAFF
ST 1        LT      10000   ST07                    SAVE    RITEAFF
ST 2        MJ                                      RETURN
ST 3        SP      ST06      36                    RESTORE LEFTAFF
ST 4        SA      ST07                            RESTORE RITEAFF
ST 5        MJ                                      RETURN
ST 6                                    B           X LEFTAFF
ST 7                                    B           X RITEAFF
ST 8                                    B           X 0


TR          TV      AL24    UU05                    SAVE V ADDRESS
TR 1        TV      UU04    AL24                    DUMMY UP V
TR 2        QJ      TR03    AL23                    TEST FOR ONE
TR 3        QJ      TR05    TR04                     OR TWO WAY
TR 4        QJ      AL23    TR05                     TRANSFER
TR 5        TU      AL24    UU05                    SAVE U ADDRESS
TR 6        TU      UU04    AL24                    DUMMY UP U
TR 7        MJ              AL23                    EXIT


UU          TP      Q       ST08                    STORE Q
UU 1        TU       AL01   TP00                    SAVE CURNT LOC
UU 2        TU       UU05   AL01                    SET NEW L CTR
UU 3        MJ              TP00                    TO TYPEWRITER
UU 4        TP       UU00   VV00                    ADDR DUMMIES
UU 5                                    B           TRUE ADDRESSES


VV          TP      Q       ST08                    STORE Q
VV 1        LQ       UU05     15                    V TO U
VV 2        MJ               UU01                   TO CTR STORE


MS          RJ      ST02    ST00                    STORE ACC
MS 1        TV      AL24    UU05                    SAVE V ADDRESS
MS 2        TV      MS08    AL24                    DUMMY UP V
MS 3        TP      TC19    Q                       CURNT LOC TO
MS 4        QT      AL01    A                        V PART OF Q
MS 5        LT        21    Q
MS 6        RJ      ST05    ST03                    RESTORE ACC
MS 7        MJ              AL24                    EXIT
MS 8        TP              VV01


RJ          RJ      ST02    ST00                    STORE ACC
```

```
RJ 1        TV    AL24    UU05          SAVE V ADDRESS
RJ 2        LQ    AL24      21
RJ 3        TV    Q       RJ07          SET TV STORE
RJ 4        SP    AL01
RJ 5        SA    TC18                  Y PLUS ONE
RJ 6        LQ    A         21
RJ 7        TV    Q
RJ 8        RJ    ST05    ST03          RESTORE ACC
RJ 9        MJ            VV01          EXIT


EF          TU    AL01    Q             FOR EF COMMAND
EF 1        LQ    Q         21           RESTORE Q AND
EF 2        TV    Q       EF04           RETURN CONTROL
EF 3        TP    ST08    Q              TO TRACED
EF 4        MJ                           PROGRAM


RP          RJ    ST02    ST00          STORE ACC
RP 1        SP    AL01                  PICK LOCATION
RP 2        SA    TC18                   OF NEXT
RP 3        TU    A       RP18           COMMAND
RP 4        TP    Q       AL24          SET INDEX
RP 5        LQ    AL24      15
RP 6        TP    TC17    Q
RP 7        QT    AL24    A
RP 8        ST    TC12    RP47          STORE INDEX
RP 9        LQ    AL24      15
RP10        TV    Q       UU05          SET NEW LOC
RP11        LQ    Q         7
RP12        SP    TC11                  COMPUTE
RP13        QJ    RP14    RP15           MODIFIER
RP14        SA    TC18
RP15        QJ    RP16    RP17
RP16        SA    TC12
RP17        TP    A       RP48          STORE MODIFIER
RP18        TP            RP25
RP19        TP    TC22    Q
RP20        QT    RP25    A
RP21        EJ    TC20    RP32          TEST FOR TJ
RP22        EJ    TC21    RP32          TEST FOR EJ
RP23        TP    ST08    Q             RESTORE Q
RP24        RJ    ST05    ST03          RESTORE ACC
RP25                            B       EXECUTE
RP26        RJ    ST02    ST00          STORE ACC
RP27        RA    RP25    RP48          MODIFY
RP28        IJ    RP47    RP24          RECYCLE
RP29        TP    Q       ST08          STORE Q
RP30        RJ    ST05    ST03          RESTORE ACC
RP31        MJ            VV01          TO TYPEWRITER
```

```
RP32    TV    RP49    RP25              DUMMY UP V
RP33    55    RP48   32000  BRB        MODIFY THE
RP34    LQ    Q         35              MODIFIER
RP35    QJ    RP36    RP37
RP36    ST    TC12    RP48
RP37    MJ            RP24            RETURN TO LOOP
RP38    RJ    ST02    ST00            STORE ACC
RP39    TV    AL24    UU05            SET TRUE LOC
RP40    PA    RP47    TC12            ∫N-R∫
RP41    LQ    AL24       9
RP42    TP    TC14    Q
RP43    QT    AL24    A
RP44    LA    A          12
RP45    AT    RP47    ST08            STORE Jω∫N-R∫
RP46    MJ            RP30            TO MAIN LOOP
RP47                        B         INDEX
RP48                        B         MODIFIER
RP49    TP            RP38            V DUMMY


IP      TV    IP03                    DUMMY UP RETURN
IP 1    TP    ST08    Q                FROM IP COMMND
IP 2    MJ               1            LET ER GO -----
IP 3    TP            IP04
IP 4    RJ    ST02    ST00            STORE ACC
IP 5    TU    AL01    A               COMPUTE
IP 6    AT    TC18    UU05             NEXT LOC
IP 7    RJ    ST05    ST03            RESTORE ACC
IP 8    MJ            UU00


TP      PR            TC15            CARRIAGE RETURN
TP 1    PR            TC16            USE LOWER CASE
TP 2    RJ    ST02    ST00            STORE ACC
TP 3    TP    TC12    RP25            1 TO INDEX 1
TP 4    TU    TP00    AL24
TP 5    TU    AL24    TP11            PICK LOCATION
TP 6    LQ    AL24       6
TP 7    TP    TC13    A
TP 8    RJ    TP34    TP27            PRINT LOCATION
TP 9    PR            TC13            SPACE
TP10    PR            TC13            SPACE
TP11    TP            AL24
TP12    TP    TC12    A
TP13    RJ    TP34    TP27            PRINT OPERATION
TP14    PR            TC13            SPACE
TP15    TP    TC13    A
TP16    RJ    TP34    TP27            PRINT U ADDRESS
TP17    PR            TC13            SPACE
TP18    TP    TC13    A
TP19    RJ    TP34    TP27            PRINT V ADDRESS
TP20    PR            TC13            SPACE
```

```
TP21        PR              TC13            SPACE
TP22        PR              TC13            SPACE
TP23        TU      AL01    AL24            PICK NEXT LOC
TP24        IJ      RP25    TP05            RECYCLE
TP25        RJ      ST05    ST03            RESTORE ACC
TP26        MJ              AL01            EXIT
TP27        TP  A           UU05            TYPEWRITER
TP28        LQ      AL24       3             PRINT OUT
TP29        TP      TC14    Q                SUB ROUTINE
TP30        QT      AL24    A
TP31        AT      TC10     TP32
TP32                                 B      TYPE ONE DIGIT
TP33        IJ      UU05     TP28
TP34        MJ                              EXIT


TC                             37   B       LOC 0 DIGIT
TC 1                           52   B       LOC 1 DIGIT
TC 2                           74   B       LOC 2 DIGIT
TC 3                           70   B       LOC 3 DIGIT
TC 4                           64   B       LOC 4 DIGIT
TC 5                           62   B       LOC 5 DIGIT
TC 6                           66   B       LOC 6 DIGIT
TC 7                           72   B       LOC 7 DIGIT
TC 8                           60   B       LOC 8 DIGIT
TC 9                           33   B       LOC 9 DIGIT
TC10        PR                 TC00         DUMMY PRINT
TC11                                 B       CONSTANT 00 OCT
TC12                           1    B       CONSTANT 01 OCT
TC13                           4    B       CONSTANT 04 OCT
TC14                           7    B       CONSTANT 07 OCT
TC15                           45   B       CONSTANT 45 OCT
TC16                           47   B       CONSTANT 47 OCT
TC17                           7777 B       INDEX     MASK
TC18                    1           B       U MODIFIER
TC19                77777          B       LOCATION  MASK
TC20        42                     B       TJ TEST
TC21        43                     B       EJ TEST
TC22        77                     B       OPERATION MASK


TL          TP      Q       ST08            SAVE Q AND LOC
TL 1        RJ       ST02   ST00            STORE ACC
TL 2        SP       TL15
TL 3        ST       TC12   TL15            STORE CURNT LOC
TL 4        55       TC19   32025  BRB      MASK TO Q
TL 5        QT       TL15   TL19
TL 6        SP       TB00                   START LOOP LOOK
TL 7        RJ       TL19   TL10            EXIT
TL 8        RA       TL06   TL18            MODIFY LOOP
```

```
TL 9        MJ              TL06                RECYCLE
TL10        LA    A           15
TL11        TU    A         AL01                SET L COUNTER
TL12        RA     TL06     TC18
TL13        TU    A         TL15
TL14        TU     TL17     TL06                RESET LOOP
TL15        TP
TL16        MJ              AL01                BEGIN THE TRACE
TL17        TP     TB00     TB00                DUMMY RESET
TL18                  2           B             LOOP MODIFIER
TL19                              B             LOC TEST WORD


TB                                B             α   TABLE OF
TB 1                              B             IJαJ INSTR AND
TB 2                              B             β   ASSOCIATED
TB 3                              B             IJβJ LOCATIONS
TB 4                              B
TB 5                              B
TB 6                              B
TB 7                              B
TB 8                              B
TB 9                              B
TB10                              B
TB11                              B
TB12                              B
TB13                              B             IJγJ
```

PAPER TAPE DIRECTORY

	D	DFR	42348	44454
	D	FR		00000
QES	D	DCI	43456	46600 640 IMAGE

QES
QES
QES
QES
READ PAPER TAPE


```
DFR          RP    30192    DFR02                  STORE
DFR 1        TP             DCI00                   CORE
DFR 2        RP    30042     FR12                  PROGRAM AND
DFR 3        TP    DFR04     FR04                   CONST TO CORE
DFR 4                       10100   B              ENTER DATA CODE
DFR 5                       11100   B              INSRT ADDR CODE
DFR 6                       10500   B              CK ADDR CODE
DFR 7                         300   B              END CODE
DFR 8                          77   B              SIX BIT MASK
DFR 9                       17700   B              7TH LEVEL MASK
DFR10        10       2             B              START CODE
DFR11        10       1             B              STOP CODE
DFR12        EF              FR10                  START READER
DFR13        ER              Q                     10A TO Q
DFR14        SP     FR01        6                  ASSEMBLE
DFR15        QA     FR08      FR01                  DATA
DFR16        SP     FR10         1                 OBTAIN
DFR17        52     FR09     31000   BRB            SEVENTH
DFR18        QT     FR09      FR10                  LEVEL
DFR19        EJ     FR04      FR32                 IS THIS ED
DFR20        EJ     FR05      FR30                 IS THIS IA
DFR21        EJ     FR06      FR42                 IS THIS CA
DFR22        51     FR07     32000   BRB
DFR23        EJ     FR07      FR25                 IS THIS END
DFR24        MJ               FR13                 CONTINUE READ
DFR25        EF               FR11                 STOP READER
DFR26        TV     FR01      FR29                 SET EXIT
DFR27        RP    30192      FR29                 RESTORE
DFR28        TP    DCI00                            CORE
DFR29        MS                                     STOP START PROG
DFR30        TV     FR01      FR34                 SET STORE
DFR31        MJ               FR13                 CONTINUE READ
DFR32        TP     FR34     A                     TEST WHERE
DFR33        TJ     FR37      FR39                  TO STORE
DFR34        TP     FR01                           STORE
DFR35        RA     FR34      FR38                 BUMP STORE
DFR36        MJ               FR13                 CONTINUE READ
DFR37        11     FR01       300   BRB           DUMMY
DFR38                           1   B              CONSTANT
DFR39        AT     FR46      FR40                 ADD CONSTANT
DFR40        11     FR01            BRB            FALSE STORE
DFR41        MJ               FR35
DFR42        TV     FR01      FR40                 SET TEST TO
DFR43        TP     FR40     A                      SEE IF CHECK
DFR44        EJ     FR34      FR13                  ADDR IS OK
DFR45        MJ               FR25                 STOP READER
DFR46                         DCI00
```

OPERATIONS DIRECTORY

	D	DDD	40000	40000 DR START
	D	DDR	40016	40020 DR REF
QES	D	DAS	40086	40126 INTER
QES	D	DST	40094	40136 COLD STRT
QES	D	DRR	40111	40157 READ TAPE
QES	D	DBL	40128	40200 BIN LOAD
QES	D	DMP	40154	40232 PARAMTERS
QES	D	DBS	40162	40242 STORE BLK
QES	D	DCN	40188	40274 CONSTANTS
QES	D	DMQ	40204	40314 CK SUM
QES	D	DMM	40214	40326 DRUM READ
QES	D	DLF	40233	40351 LOAD FAP
QES	D	DZY	40253	40375 EST LIBR
QES	D	DTR	40308	40464 LOGIC TR
QES	D	DUM	40609	41141 OCT DUMP
QES	D	DKN	40704	41300 DMP CONST
QES	D	PBT	40725	41325 PR BIN TP
QES	D	FAP	40766	41376 FAP
QES	D	DHK	44096	50000 ASSEMBLY
QES	D	DAB	43741	47235 SEC TWO (Dump)
QES	D	DDP	42200	44230 Tape dump
QES	D	DCP	42170	44172 Tape comp
QES	D	DFR	42348	44454 Fwants read
QES	D	DCI	43456	46600 640 IMAGE
QES	D	ST		
QES	D	RR	17	
QES	D	BL	34	
QES	D	MP	60	
QES	D	BS	68	
QES	D	CN	94	
QES	D	MQ	110	
QES	D	MM	120	
QES	D	LF	139	
QES	D	ZY	159	
QES	D	AB	120	
QES	D	FF	784	
QES	D	GF	904	
QES	D	HK	1	
QES	D	F	1000	
QES	D	DP	31	00037
QES	D	CP	1	00001
QES	D	X	314	00472

QES
QES
QES
QES
OPERATIONS

DDD	MJ		DDR00		RD SERVICE TAPE
DDD 1	MJ		DDD02		DRUM FI
DDD 2	MS		DDD00		STOP
DDD 3	MJ		DDR05		LOAD FAP
DDD 4	MJ		DDR10		LOAD BINARY
DDD 5	MJ		DDR15		LOGIC TRACE
DDD 6	MJ		DDR20		OCTAL DUMP
DDD 7	MJ		DDR25		ASSEMBLY
DDD 8	MJ		DDR30		CORRECTION
DDD 9	MJ		DDR35		TAPE DUPLICATE
DDD10	MJ		DDR40		TAPE COMPARE
DDD11	MJ		DDR45		PRINT BIN TAPE
DDD12	MJ		DDR50		PREPARE LIBRY
DDD13	MJ		DDR55		READ PAPER TAPE
DDD14	MJ		DDR60		NOT USED
DDD15	MJ		DDR65		NOT USED
DDR	RJ	DMP00	DAS00		READ
DDR 1	TP	ST01	ST01		SERVICE
DDR 2		73		B	TAPE
DDR 3				B	
DDR 4				B	
DDR 5	RJ	DMP00	DAS00		LOAD
DDR 6	TP	LF00	LF00		FAP
DDR 7		24		B	
DDR 8				B	
DDR 9				B	
DDR10	RJ	DMP00	DAS00		LOAD
DDR11	TP	BL00	BL00		ASSEMBLED
DDR12		32		B	PROGRAM
DDR13				B	TAPE
DDR14				B	
DDR15	RJ	DMP00	DAS00		LOGIC
DDR16	TP	DTR00	DTR00		TRACE
DDR17		455		B	
DDR18				B	
DDR19				B	
DDR20	RJ	DMP00	DAS00		OCTAL
DDR21	TP	DUM00	DUM00		MEMORY
DDR22		164		B	DUMP
DDR23				B	
DDR24				B	
DDR25	RJ	DMP00	DAS00		ASSEMBLY
DDR26	TP	DHK00	HK00		
DDR27		1574		B	
DDR28				B	

DDR29				B	
DDR30	RJ	DMP00	DAS00		ASSEMBLY
DDR31	TP	DHK00	HK00		CORRECTION
DDR32		3012		B	
DDR33				B	
DDR34				B	
DDR35	RJ	DMP00	DAS00		TAPE
DDR36	TP	DDP00	DP00		DUPLICATE
DDR37		224		B	
DDR38				B	
DDR39				B	
DDR40	RJ	DMP00	DAS00		TAPE
DDR41	TP	DCP00	CP00		COMPARE
DDR42		262		B	
DDR43				B	
DDR44				B	
DDR45	RJ	DMP00	DAS00		PRINT
DDR46	TP	PBT00	PBT00		BINARY
DDR47		51		B	TAPE
DDR48				B	
DDR49				B	
DDR50	RJ	DMP00	DAS00		PREPARE
DDR51	TP	ZY00	ZY00		SERVICE
DDR52		67		B	LIBRARY
DDR53				B	TAPE FROM
DDR54				B	DRUM
DDR55	RJ	DMP00	DAS00		READ
DDR56	TP	DFR00	DFR00		
DDR57		57		B	
DDR58				B	
DDR59				B	
DDR60				B	NOT USED
DDR61				B	
DDR62				B	
DDR63				B	
DDR64				B	
DDR65				B	NOT USED
DDR66				B	
DDR67				B	
DDR68				B	
DDR69				B	

DAS	TP	Q	DMP05		SAVE Q
DAS 1	LT		DMP06		SAVE AL
DAS 2	TP	A	DMP07		SAVE AR
DAS 3	11	DST00		BRB	RESTORE F1
DAS 4	RP	30240	DAS06		SAVE CORE
DAS 5	TP	ST00	DCI00		IMAGE
DAS 6	RP	30240	MM00		PROGRAM
DAS 7	TP	DST00	ST00		TO CORE

DST	45		40000	B	CORE F1

		BL25			
DST 1	TV	~~ST00~~	ST15		SET COLD EXIT
DST 2	EF		CN01		REWIND TAPE 1
DST 3	17	30357	CN00	BBR	MOVE 1 FWD 1
DST 4	TP	CN07	Q		READ
DST 5	RJ	RR09	RR00		FIRST BLOCK
DST 6	TP	AB00	A		FIRST WD
DST 7	EJ	CN06	ST10		TST END TAPE
DST 8	RJ	CN12	BS00		STORE BLOCK
DST 9	MJ		RR04		READ ANOTHER
DST10	EF	AB01	CN01		REWIND TAPE
DST11	TU	ST03	ST15		SET RPT
DST12	TP	MP05	Q		RESTORE Q
DST13	SP	MP06	36		A LEFT
DST14	SA	MP07			A RIGHT
DST15	~~RP~~ 75	30000	40002	B	REST ADJUSTED
DST16	TP	DCI01	ST01		CORE AND EXIT
DRR	SP	Q	12		TAPE UNIT 12
DRR 1	SA	CN07			+1 0
DRR 2	RP	10004	RR04		SET REWINDωBACK
DRR 3	TV	A	CN00		SPACEωAND READ
DRR 4	TP	CN05	MP00		SET BIAS INDEX
DRR 5	EF		CN03		READ ONE
DRR 6	RP	10120	RR08		BLOCK INTO
DRR 7	ER	10000	AB00		BUFFER
DRR 8	ER		A		IOA TO A
DRR 9	ZJ	RR10			TST FOR ERROR
DRR10	IJ	MP00	RR12		TST BIAS
DRR11	FS				STOP BAD TAPE
DRR12	EF		CN02		BACKSPACE TAPE
DRR13	SP	A	12		SET UP
DRR14	AT	CN04	MP03		AND CHANGE
DRR15	EF		MP03		BIAS
DRR16	MJ		RR05		REREAD
DBL	RJ	RR09	RR00		READ BLOCK
DBL 1	TP	CN08	MP00		SET INDEX TO 5
DBL 2	TU	ST06	BL03		TEST
DBL 3	TP		A		END
DBL 4	EJ	CN06	BL08		OF HIGH
DBL 5	RA	BL03	CN14		SPEED PRINTER
DBL 6	IJ	MP00	BL03		PART OF TAPE
DBL 7	MJ		RR04		READ ANOTHER
DBL 8	RS	MP04	MP04		ZERO CKSUM
DBL 9	RJ	RR09	RR04		READ BINARY
DBL10	TP	AB00	A		TST END
DBL11	SJ	BL19	BL12		BINARY
DBL12	RJ	CN12	BS00		STORE BLOCK

```
DBL13     SP    MP04                    FORM AND
DBL14     RP    20120     BL16           SAVE
DBL15     SA    AB00                     RUNNING
DBL16     TP    A         MP04           CHECK SUM
DBL17     TP    MP05      Q              TPE NO TO Q
DBL18     MJ              RR04           READ ANOTHER
DBL19     EF              CN00           MOVE FWD 1 BLK
DBL20     TV    AB00      ST15           SET EXIT
DBL21     SP    AB00                     FORM FINAL
DBL22     SA    MP04                     CKSUM
DBL23     SS    AB01                     TEST FOR
DBL24     ZJ    BL25      ST11           CKSUM
DBL25     ~~FS~~57  00000   40002 B      ERROR


DBS       TU    ST10      MP01           SET STORE LOC
DBS 1     TV    AB00      MP01           SET EXEC  LOC
DBS 2     TU    AB00      MP02           SET NO WDS
DBS 3     SP    AB00        21
DBS 4     LQ    A           15           EXEC LOC TO AωQ
DBS 5     TU    MP01      CN09           SET OV TRM DMMY
DBS 6     AT    CN09      BS25           SET OVLP TRM
DBS 7     TP    CN10      A              240 0
DBS 8     ST    Q         MP03           E EQ OVERLAP
DBS 9     SJ    BS10      BS11           IF NEGATIVE
DBS10     RS    MP03      A              SET ZERO
DBS11     55    MP03      32017  BRB     POS OV IN QωA
DBS12     AT    MP03      A              OV 15 + OV 0
DBS13     AT    MP01      BS23           SET NORM TRM
DBS14     TN    Q         A
DBS15     AT    MP02      A              N-OV IN A  15
DBS16     SJ    BS17      BS19           IF NEGATIVE
DBS17     RS    A         A              SET ZERO
DBS18     TP    MP02      Q              N TO Q
DBS19     AT    CN11      BS22           SET NORM RPT
DBS20     TP    Q         A              SET OVERLAP
DBS21     AT    CN12      BS24           REPEAT
DBS22                         B          NORMAL
DBS23                         B          TRM
DBS24                         B          OVERLAP
DBS25                         B          TRM


DCN         2       4     10001  B       MOVE TPE 1 FWD   Rω
DCN 1       2     200     10001  B       REWIND           MωS
DCN 2       2      14     10001  B       MOVE BACK
DCN 3       2     602     10001  B       READ FWD
DCN 4       2       1     50000  B       NORMAL BIAS
DCN 5                         3  B       3 0
DCN 6      60   60606      6060  B       INDICATOR
DCN 7                         1  B       1 0
DCN 8                         5  B       5 0
```

```
DCN 9          TP          DCI00                    OV TRM DMY
DCN10                        360    B                240 0
DCN11          RP    30000   BS24                    NORM RPT DMY
DCN12          RP    30000                           OVLP RPT DMY
DCN13                      40000    B                CORE TST
DCN14                 24           B                20 15
DCN15          RP    20000   MQ06                    CKSUM DUMMY


DMP                                   B               LOC CALLSEQ
DMP 1                BS00             BRB             TPωSTOREωEXEC
DMP 2                .107             B               BLωNO WDSωBL 71
DMP 3                                 B               CK SUM LOWER
DMP 4                                 B               CK SUM UPPER
DMP 5                                 B               Q
DMP 6                                 B               AL
DMP 7                                 B               AR


DMQ            TP     CN15    A                       DUMMY TO A
DMQ 1          AT     MP02     MQ04                   SET RPT
DMQ 2          TU     MP01     MQ05                   SET ADD
DMQ 3          RS     A        A                      CLEAR A
DMQ 4                                  B              FORM
DMQ 5          SA                                     CHECK SUM
DMQ 6          SS     MP03       36                  SUBTRACT
DMQ 7          SS     MP04                           CORRECT SUM
DMQ 8 (Normally azj)  MJ     MQ09                    EXIT IF ZERO
DMQ 9          MJ             ~~ST01~~ ST02          ERROR STOP


DMM            RS     Q        Q                     ZERO TO QωA
DMM 1          RJ      MQ08     MQ00                  CKSM DMM+
DMM 2          55      MP00    31017   BRB            POS LOC CALL
DMM 3          TU     Q        MM05                   OBTAIN CALL SEQ
DMM 4          RP     30004    MM06                    FOR CURRENT
DMM 5          TP              MP01                    ROUTINE
DMM 6          IJ      MP00     MM07                  CALL-1
DMM 7          TV     A        ~~ST00~~ ST15          SET ERROR EXIT
DMM 8          RJ      MQ08     MQ00                  CKSM FOR ROUTNE
DMM 9          TV      MP01     ST15                  SET SUCCESS XIT
DMM10          SP      MP01       6
DMM11          SP     A          15
DMM12          LT              MP03                   STORAGE LOC
DMM13          LQ     A          15                   EXEC LOC TO QωA
DMM14          EJ      MP03     MM17                  NO TRM IF EQ
DMM15          RJ      CN12     BS05                  OBTAIN ROUTINE
DMM16          MJ              ST11                   EXIT
DMM17          ST      CN13     A                     IF IN CORE
```

```
DMM18          SJ     ST12      ST11                    DO NOT REPLACE


DLF            RP     30018      F02                    TRANSFER
DLF 1          TP      LF02      F02                     ROUTINE
DLF 2          TV      CN13     ST15                    SET FAP ONLY XT
DLF 3          TP     Q          A                      TPE TO A
DLF 4          ZJ       F05      F06                    IF NOT ZERO
DLF 5          RJ      BL24     BL00                     LOAD BINARY
DLF 6          TV      ST15      F15                    OBTAIN EXIT
DLF 7          RP     30898      F09                    BRING FAP
DLF 8          TP     FAP00     ST00                     OFF DRUM
DLF 9          RS     A          A                      CLEAR A
DLF10          RP     30898      F12                    FORM CHECK
DLF11          SA      ST00                              SUM
DLF12          SS       F18      36                     SUBTRACT
DLF13          SS       F19                              CORRECT SUM
DLF14          ZJ       F15      F16                    TST FOR
DLF15          FS                                       CKSUM ERROR
DLF16          TV       F15      X16                    SET EXIT
DLF17          45                1600   B               EXIT TO BT47
DLF18                                   B               CKSUM    LOWER
DLF19                                   B                FOR FAP UPPER


DZY            RP     10004      ZY02                   SET TAPE READ
DZY 1          TV      ZY50      CN00                    OPERATIONS
DZY 2          EF                CN01                   REWIND TAPE 2
DZY 3          RS     Q          CN13                   END - 40000 OCT
DZY 4          AT      CN07     A                       +1 EQ NO WDS
DZY 5          DV      ZY48      MP06                   BLOCK COUNT
DZY 6          LT     10015      MP07                   OVERFLOW CT
DZY 7          RP     30120      ZY09                   COLD START
DZY 8          TP     DST00      FF00                    TO BUFFER
DZY 9          RP     30004      ZY11                   COLD START
DZY10          TP      ZY51      MP01                    PARAMETERS
DZY11          TV      ZY51      MQ09                   SET FOR ERROR
DZY12          RJ      MQ08      MQ00                    AND CHECK SUM
DZY13          TP     A          MP04                   ZERO TO WRT CT
DZY14          TV      ZY42      RR07                   SET READ BUFFER
DZY15          RJ      ZY44      ZY34                   WRITE BLOCK
DZY16          TP      ZY49     A                       119 15 TO A
DZY17          AT      CN13      FF00                   SET FIRST WORD
DZY18          RJ      ZY44      ZY21                   SET LOOP
DZY19          RA      ZY33      ZY49                   BUMP DRUM READ
DZY20          RA      FF00      ZY48                   BUMP LOCATION
DZY21          IJ      MP06      ZY31                   TST NO BLKS
DZY22          TP      MP07     A                       OVERFLOW TO A
DZY23          ZJ      ZY24      ZY26                   IF ZERO EXIT
DZY24          TU     A          FF00                   SET WORD CT
DZY25          RJ      ZY44      ZY31                   WRITE BLOCK
DZY26          EF                ZY50                   WRITE
```

```
DZY27          RP       120     ZY29                    END OF
DZY28          EW     10000     CN06                    FILE
DZY29          EF               CN01                  REWIND
DZY30          FS                                     END PROGRAM
DZY31          RA       MP04    CN07                  BUMP WRITE CT
DZY32          RP     30119     ZY34                  BLOCK
DZY33          11     40000     FF01    BBR            FROM DRUM
DZY34          EF               ZY50                  WRITE
DZY35          RP     10120     ZY37                    BLOCK
DZY36          EW     10000     FF00                    ON TAPE
DZY37          EF               CN02                  BACKSPACE
DZY38          RJ       RR09    RR04                  READ BACK
DZY39          RP     30120     ZY41                  TAPE MINUS
DZY40          RS       GF00    FF00                    ORIGINAL
DZY41          RP     30120     ZY43                  OBTAIN
DZY42          TM       GF00    GF00                    MAGNITUDES
DZY43          ZJ       ZY46    ZY44                  ERROR IF NOT 0
DZY44          RP     20119                           TST FOR
DZY45          TJ       GF00    ZY46                    ERROR
DZY46          TP       CN07    A                     WRT CT TO A
DZY47          MS               ZY32                  TAPE COPY STOP
DZY48                           167     B             119 0
DZY49                  167              B             119 15
DZY50          2       606     20001   B             WRT FWD CODE
DZY51                  FF00    40000   BRB           PARAMETERS
DZY52                  170              B              FOR COLD
DZY53                                   B              START
DZY54                                   B              CHECKSUM
```

TAPE DUPE DIRECTORY

	D	DCP	42170	44172
	D	DDP	42200	44230
QES	D	DTP	42256	
QES	D	DRD	42286	
QES	D	DEF	42301	
QES	D	DWR	42313	
QES	D	DER	42325	
QES	D	CP	1	00001
QES	D	DP	31	00037
QES	D	TP	87	00127
QES	D	RD	117	00165
QES	D	EF	132	00204
QES	D	WR	144	00220
QES	D	ER	156	00234
QES	D	TM	179	00263
QES	D	5B	3736	07230
QES	D	2B	3856	07420
QES	D	NB	3976	07610

QES
QES
QES
QES

TAPE COMPARISON AND DUPLICATION

DCP	TU	CP29	TP13		SET EXITS
DCP 1	TV	CP29	DP36		FROM DP RTN
DCP 2	RS	DP03	DP50		SET SHIFT
DCP 3	MJ	10000	TP00		TST TAPE MODE
DCP 4	QT	CP28	A		OBTAIN PROG P
DCP 5	LT	21	TM12		OF 2
DCP 6	RJ	DP21	DP01		MOVE N
DCP 7	TP	TM12	TM11		SET UP
DCP 8	TP	ER21	TM02		AND
DCP 9	TP	DP51	TM00		MOVE
DCP10	TP	DP52	TM01		TAPE 2
DCP11	RJ	DP21	DP20		P-1 PROGS
DCP12	TP	ER14	TM02		SET ERROR WORD
DCP13	TV	EF01	RD03		SET BUFFER
DCP14	TP	TM05	TM00		SET WORDS FOR
DCP15	TP	TM06	TM01		TAPE N READ
DCP16	RJ	RD05	RD00		READ BLOCK
DCP17	TP	ER22	TM02		SET ERROR WORD
DCP18	TV	EF03	RD03		SET BUFFER
DCP19	TP	DP51	TM00		SET WORDS FOR
DCP20	TP	DP52	TM01		TAPE 2 READ
DCP21	RJ	RD05	RD00		READ BLOCK
DCP22	TV	WR03	EF10		SET EXIT NO CMP
DCP23	TP	ER17	TM02		SET ERROR WD
DCP24	RJ	EF09	EF00		COMPARE
DCP25	TV	CP28	EF10		SET EXIT NC EF
DCP26	RJ	EF09	EF02		TST END FILE
DCP27	MJ		DP35		END ROUTINE
DCP28		77777	CP12	BBR	U MASKω DUMMY
DCP29		CP04	CP04	BRR	EXIT DUMMY

DDP	MJ	10000	TP00		TST TAPE MODE
DDP 1	TP	Q	TM10		CONTROL WORD
DDP 2	QT	DP49	TM11		PROGRAM NO
DDP 3	55	TM10	32041	BRB	POSITION N
DDP 4	55	DP50	31014	BRB	SET TPE NO MASK
DDP 5	RP	30005	DP07		DUMMY WDS
DDP 6	TP	DP51	TM05		TO TMPS
DDP 7	RP	10005	DP09		SET TAPE N EXT
DDP 8	QS	A	TM05		FUNCTION WDS
DDP 9	EF		DP55		REWIND 2
DDP10	EF		TM09		AND N
DDP11	RA	ER12	WR09		TALLY RUN
DDP12	EF		WR10		POSITION TPE 2
DDP13	TV	EF01	RD03		SET BUFFER
DDP14	TP	ER13	TM02		SET ERROR WD

```
DDP15      TV    DP26    EF10          SET EXIT NO EF
DDP16      TP    TM05    TM00          SET TAPE
DDP17      TP    TM06    TM01           WORDS
DDP18      TV    ER08    RD05          SET EXIT READ
DDP19      RJ    EF09    DP20          SET EXIT EF
DDP20      RS    TM11    WR09          TEST PROGRAM
DDP21      ZJ    RD00    DP22           NUMBER
DDP22      TP    ER14    TM02          SET ERROR WD
DDP23      RJ    EF10    DP25          SET EXIT NO EF
DDP24      MJ            WR00          TO WRITE
DDP25      TV    DP26    WR05          SET EXIT WRITE
DDP26      RJ    EF09    RD00          SET EXIT EF
DDP27      TP    TM10    A             IF NEGATIVE
DDP28      SJ    DP29    DP31           SUPPRESS WR EF
DDP29      EF            TM06           BACKSPACE
DDP30      MJ            DP32          TO RDBACK
DDP31      RJ    WR05    WR00          WRIT END OF FL
DDP32      TV    WR03    EF10          SET EXIT NO CMP
DDP33      RJ    EF09    DP34          SET EXIT CMP
DDP34      IJ    WR11    DP37          TST BLOCK TALLY
DDP35      MJ    10000   TP07          TST TAPE MODE
DDP36      MS            DP01          STOPωNEW CW
DDP37      TP    ER15    TM02          SET ERROR WD
DDP38      TP    TM07    TM00          SET WDS FOR
DDP39      TP    TM08    TM01           TAPE N RDBK
DDP40      TV    EF01    RD03          SET BUFFER
DDP41      RJ    RD05    RD00          READ BLOCK
DDP42      TP    ER16    TM02          SET ERROR WD
DDP43      TP    DP53    TM00          SET WDS FOR
DDP44      TP    DP54    TM01           TAPE 2 RDBK
DDP45      TV    EF03    RD03          SET BUFFER
DDP46      RJ    RD05    RD00          READ BLOCK
DDP47      TP    ER17    TM02          SET ERROR WD
DDP48      MJ            EF00          TO COMPARE
DDP49                    77777  B      V MASK
DDP50                       17  B      TPE NO MASK 15
DDP51       2     646    20001  B      RD FWD 2
DDP52       2     654    20001  B      MV BK  2
DDP53       2     656    20001  B      RD BK  2
DDP54       2     644    20001  B      MV FWD 2
DDP55       2     200    20001  B      REWIND 2


DTP        EF            TP25          REWIND 5
DTP 1      TP    ER18    TM02          ERROR WD
DTP 2      TV    TP29    RD03          SET BUFFER
DTP 3      TP    TP23    TM00          SET TAPE
DTP 4      TP    TP24    TM01          WORDS
DTP 5      RJ    RD05    RD00          READ BLOCK
DTP 6      EF            TP25          REWIND 5
DTP 7      IJ    TP26    TP10          INDEX ON 60
DTP 8      TP    ER19    TM02          END WD
DTP 9      MJ            ER00          TYPE FINIS
```

```
DTP10          RJ      TP22      TP14                CONVERT TWO XS3
DTP11          RJ      TP22      TP14                 WDS TO ONE BWD
DTP12          55      TM10     32000   BRB          CONTROL WD TOQ
DTP13          ZJ      DP02      TP08                END IF ZERO
DTP14          TP      ER11      TM03                XS3
DTP15          TP      5B00      Q                    CON
DTP16          LQ      Q            6                VER
DTP17          SP      TM10         3                 SION
DTP18          QA      TP27      A                     RO
DTP19          ST      RD13       TM10                  UT
DTP20          IJ      TM03       TP16                   I
DTP21          RA      TP15       TP28                    N
DTP22          MJ                                          E
DTP23           2       646      50001   B           RD FWD 5
DTP24           2       654      50001   B           MV BK  5
DTP25           2       200      50001   B           REWIND 5
DTP26                              74     B           60 0  INDEX
DTP27                              77     B           MASK
DTP28                   1                 B           U ADV
DTP29                             5B00    BBR         DUMMY


DRD            TP      RD13      TM03                SET BIAS INDEX
DRD 1          EF                TM00                READ BLOCK
DRD 2          RP     10120      RD04                 INTO
DRD 3          ER     10000                           BUFFER
DRD 4          ER                A                   IOA TO A
DRD 5          ZJ      RD06                          TST FOR ERROR
DRD 6          IJ      TM03      RD08                TST BIAS
DRD 7          MJ                ER00                ERROR EXIT
DRD 8          SP      A           12                SET UP
DRD 9          AT      RD14      TM04                 AND
DRD10          EF                TM04                 CHANGE BIAS
DRD11          EF                TM01                BACKSPACE
DRD12          MJ                RD01                REREAD
DRD13                                3  B             3 0
DRD14           2          1     50001   B           NORM BIAS CONST


DEF            RP     30120      EF06                COMPARE
DEF 1          RS      2B00      NB00                 ENTRY
DEF 2          RP     30120      EF04                ENDFILE
DEF 3          TP      NB00      2B00                 ENTRY
DEF 4          RP     20120      EF06                SUBTRACT
DEF 5          RS      2B00      EF11                 TEST CONSTANT
DEF 6          RP     30120      EF08                OBTAIN
DEF 7          TM      2B00      2B00                 MAGNITUDES
DEF 8          RS      A         A                   ZERO ACCUMULTR
DEF 9          RP     20120                          ENDFL OR CMPRE
DEF10          TJ      2B00                          NO EF OR NO CMP
```

DEF11	60	60606	6060	B	TST CONST
DWR	RA	WR11	WR09		BLOCK TALLY M
DWR 1	RA	WR10	WR09		BLK TALLY TP 2
DWR 2	TP	ER20	TM02		SET ERROR WD
DWR 3	EJ	WR07	ER00		TST NO BLKS 2
DWR 4	EF		WR08		WRITE ONE
DWR 5	RP	10120			BLOCK ON TP 2
DWR 6	EW	10000	NB00		AND EXIT
DWR 7	2	644	22735	B	2 BLK LIMIT
DWR 8	2	626	20001	B	WRITE CODE
DWR 9			1	B	1 0
DWR10	2	644	20000	B	TOTAL BLKS ON 2
DWR11				B	BLKS IN PROG M
DER	PR		ER09		CARRIAGE RETURN
DER 1	PR		ER10		SHIFT DOWN
DER 2	TP	ER11	TM03		SET INDEX
DER 3	LQ	TM02	6		POSITION
DER 4	PR		Q		AND PRINT
DER 5	IJ	TM03	ER03		TST END PRINT
DER 6	PR		ER09		CAR RET
DER 7	TP	ER12	Q		TALLY TO Q
DER 8	FS		EF02		STOP
DER 9			45	B	CAR RET
DER10			57	B	SHIFT DOWN
DER11			5	B	5 0
DER12				B	RUN TALLY
DER13	6	4070	31720	B	N MOVE
DER14	7	4122	3022	B	M READ
DER15	6	4122	22336	B	N RDBK
DER16	74	4122	22336	B	2 RDBK
DER17	16	7153	1220	B	CMPARE
DER18	62	4122	3022	B	5 READ
DER19	26	14061	42404	B	FINIS
DER20	3	56261	10331	B	O-FLOW
DER21	74	4070	31720	B	2 MOVE
DER22	74	4122	3022	B	2 READ

MISHAP DIRECTORY

	D	C	64	100 OCTAL
	D	HK	192	300
QES	D	FBF	256	400
QES	D	RCC	320	500
QES	D	FLD	384	600
QES	D	B	448	700
QES	D	QR	576	1100
QES	D	DR	512	1000
QES	D	Q	640	1200
QES	D	FP	704	1300
QES	D	R	768	1400
QES	D	K	832	1500
QES	D	DC	896	1600
QES	D	CC	1024	2000
QES	D	FTR	1088	2100
QES	D	WPT	1216	2300
QES	D	PTS	1280	2400
QES	D	BPS	1344	2500
QES	D	WBT	1408	2600
QES	D	ERR	1472	2700
QES	D	ST	1536	3000
QES	D	REG	1600	3100
QES	D	V	1664	3200
QES	D	T	1728	3300
QES	D	W	1792	3400
QES	D	X	1856	3500
QES	D	CIM	1920	3600
QES	D	BT	1984	3700
QES	D	TIB	2112	4100
QES	D	PT	2240	4300
QES	D	RD	2368	4500
QES	D	AD	2496	4700

QES
QES
QES
QES
MISHAP


```
         B        TP    C07     T01      SET TALLY
         B 1      TP  A         T00      STORE FIELD
         B 2      TV    C50     B06      SET STORE
         B 3      TV    C50     B12      SET MINUS STORE
         B 4      LQ    T00       6      FIRST CHARACTER
         B 5      QT    C04   A          MASK
         B 6      ST    C03     T02      STORE
         B 7      SJ    B12     B08      TEST FOR MINUS
         B 8      RA    B06     C01      BUMP STORE
         B 9      RA    B12     C01      BUMP  STORE
         B10      IJ    T01     B04      TEST FOR LAST
         B11      MJ                     EXIT
         B12      TP    C00     T02      ZERO IF MINUS
         B13      MJ            B08


         K                  10100   R08  BBR   REG CONSTANT
         K 1                21400  DC00  BBR   DECIMAL NUMBER
         K 2                30300   R08  BBR   REG CONSTANT
         K 3              2 46635   R08  BBR   AT
         K 4              2 62627   R08  BBR   CC
         K 5              2 77073   R08  BBR   DV
         K 6              3  3117   R08  BBR   EF
         K 7              3  4443   R08  BBR   EJ
         K 8              3  5476   R22  BBR   ER
         K 9              3  7177   R22  BBR   EW
         K10              3 16557   R08  BBR   FS
         K11              3 44441   R08  BBR   IJ
         K12              3 45214   R08  BBR   IP
         K13              4 62454   R15  BBR   LA
         K14              4 65355   R15  BBR   LQ
         K15              4 66622   R22  BBR   LT
         K16              4 72472   R08  BBR   MA
         K17              4 74445   R22  BBR   MJ
         K18              4 75271   R08  BBR   MP
         K19              4 76556   R22  BBR   MS
         K20              5 25461   R08  BBR   PR
         K21              5 26763   R22  BBR   PU
         K22              5 32452   R08  BBR   QA
         K23              5 34444   R08  BBR   QJ
         K24              5 36553   R08  BBR   QS
         K25              5 36651   R08  BBR   QT
         K26              5 42421   R08  BBR   RA
         K27              5 44437   R08  BBR   RJ
         K28              5 45275   R22  BBR   RP
         K29              5 46523   R08  BBR   RS
         K30              6 31400  DC00  BBR   DECIMAL NUMBER
         K31              6 52432   R15  BBR   SA
         K32              6 53174   R08  BBR   SF
```

K33	6	54446	R08	BBR	SJ
K34	6	55033	R15	BBR	SN
K35	6	55231	R15	BBR	SP
K36	6	56534	R15	BBR	SS
K37	6	56636	R08	BBR	ST
K38	6	64442	R08	BBR	TJ
K39	6	64712	R08	BBR	TM
K40	6	65013	R08	BBR	TN
K41	6	65211	R08	BBR	TP
K42	6	66715	R08	BBR	TU
K43	6	67016	R08	BBR	TV
K44	7	44447	R08	BBR	ZJ
C				B	ZERO
C 1			1	B	
C 2			2	B	
C 3			3	B	
C 4			77	B	
C 5		77777	70000	B	
C 6		1		B	
C 7			5	B	
C 8		TIB00	TIB00	BRR	
C 9		11		B	9 DEC
C10		1010	10101	B	BLANKS
C11		65662	45466	B	START
C12		1475	15430	B	MORE
C13		27010	10101	B	D
C14				B	NOT USED
C15	37			B	FAST FEED
C16				B	NOT USED
C17				B	NOT USED
C18	4			B	
C19		3030	30303	B	
C20		X00	W11	BRR	
C21		4		B	
C22			7777	B	
C23	4		5	B	EF CD RD
C24	60	60606	6060	B	STOP
C25	MJ		QR01		
C26				B	NOT USED
C27	1	30545	45154	B	ERROR
C28	MJ		ST03		
C29	2	14	50001	B	BACK 1 BLK TP 5
C30			14	B	
C31			20	B	
C32			40	B	
C33			4	B	
C34			100	B	64 DEC
C35		CIM00	CIM24	BRR	
C36		CIM12	CIM36	BRR	

```
C37                        W01   BBR
C38                         63   B       PLUS
C39        2          1  50000   B       NORMAL BIAS
C40                   10  10101   B       XS3 BLANKS
C41                   30  30303   B       XS3 ZEROS
C42                               B       NOT USED
C43                        113   B       75 DEC
C44        2        200  20000   B       REWIND TAPE 2
C45        2        200  30000   B       REWIND TAPE 3
C46                               B       NOT USED
C47                               B       NOT USED
C48                               B       NOT USED
C49        2        200  50000   B       REWIND TAPE 5
C50                        T02   BBR
C51       45      47302  42420   B         ASSE
C52        7      23112  50403   B         MBLY 0
C53       36       4040  40404   B         K
C54       45      47013   1520   B         TAPE
C55        4      57740  44726   B          2 F
C56       30      14112  40404   B       AILS
C57       45      47302  42420   B         ASSE
C58        7      23112  50431   B        MBLY W
C59       54      20121  20312   B         ERROR
C60       45      47010  30304   B          TOO
C61        7      30062  50412   B        MANY R
C62       20      13140  30624   B        EGIONS
C63       TP        K00    T00
C64                    2  50101   B       B
C65                    2  55454   B       BRR
C66                    2  55425   B       BRB
C67                    2  52554   B       BBR
C68                20054         B
C69                20121         B
C70       TV        AD00    T00
C71                        1750   B       1000 DEC
C72                         144   B       100 DEC
C73                               B       NOT USED
C74        2        14     20001   B       BACK 1 BLK TP 2
C75                               B       NOT USED
C76        2         1     70000   B       HIGH BIAS
C77        2         1     60000   B       LOW BIAS
C78                 C80     BT01   BRR
C79                          12   B      10 DEC
C80       45      47013   1520   B           TAPE
C81        4      57620  44726   B            5 F
C82       30      14112  40404   B         AILS
C83                         33   B       27 DEC
C84                         22   B       18 DEC
C85                 C54     ST01   BRR
C86                 C57     FBF01  BRR
C87                 C60     FBF00  BRR
C88        2        606   50000   B       EF WRT BIN TP 5
C89        2        602   20000   B       EF RD INPUT TP2
C90        .                  6   B
```

```
C91                          24  B          20 DEC
C92          2      646     30000  B       EF WRT PTR TP 3
C93                 AC36     PT00  BRR
C94          2      602     50000  B       EF RD BIN TP 5


V                            22  B          IN TAPE TALLY
V 1                              B          BIN TP JALLY
V 2                              B          MEMORY SUM
V 3                           1  B          ERROR TALLY
V 4                           2  B          TW PRINT TALLY
V 5                              B          PTR TAPE TALLY
V 6                              B          NEW INSTR TALLY
V 7                              B          M TABLE TALLY
V 8                              B          REPL TALLY
V 9                              B          RELOC TALLY
V10                              B          I FLAG


Q            SP      W02          6          LOAD OP
Q 1          RJ      Q11        Q05          OCTAL ADDR
Q 2          LQ      C04                     LOAD MASK
Q 3          QT    A              X01
Q 4          MJ                              EXIT
Q 5          TP      C33        T01          BREAK A AND
Q 6          RJ      B11        B01           CONV TO BIN
Q 7          SP      T02          3          ASSEMBLE
Q 8          RP    2   3        Q10           IN
Q 9          SA      T03          3            BINARY
Q10          AT      T06      A
Q11          MJ                              EXIT
Q12          TP    A              T08          STORE TEMP
Q13          LA    A               24
Q14          TP      C01        T01          BREAK A AND
Q15          RJ      B11        B01           CONV TO BIN
Q16          LQ      C05                     LOAD MASK
Q17          QT      T08        T09          MASK OUT REGION
Q18          RP    2  82      ERR10          LOOK UP
Q19          EJ     RD00        Q20           REGION
Q20          SN    Q              15          SET
Q21          AT      C69      A                UP
Q22          AT      C70        Q24              FETCH
Q23          TP      C00        T00          CLEAR T00
Q24          TV     AD00        T00          OCT ADR OF REG
Q25          SP      T00
Q26          SA      T03
Q27          MA      C79        T02          OCTAL
Q28          MJ                              EXIT
Q29          TP      C33        T01          BREAK A AND
Q30          RJ      B11        B01           CONV TO BIN
```

```
Q31     SP      T02     12      J
Q32     MA      T03     C71     CONVERT
Q33     MA      T04     C72      AND
Q34     MA      T05     C79       ASSEMBLE N
Q35     SA      T06             JωN
Q36     MJ                      EXIT
Q37     TP      C33     T01     BREAK A AND
Q38     RJ      B11     B01      CONV TO BIN
Q39     SP      T02       3     CONVERT AND
Q40     SA      T03       9      ASSEMBLE K
Q41     MA      T04     C72     CONVERT AND
Q42     MA      T05     C79      ASSEMBLE N
Q43     SA      T06             KωN
Q44     MJ                      EXIT


R       RJ      Q04     Q00     OCTAL OP
R 1     SP      W03       6     LOAD U
R 2     RJ      Q11     Q05     OCTAL ADDR
R 3     TP  A           X02     STORE U
R 4     SP      W04       6     LOAD V
R 5     RJ      Q11     Q05     OCTAL ADDR
R 6     TP  A           X03     STORE V
R 7     MJ              QR31    EXIT
R 8     SP      W03             LOAD U
R 9     RJ      Q28     Q12     REGIONAL ADDR
R10     TP  A           X02     STORE U
R11     SP      W04             LOAD V
R12     RJ      Q28     Q12     REGIONAL ADDR
R13     TP  A           X03     STORE V
R14     MJ              QR31    EXIT
R15     SP      W03             LOAD U
R16     RJ      Q28     Q12     REGIONAL ADDR
R17     TP  A           X02     STORE U
R18     SP      W04       6     LOAD V
R19     RJ      Q44     Q37     KKNNN
R20     TP  A           X03     STORE V
R21     MJ              QR31    EXIT
R22     SP      W03       6     LOAD U
R23     RJ      Q36     Q29     JNNNN
R24     TP  A           X02     STORE U
R25     SP      W04             LOAD V
R26     RJ      Q28     Q12     REGIONAL ADDR
R27     TP  A           X03     STORE V
R28     MJ              QR31    EXIT
R29     RJ      Q04     Q00     OCTAL OP
R30     MJ              R08     EXIT
R31     RJ      Q04     Q00     OCTAL OP
R32     SP      W03             LOAD U
R33     RJ      Q28     Q12     REGIONAL ADDR
R34     TP  A           X02     STORE U
R35     MJ              R04     EXIT
R36     RJ      Q04     Q00     OCTAL OP
```

```
R37       SP      W03       6          LOAD U
R38       RJ      Q11       Q05        OCTAL ADDR
R39       TP      A         X02        STORE U
R40       MJ                R11        EXIT


ST        EF                C44        REWIND INPUT TP
ST 1      SP      W03                  LOAD U
ST 2      RJ      QR10      QR00       CONVERT TO BIN
ST 3      RP      10003     ST05       SET
ST 4      TP      C00       W12         BLANKS
ST 5      RJ      PTS27     PTS01      SET UP PTR TAPE
ST 6      RJ      FBF49     FBF45      WRT PT IF FULL
ST 7      TP      C24       W00        SET STOP
ST 8      RJ      PTS27     PTS24      WET UP PTR TAPE
ST 9      RJ      WPT05     WPT00      WRITE PTR TAPE
ST10      RJ      WBT11     WBT00      WRITE BIN TAPE
ST11      SP      X00                  SET START ADDR
ST12      AT      C18       BT00       SET MINUS BIT
ST13      SP      V02                  MEMORY SUM
ST14      SA      BT00
ST15      TP      A         BT01       STORE MEM SUM
ST16      EF                C88        BIN TP WRITE
ST17      RP      10120     ST19       WRITE LAST BLCK
ST18      EW      1         BT00        BIN TAPE
ST19      EF                C88        BIN TP WRITE
ST20      RP      120       ST22       WRITE END OF
ST21      EW      1         C24         RECORD
ST22      EF                C49        REWIND BIN TAPE
ST23      MJ                ST32
ST24      EF                C94        BIN TP READ
ST25      RP      10120     ST27       READ BLOCK OF
ST26      ER      1         BT00        BIN TAPE
ST27      ER                A          LOAD IOA
ST28      EF                C39        NORMAL BIAS
ST29      ZJ      ST30      ST39       TEST PARITY BIT
ST30      EF                C29        BACK ONE BLOCK
ST31      MJ
ST32      RJ      ST31      ST24
ST33      RJ      ST31      ST24
ST34      EF                C76        HIGH BIAS
ST35      RJ      ST31      ST24
ST36      EF                C77        LOW BIAS
ST37      RJ      ST31      ST24
ST38      MJ                ERR43
ST39      TP      BT00      Q          TEST FOR MINUS
ST40      QJ      ST42      ST41
ST41      TP      C01       T02        SET INDEX
ST42      EF                C92        WRITE PTR TAPE
ST43      RP      10120     ST45       WRITE BIN PROGR
ST44      EW      1         BT00        ON PTR TAPE 3
```

```
ST45        IJ      T02     ST32
ST46        EF              C45             REWIND PTR TP 3
ST47        EF              C49             REWIND BIN TP 5
ST48        TP      C07     T00
ST49        LQ      C51     6               LOAD TW WORD
ST50        PR              Q               TYPE
ST51        IJ      T00     ST49
ST52        RA      ST49    C06             BUMP LOAD
ST53        IJ      V04     ST48
ST54        FS                              US IS THROON


CC          LA      T09     72
CC 1        31    46314   63146   B         10 TO -1 POWER
CC 2         2    43656    5075   B               2
CC 3              20304   46723   B               3
CC 4               1506   67057   B               4
CC 5                123   70553   B               5
CC 6                 10   30676   B               6
CC 7                      65540   B               7
CC 8                       5275   B               8
CC 9                        423   B               9
CC10                         33   B              10
CC11                          3   B              11
CC12         4                    B         5J4 0 POWER
CC13         5                    B              1
CC14         6     2              B              2
CC15         7    64              B              3
CC16        11    61              B              4
CC17        14   152              B              5
CC18        17  2044              B              6
CC19        23   455              B              7
CC20        27 65702              B              8
CC21        35 63262     4        B              9
CC22         2                    B             00
CC23        22 50057     44       B             10
CC24        25 53616   57055      B             20
CC25        31 17454   47075      B             30
CC26                     102      B         SCALE OF 5J4 00
CC27                      77      B                     10
CC28                      74      B                     20
CC29                      71      B                     30
CC30                      36      B         30 DEC
CC31                     162      B         114 DEC
CC32        MP      CC22    CC12
CC33        SP      CC26
CC34                      31      B         F
CC35                     243      B         163 DEC
CC36                     105      B          69DEC


DC          TP      C33     T01             SET TALLY
```

```
DC 1    SP    W04     6       LOAD V
DC 2    RJ    B11     B01     SPLIT-CONVERT
DC 3    RP  30005     DC06
DC 4    TP    T02     T08     MOVE
DC 5    SP    W02     24      LOAD OP
DC 6    SP    A
DC 7    LT      6     T14     STORE SIGN OF N
DC 8    SA    W03             LOAD U
DC 9    RJ    B11     B00     SPLIT-CONVERT
DC10    MP    T02     CC01    CONVERT
DC11    RP  30010     DC13      MANTISSA
DC12    MA    T03     CC02        TO BINARY
DC13    LA    A       25      SHIFT LEFT
DC14    ZJ   DC15     DC35    TEST FOR ZERO
DC15    SF    A       T08     NORMALIZE
DC16    TP    A       T09     STORE MANTISSA
DC17    SP    W05     18
DC18    SP    A
DC19    LT      6     T10     STORE SIGN OF D
DC20    TP    C01     T01     SET TALLY
DC21    RJ    B11     B01     SPLIT-CONVERT
DC22    MP    C03     T03     3 D2
DC23    MA   CC30     T02     3D2 +30D1 EQ 3D
DC24    TP    A       T11     STORE 3D
DC25    ZJ   DC27     DC26    TEST FOR ZERO D
DC26    TP    C00     T10     SET SIGN PLUS
DC27    SP    T10
DC28    EJ    C02     DC32    TEST FOR MINUS
DC29    SP   CC31
DC30    SS    T11
DC31    SJ  ERR12     DC37    D TOO LARGE
DC32    TN    T11     T11     SET D MINUS
DC33    SN    T11
DC34    TJ   CC31     DC37    D TOO SMALL
DC35    TP    C00     T09     SET MANT ZERO
DC36    MJ            DC85
DC37    SP    T02     15      D1
DC38    SA    T03             ADD D2
DC39    AT   CC32     DC40    SET UP MULT
DC40    MP   CC22     CC12    5J4 TO POWER D
DC41    SF    A       T13     NORMALIZE
DC42    TP    A       T12     STORE
DC43    SP    T02     15      SET UP SCALE
DC44    AT   CC33     DC45      FACTOR OF 5J4
DC45    SP   CC26             LOAD SCALE
DC46    ST    T13     T13     SF OF 5J4 TO D
DC47    SP    C02             TEST FOR
DC48    SS    T10               D MINUS
DC49    ZJ   DC54     DC50    TAKE RECIP IF -
DC50    SP    C18      34     LOAD ONE
DC51    DV    T12     T12     RECIPROCAL
DC52    SP   CC36             69
```

```
DC53    ST     T13     T13      SF OF 5J4 TO D
DC54    MP     T09     T12      MANT X 5J4 TO D
DC55    SF   A         T15
DC56    TP   A         T09      STORE
DC57    SP     W06      18      LOAD B
DC58    SP   A
DC59    LT       6     T16      STORE SIGN OF B
DC60    TP     C01     T01      SET TALLY
DC61    RJ     B11     B01      SPLIT-CONVERT
DC62    MP     T02     C79      10 TIMES
DC63    MJ             DC64      B1
DC64    AT     T03     T17      B IN BINARY
DC65    SP     C02              TEST FOR
DC66    SS     T16               B MINUS
DC67    ZJ    DC69     DC68     CHANGE SIGN IF
DC68    TN     T17     T17       MINUS
DC69    RS     T13     T08      SF OF 5J4 - Q1
DC70    RS     T13     T15      MINUS Q3
DC71    RA     T13     C04      PLUS 63 EQUAL J
DC72    RS     T11     T13      3D - J
DC73    SP    CC34              LOAD F
DC74    EJ     T16     DC92     TEST FOR FLOAT
DC75    TP     T11   A          3D - J + B
DC76    AT     T17   A
DC77    SJ    DC79     DC78     TEST WRONG SHFT
DC78    ZJ   ERR12     DC81
DC79    AT    CC00     DC80     SET UP SHFIT
DC80    LA     T09      72
DC81    SP     C02              TEST FOR
DC82    SS     T14              N MINUS
DC83    ZJ    DC85     DC84     CHANGE SIGN
DC84    TN     T09     T09       IF MINUS
DC85    SP     T09       6
DC86    LT               X01    SPLIT INTO OP
DC87    SP   A           15
DC88    LT               X02                U
DC89    SP   A           15
DC90    LT               X03                V
DC91    MJ               QR31   EXIT
DC92    LA     T09       28     FLOATING POINT
DC93    LT             Q        MANTISSA
DC94    SP     T11
DC95    SA    CC35       27     CHARACTERISTIC
DC96    AT   Q           T09    PACK AND STORE
DC97    MJ               DC81



DR      IJ     C43     DR02     TEST TOO MANY D
DR 1    MJ             ERR00    TO ERROR
DR 2    MJ             DR03     EF IF CDS
DR 3    55     W02     31006  BRB  LOAD OP
DR 4    QT     C05     RD07     STORE REGION
DR 5    SP     W04       6      LOAD V
```

```
DR 6      RJ     Q11      Q05      CONV TO BINARY
DR 7      TP   A          X03      STORE V
DR 8      SP     W03        6      LOAD U
DR 9      RJ     Q11      Q05      CONV TO BIN
DR10      TP   A          X02      STORE U
DR11      LA   A           15      SHIFT
DR12      AT     X03      T00      U AND V
DR13      LQ     C04               LOAD MASK
DR14      QT     W02      X01      SIGN OF U
DR15      SS     C02               TEST MINUS
DR16      ZJ    DR19     DR17      U PLUS
DR17      SP     C18               SET MINUS FLAG
DR18      AT     T00      T00      ADD U AND V
DR19      TP     T00      AD07     STORE U AND V
DR20      RA    DR04      C01      BUMP STORE
DR21      RA    DR19      C01       COMMANDS
DR22      RJ   PTS27     PTS23      PACK PTR TAPE
DR23      MJ               FBF45   EXIT


HK        EF               C45      REWIND PTR TP 3
HK 1      EF               C49      REWIND BIN TP 5
HK 2      TP     C25                SET MJ IN F1
HK 3      EF               C39      SET BIAS NORMAL
HK 4      RP   30007      HK06      SET
HK 5      TP   REG00      RD00       UP
HK 6      RP   30007      HK08         PERM
HK 7      TP   REG07      AD00           REGIONS
HK 8      QT     C01      A         TEST FOR CARDS
HK 9      ZJ    HK19      HK10
HK10      EF               C23      CARD READ
HK11      TV     C86      FBF49     SET CARD EXIT
HK12      TV     C87      FBF50     SET CD FILL EXT
HK13      TP   FBF00      FBF37     SET
HK14      TP   FBF00      ERR24      CARD
HK15      TP   FBF00       DR02        SWITCHES
HK16      TV     C85      FBF16     SET START ENTRY
HK17      RJ   RCC50      RCC10     READ CARD
HK18      MJ               FBF00    CARD EXIT
HK19      TP     ST00     ERR01     SET TAPE SWITCH
HK20      MJ               FBF03     TAPE EXIT


QR        RJ     Q28        Q12
QR 1      TP   A            T01      STORE
QR 2      TU     Q24       QR03
QR 3      TP               A        ABS ADR AND TAG
QR 4      TP     C00        T00      CLEAR T00
QR 5      TU   A            T00      TAG TO T00
QR 6      SJ    QR07       QR08      TEST NEG TAG
```

```
QR 7        TN      T00     T00             NEG TAG
QR 8        LA      T00      57
QR 9        AT      T01     X00             ADD TAG
QR10        MJ             FBF28            EXIT
QR11        SP      W05                      LOAD D
QR12        EJ      C64     R00              TEST B WORD
QR13        EJ      C65     R29              TEST BRR WORD
QR14        EJ      C66     R31              TEST BRB WORD
QR15        EJ      C67     R36              TEST BBR WORD
QR16        SP      C40
QR17        TJ      W02     FP00             TEST FP
QR18        LQ      C22                      LOAD MASK
QR19        QT      W02     A                MASK OUT OP
QR20        LA    A          21              SHIFT
QR21        RP    2  45     ERR12            TABLE LOOK UP
QR22        TJ      K00     QR23              OF OP
QR23        SN    Q          15              SET
QR24        AT      C68     A                   UP
QR25        AT      C63     QR26                   FETCH
QR26        TP      K00      T00             FETCH ML OP
QR27        TV      T00     QR30             SET UP JUMP
QR28        LQ      T00      21
QR29        QT      C04      X01             STORE OCTAL OP
QR30        MJ                               TO R REGION
QR31        MJ                               EXIT


FP          LQ      W02                      LOAD OP
FP 1        QT      C22     A                MASK OUT OCT OP
FP 2        RP    2   8      FP13            TEST FOR TRI
FP 3        EJ     FP24     FP04              OR NI
FP 4        SP      W03       18             N
FP 5        TP      C02       T01            BREAK A CONV TO
FP 6        RJ      B11       B00             BINARY
FP 7        MP      T02       C79
FP 8        SA      T03         3
FP 9        TJ      C34      FP11            TEST N TOO BIG
FP10        MJ              ERR12
FP11        AT      T04       X02            STORE NI
FP12        MJ              FP16
FP13        SP      W03         6
FP14        RJ      Q11       Q05            CONV OCTAL ADDR
FP15        TP    A           X02            STORE TRI
FP16        SP      W04                      TRANSLATE V
FP17        RJ      Q28       Q12
FP18        TP    A           X03
FP19        RJ      Q04       Q00
FP20        LA      X01         9
FP21        AT      X02       X02
FP22        TP      C30       X01
FP23        MJ              QR31             EXIT
FP24                        1103   B         READ FD CARDS
FP25                        1104   B         READ OCT CARDS
```

```
FP26                        1203  B     PUNCH RD CARDS
FP27                        1204  B     PUNCH OCT CDS
FP28                         505  B     UNFLOAT
FP29                         506  B     FLOAT
FP30                        1210  B     PRINT F D
FP31                        1211  B     WRITE END OF F


BPS         SP      X01      15         PACK
BPS 1       SA      X02      15           OCTAL
BPS 2       SA      X03                     WORD
BPS 3       TP      A        BT01       STORE
BPS 4       RA      BPS03    C01        BUMP STORE
BPS 5       RA      V01      C01
BPS 6       MJ                          EXIT


ERR         TU      C87      ST49       ENTER 1 SET TW
ERR 1       MJ              ERR02       IF TAPE REWIND
ERR 2       EF               C92        EF WRT PTR TP
ERR 3       TP      C24      W00        SET PTR STOP
ERR 4       RJ      PTS27    PTS23      SET UP PTR WRT
ERR 5       RJ      WPT05    WPT00      WRITE PTR TAPE
ERR 6       MJ              ERR07
ERR 7       MJ               ST46       EXIT 1 AND 2
ERR 8       TU      C85      ST49       ENTER 2 SET TW
ERR 9       MJ              ERR01       EXIT 2
ERR10       SP      Q28                 ENTER 3
ERR11       EJ      C25      ERR22      TEST LOC
ERR12       RP    1   3      ERR14      ENTER 3A  SET
ERR13       TP      C00       X01       ZERO IN BIN BLK
ERR14       SP      V01                 LOAD BIN TALLY
ERR15       ZJ    ERR18      ERR16      TEST FIRST WORD
ERR16       TP      X00       BT00      STORE LOC
ERR17       RA      V01       C01       BUMP TALLY
ERR18       RJ    BPS06      BPS00      PACK AND STORE
ERR19       RJ    ERR42      ERR30      SET UP ERROR
ERR20       RJ    PTS27      PTS21      SET UP PTR TP
ERR21       MJ               FBF45      EXIT 3
ERR22       SP     QR10                 TEST FOR START
ERR23       EJ      C28      ERR26      JUMP IF START
ERR24       MJ              ERR25       EF IF CARDS
ERR25       MJ              ERR19       EXIT 3L
ERR26       TP      C00       X00       ZERO START LOC
ERR27       RJ    ERR42      ERR30      SET UP ERROR
ERR28       RJ    PTS27      PTS21      SET UP PTR TP
ERR29       MJ               ST06       EXIT 3S
ERR30       TU      C86      ST49       SET TW OUTPUT
ERR31       TP      C27       W11       STORE ERROR
ERR32       TP      C00       W13       SET
```

```
ERR33     TP     C00     W14      BLANKS
ERR34     SP     V03      33     LOAD ERR TALLY
ERR35     LT             T00     CONVERT
ERR36     SP  A           3       TO
ERR37     LT             T01       XS3
ERR38     SP     T00      6         AND
ERR39     SA     T01                STORE
ERR40     AT     C19     W12           ERROR NO
ERR41     RA     V03     C01     BUMP ERR TALLY
ERR42     MJ                     EXIT
ERR43     TU     C78    ST49     ENTR 4
ERR44     MJ            ST46     EXIT 4


FBF       EF             C23     CARD READ
FBF 1     RJ   RCC50    RCC10     READ CARD
FBF 2     MJ            FBF13
FBF 3     SP     V00              TEST
FBF 4     SS     C84               FOR
FBF 5     ZJ   FBF09    FBF06       TAPE READ
FBF 6     RJ   FTR77    FTR82     READ TAPE
FBF 7     TP     C00      V00     RESET TALLY
FBF 8     TU     C08    FBF10     SET UP MOVE
FBF 9     RP   30009    FBF11     MOVE
FBF10     TP   TIB00      W01      WORD
FBF11     RA     V00      C01     BUMP TALLY
FBF12     RA   FBF10      C09     BUMP TIB BY 9
FBF13     SP     W01              LOAD LOC
FBF14     EJ     C12    FBF51     TEST MORE
FBF15     EJ     C13     DR00     TEST D
FBF16     EJ     C11     ST00     TEST START
FBF17     EJ     C10    FBF20     TEST BLANKS
FBF18     EJ     C19    FBF20     TEST ZEROS
FBF19     MJ            FBF27
FBF20     SP     W03              TEST
FBF21     SS     W04               FOR
FBF22     ZJ   ERR24    FBF23        FILL
FBF23     SP     W02
FBF24     EJ     C40    FBF50
FBF25     EJ     C41    FBF50
FBF26     MJ            ERR24
FBF27     RJ    QR10     QR00     CONVERT LOC
FBF28     SP     T03
FBF29     MA     C79      T02     SEQ IN BINARY
FBF30     AT     T09      T00     LOC
FBF31     SS     X04               PREV LOC
FBF32     TP     T00      X04     STORE PREV LOC
FBF33     EJ     C01    FBF37     TEST SEQ
FBF34     RJ   FBF34    FBF36     ONE SHOT SWITCH
FBF35     RJ   WBT11    WBT00     WRITE BIN TP
FBF36     TP     C15      W00     SET FAST FEED
FBF37     MJ            FBF38     EF IF CARDS
FBF38     RJ    QR31     QR11     TO TRANSLATION
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```
FBF39     SP     V01
FBF40     ZJ   FBF43    FBF41      TEST FIRST WORD
FBF41     TP     X00     BT00      STORE LOC
FBF42     RA     V01      C01      BUMP TALLY
FBF43     RJ   BPS06    BPS00      PACK STORE BIN
FBF44     RJ   PTS27    PTS00      PACK STORE PTR
FBF45     SP     V05               TEST FOR WRITE
FBF46     TJ     C90    FBF48       PTR TAPE
FBF47     RJ   WPT05    WPT00      WRITE PTR TAPE
FBF48     TP     C00      W00      NO FAST FEED
FBF49     MJ            FBF03      EXIT
FBF50     MJ            FBF03      FILL EXIT
FBF51     EF              C44
FBF52     MS            FBF06


FLD       LQ     T00       35
FLD 1     TP     C00      T01
FLD 2     TP     C00      T02
FLD 3     LQ     T00       35
FLD 4     RP   3  12    FLD06
FLD 5     QT   CIM00      T03      TEST A COL FOR
FLD 6     TP     Q          A      BIT  T03-T14
FLD 7     RP   2  10    FLD09
FLD 8     EJ     T03    FLD11
FLD 9     TP     T00      T02
FLD10     MJ            FLD13
FLD11     QT     C04      T03      ROW INTO T03
FLD12     ZJ   FLD13    FLD23
FLD13     TP     T00        A
FLD14     RP   3   3     FLD16
FLD15     EJ     T12    FLD18
FLD16     EJ     T02    FLD30
FLD17     MJ            FLD23
FLD18     RA     T03      C31      CONVERT
FLD19     RA     T03      C31        TJ
FLD20     RA     T03      C31          ALPHABETIC
FLD21     EJ     C32    FLD32      X PUNCH ONLY
FLD22     EJ     C31    FLD34      Y PUNCH ONLY
FLD23     RA     T03      C03      ADD 3
FLD24     SP     T01        6
FLD25     AT     T03      T01
FLD26     IJ     T15    FLD02
FLD27     TP     T01      W01
FLD28     RA   FLD27      C01
FLD29     MJ                      EXIT
FLD30     TP     C01      T03      BLANK CODE
FLD31     MJ            FLD24
FLD32     TP     C02      T03      X ONLY
FLD33     MJ            FLD24
FLD34     TP     C38      T03      Y ONLY
```

FLD35	MJ		FLD24	
FTR	TP	C07	CIM27	PRESTORE
FTR 1	MJ		FTR02	INDICES
FTR 2	RP	1 20	FTR04	
FTR 3	ER	1	T00	
FTR 4	SP	T00	30	
FTR 5	LT		CIM00	STORE L
FTR 6	SP	A	6	
FTR 7	SA	T01	18	
FTR 8	LT		CIM01	STORE OP
FTR 9	SP	A	18	
FTR10	SA	T02	12	
FTR11	LT		CIM02	STORE U
FTR12	SP	A	24	
FTR13	SA	T03	6	
FTR14	LT		CIM03	STORE V
FTR15	SP	A	18	
FTR16	LT		CIM04	STORE D
FTR17	SP	A	12	
FTR18	SA	T04	6	
FTR19	LT		CIM05	STORE B
FTR20	SP	A	18	
FTR21	LT		CIM06	STORE C1
FTR22	SP	A	12	
FTR23	SA	T05	24	
FTR24	LT		CIM07	STORE C2
FTR25	SP	A	12	
FTR26	SA	T06	24	
FTR27	LT		CIM08	STORE C3
FTR28	SP	A	12	
FTR29	SA	T07	18	
FTR30	LT		CIM09	STORE L
FTR31	SP	A	18	
FTR32	SA	T08	6	
FTR33	LT		CIM10	STORE P
FTR34	SP	A	30	
FTR35	LT		CIM11	STORE U
FTR36	SP	T09	30	
FTR37	LT		CIM12	STORE V
FTR38	SP	A	6	
FTR39	SA	T10	12	
FTR40	LT		CIM13	STORE D
FTR41	SP	A	18	
FTR42	LT		CIM14	STORE B
FTR43	SP	A	6	
FTR44	SA	T11	12	
FTR45	LT		CIM15	STORE C1
FTR46	SP	A	24	
FTR47	SA	T12	12	
FTR48	LT		CIM16	STORE C2
FTR49	SP	A	24	

```
FTR50     SA      T13      12
FTR51     LT               CIM17     STORE C3
FTR52     SP   A           24
FTR53     SA      T14       6
FTR54     LT               CIM18     STORE L
FTR55     SP   A           24
FTR56     LT               CIM19     STORE P
FTR57     SP   A            6
FTR58     SA      T15      24
FTR59     LT               CIM20     STORE U
FTR60     SP   A           12
FTR61     SA      T16      18
FTR62     LT               CIM21     STORE V
FTR63     SP   A           18
FTR64     LT               CIM22     STORE D
FTR65     SP      T17      18
FTR66     LT               CIM23     STORE B
FTR67     SP   A           18
FTR68     LT               CIM24     STORE CU
FTR69     TP      T18      CIM25     STORE C2
FTR70     TP      T19      CIM26     STORE C3
FTR71     RP   3  27       FTR73     MOVE BLOCK
FTR72     TP   CIM00       TIB00
FTR73     RA   FTR72         C83
FTR74     IJ   CIM27       FTR02
FTR75     ER               A         CHECK IOA
FTR76     EF                 C39     NORMAL BIAS
FTR77     ZJ   FTR78                  EXIT
FTR78     EF                 C74     BACK 1 BLOCK
FTR79     TV     C08       FTR72
FTR80     EF                 C89     READ TAPE 2
FTR81     MJ
FTR82     RJ   FTR81       FTR79     ENTER
FTR83     RJ   FTR81       FTR00
FTR84     RJ   FTR81       FTR00
FTR85     EF                 C77     LOW BIAS
FTR86     RJ   FTR81       FTR00
FTR87     EF                 C76     HIGH BIAS
FTR88     RJ   FTR81       FTR00
FTR89     MJ               ERR08     JUMP TO ERROR


WBT       EF                 C88     WRITE TAPE
WBT 1     SP      V01       15
WBT 2     TU   A           BT00      PUT N IN WORD 1
WBT 3     SP      V02
WBT 4     RP   20120       WBT06     MEMORY
WBT 5     SA    BT00                 SUM
WBT 6     TP   A           V02       STORE MS
WBT 7     RP   10120       WBT09
WBT 8     EW   10000        BT00     WRITE TAPE
```

```
WBT 9       TV      C78     BPS03       RESET STORE
WBT10       TP      C00       V01       RESET TALLY
WBT11       MJ                          EXIT


WPT         EF                C92       TAPE WRITE
WPT 1       RP      10120     WPT03
WPT 2       EW      10000      PT00
WPT 3       TV      C93      PTS24      RESET STORE
WPT 4       TP      C00       V05       RESET TALLY
WPT 5       MJ


PTS         TP      C03       X05       SET TALLY
PTS 1       TV      C20      PTS17      SET STORE
PTS 2       TU      C20      PTS03      SET LOAD
PTS 3       SP      X00        24       LOAD BINARY
PTS 4       LT                T00       1ST DIGIT
PTS 5       SP    A             3
PTS 6       LT                T01       2ND DIGIT
PTS 7       SP    A             3
PTS 8       LT                T02       3RD DIGIT
PTS 9       SP    A             3
PTS10       LT                T03       4TH DIGIT
PTS11       SP    A             3
PTS12       LT                T04       5TH DIGIT
PTS13       SP      T00         6
PTS14       RP    2   3     PTS16       ASSEMBLE
PTS15       SA      T01         6
PTS16       SA      T04
PTS17       AT      C19       W11       ADD 3 AND STORE
PTS18       RA    PTS03       C06       BUMP LOAD
PTS19       RA    PTS17       C01       BUMP STORE
PTS20       IJ      X05     PTS03       TEST FOR W14
PTS21       LQ      C22                 ADJUST OP FOR
PTS22       QT      W12       W12       PRINT
PTS23       RP    30020     PTS25
PTS24       TP      W00      PT00
PTS25       RA    PTS24       C91       BUMP ST BY 20
PTS26       RA      V05       C01       BUMP TALLY
PTS27       MJ                          EXIT


RCC         RP    3  24     RCC02        ENTER  MOVE
RCC 1       TP    CIM24     CIM00        CARD IMAGE
RCC 2       TV      C35     RCC05        PRESTORE RCC05
RCC 3       TV      C36     RCC06        PRESTORE RCC06
RCC 4       ER                Q          READ
RCC 5       ER    1         CIM24           A
RCC 6       ER    1         CIM36              ROW
RCC 7       RA    RCC05       C01        BUMP RCC05
```

```
RCC 8     RA    RCC06     C01          BUMP RCC06
RCC 9     MJ                           EXIT TO CONV-
RCC10     RJ    RCC09     RCC00        ENTER
RCC11     TP      C02       T00        SET STROBE
RCC12     TV      C37     FLD27
RCC13     TU      C35     FLD05
RCC14     TP      C33       T15        SET INDEX
RCC15     RJ    FLD29     FLD00        CONVERT LOC FD
RCC16     RJ    RCC09     RCC04        READ 8 ROW
RCC17     TP      C03       T15        SET INDEX
RCC18     RJ    FLD29     FLD00        CONVERT OP  FD
RCC19     RJ    RCC09     RCC04        READ 7 ROW
RCC20     TP      C33       T15        SET INDEX
RCC21     RJ    FLD29     FLD00        CONVERT U   FD
RCC22     RJ    RCC09     RCC04        READ 6 ROW
RCC23     TP      C33       T15        SET INDEX
RCC24     RJ    FLD29     FLD00        CONVERT V   FD
RCC25     RJ    RCC09     RCC04        READ 5 ROW
RCC26     TP      C02       T15        SET INDEX
RCC27     RJ    FLD29     FLD00        CONVERT D   FD
RCC28     RJ    RCC09     RCC04        READ 4 ROW
RCC29     TP      C02       T15        SET INDEX
RCC30     RJ    FLD29     FLD00        CONVERT B   FD
RCC31     RJ    RCC09     RCC04        READ 3 ROW
RCC32     TP      C33       T15        SET INDEX
RCC33     RJ    FLD29     FLD00        CONVERT 1P COM
RCC34     RJ    RCC09     RCC04        READ 2 ROW
RCC35     TU      C36     FLD05
RCC36     TP      C33       T15         SET INDEX
RCC37     RJ    FLD29     FLD01        CONVERT 2P COM
RCC38     RJ    RCC09     RCC04         READ 1 ROW
RCC39     TP      C33       T15         SET INDEX
RCC40     RJ    FLD29     FLD01        CONVERT 3P COM
RCC41     RJ    RCC09     RCC04         READ 0 ROW
RCC42     RJ    RCC09     RCC04         READ X ROW
RCC43     SP      W07       24         REPACK
RCC44     LT                W07        COMMENTS
RCC45     SP    A             3          FOR
RCC46     SA      W08       33           PRINTER
RCC47     LT                W08          OUTPUT
RCC48     AT      W09       W09
RCC49     RJ    RCC09     RCC04        READ 12 ROW
RCC50     MJ                           EXIT


REG               24010    10000  B      A--
REG 1             53010    1      B      Q--
REG 2             31010    1      B      F--
REG 3             54010    1      B      R--
REG 4             34010           B      I--
REG 5              1010    1      B
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Date	Approved	LOCKHEED AIRCRAFT CORP. MISSILE SYSTEMS DIVISION	Title	Report No.	Model	Page


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REG 6          3030     3        B          000
REG 7                   32000    B          A
REG 8                   31000    B          Q
REG 9                      16    B          F
REG10                      17    B          R
REG11                       7    B          I
REG12                            B          ZERO
REG13                            B          ZERO


START          HK                           300
```

CORRECTION

```
ABC      SP    V00              TEST FOR TAPE
ABC 1    ZJ    ABC03   ABC02     READ
ABC 2    RJ    BSR54   BSR45    READ TAPE
ABC 3    RP    20015   ABC05    GET NEXT
ABC 4    TP    TIB00     W00     INSTRUCTION
ABC 5    RA    ABC04   CRC12    BUMP LOAD
ABC 6    RS     V00      C01    DECR TALLY
ABC 7    TP     C22      Q      MASK OUT SEQ
ABC 8    QT     W01      A       OF LOC
ABC 9    RJ     Q44      Q37    CONV TO BINARY
ABC10    TP     A       BW00    STORE BIN SEQ
ABC11    RJ    BSR08   BSR00    CONV SEQ OF U V
ABC12    TU    CRC13   ABC15    SET LOAD
ABC13    TV    CRC13   ABC21    SET STORE
ABC14    TP     C03      T08    SET TALLY
ABC15    SP     W11             LOAD
ABC16    RJ    BSR60   BSR55    CONV TO BINARY
ABC17    MJ            ABC21
ABC18                       B
ABC19                       B
ABC20                       B
ABC21    TP    A         X00    STORE
ABC22    RA    ABC15     C06    BUMP LOAD
ABC23    RA    ABC21     C01    BUMP STORE
ABC24    IJ     T08    ABC15    TEST FOR LAST
ABC25    SP     W01             LOAD LOC
ABC26    EJ     C13    CDR00    TEST FOR D
ABC27    EJ     C11    CST00    TEST FOR START
ABC28    RP   20100    ABC41    TEST FOR
ABC29    EJ    RR00    ABC30     REPL
ABC30    TP   CRC15      W20    SET UP REPL
ABC31    SN   Q           15    SET UP LOAD AND
ABC32    SA     T17        3     MULT BY 8
ABC33    AT   CRC11    ABC35
ABC34    RP   30008    ABC36
ABC35    TP   2RR00      W02    LOAD NEW INSTR
ABC36    RJ   BSR08    BSR00    CONV SEQ OF U V
ABC37    RJ   LUV16    LUV00    MOD U AND V
ABC38    RJ   LUV29    LUV17    MOD LOC
ABC39    RJ     Q31      Q11    TRANSLATE
ABC40    MJ            ABC44
ABC41    TP     C00      W19    CLEAR REPL
ABC42    RJ   LUV16    LUV00    MOD U AND V
ABC43    RJ   LUV29    LUV17    MOD LOC
ABC44    SP     V10             TEST FOR INSERT
ABC45    ZJ    INF00    ABC46
ABC46    RJ    RL20      RL00    RELOCATE
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```
ABC47       RJ    BSR36     BSR14          PK AND WRT TAPE
ABC48       MJ              ABC00          TO NEXT INSTR


ARA         TP      C00       T04          CLEAR SUM
ARA 1       SP      V07
ARA 2       ST      C01       T05          SET TALLY  N-1
ARA 3       TP    2MT00     Q              LOAD
ARA 4       QT      C22       T00          N INTO T00
ARA 5       LQ    Q           8
ARA 6       QT    CRC44       T01          R ADD SEQ  T01
ARA 7       LQ    Q           6
ARA 8       QT      C04       T02          D OR I  TO T02
ARA 9       LQ    Q           7
ARA10       QT    CRC44       T03          SEQ OF I   T03
ARA11       SP      T02                    TEST FOR
ARA12       EJ    CRC08     ARA38            D OR I
ARA13       SP      T00
ARA14       ST      C01       T06            N-1 T06
ARA15       MP      T03     CRC16          9 X SEQ OF I
ARA16       AT    CRC14     A
ARA17       TV    A         ARA21
ARA18       SP      T01
ARA19       AT      T04       T07          SEQ  TALLY  T07
ARA20       RJ    BSR13     BSR09          CONV TO XS3
ARA21       AT     MT00      SS00          STORE REG ADDR
ARA22       IJ      T06     ARA24          TEST N
ARA23       MJ              ARA27
ARA24       RA    ARA21     CRC16          BUMP V OF STORE
ARA25       RA      T07       C01          BUMP SEQ
ARA26       MJ              ARA20
ARA27       RA      T04       T00          ADD N TO SUM
ARA28       TU    ARA21     ARA32
ARA29       RA    ARA21       C06          BUMP U OF STORE
ARA30       TU    A         ARA33
ARA31       RA    ARA03       C06          BUMP LOAD
ARA32       SP     MT00                    TEST FOR SAME
ARA33       SS     MT01                     REGION
ARA34       ZJ    ARA35     ARA36
ARA35       TP      C00       T04          SET SUM TO ZERO
ARA36       IJ      T05     ARA03          TEST END OF TBL
ARA37       MJ              CHK00          EXIT
ARA38       RS      T04       T00          SUBT N FROM SUM
ARA39       MJ              ARA28


BSR         LQ      C22                    CONVERT
BSR 1       QT      W03     A                SEQUENCE OF U
BSR 2       RJ      Q44       Q37            AND V TO
BSR 3       TP    A           BW01           BINARY AND
BSR 4       LQ      C22                      STORE IN BW01
BSR 5       QT      W04     A                AND BW02
```

```
BSR 6     RJ     Q44      Q37
BSR 7     TP     A        BW02
BSR 8     MJ                          EXIT
BSR 9     DV     C79      Q           CONVERT SEQ
BSR10     LQ     Q          6          FROM BINARY TO
BSR11     SA     Q                     XS3 DECIMAL
BSR12     SA     CRC10
BSR13     MJ                          EXIT
BSR14     LQ     C05                 PACK WRITE TAPE
BSR15     QT     W01      T00        REG OF LOC
BSR16     EJ     CW23     BSR18      TEST SAME REG
BSR17     TP     C15      W00        SET FAST FEED
BSR18     TP     T00      CW23       STORE REG
BSR19     RJ     PTS27    PTS00      PACK PTR TAPE
BSR20     SP     V05                 TEST FOR FULL
BSR21     TJ     C90      BSR23       BLOCK
BSR22     RJ     WPT05    WPT00      WRITE PTR TAPE
BSR23     TP     C00      W00        CLEAR FAST FEED
BSR24     RJ     BSR24    BSR29      ONE SHOT SWITCH
BSR25     SP     X00                 LOAD BIN LOC
BSR26     SS     CW24                TEST FOR OUT OF
BSR27     EJ     C01      BSR32       SEQUENCE
BSR28     RJ     WBT11    WBT00      WRITE BIN TAPE
BSR29     TP     X00      BT00       SET UP LOC
BSR30     RJ     BPS06    BPS00      PACK BIN TAPE
BSR31     TP     X00      CW24       STORE BIN LOC
BSR32     MJ              BSR35
BSR33     SP     V01                 TEST FOR FULL
BSR34     SS     CRC24                BLOCK
BSR35     ZJ     BSR30    BSR28
BSR36     MJ                          EXIT
BSR37     EF              CRC38      TAPE READ
BSR38     RP     10120    BSR40      READ BLOCK
BSR39     ER     1        TIB00
BSR40     ER              A          LOAD IOA
BSR41     EF               C39       NORMAL BIAS
BSR42     ZJ     BSR43    BSR52
BSR43     EF              CRC45      BACK ONE BLOCK
BSR44     MJ
BSR45     RJ     BSR44    BSR37      ENTER
BSR46     RJ     BSR44    BSR37
BSR47     EF               C76       HIGH BIAS
BSR48     RJ     BSR44    BSR37
BSR49     EF               C77       LOW BIAS
BSR50     RJ     BSR44    BSR37
BSR51     MJ              CER11      TO ERROR
BSR52     TU     C08      ABC04      RESET LOAD
BSR53     TP     C90      V00        RESET TALLY
BSR54     MJ                          EXIT
BSR55     RJ     B11      B00        CONV TO OCTAL
BSR56     SP     T03        3        ASSEMBLE
BSR57     RP     20003    BSR59       OCTAL NUMBERS
```

```
BSR58     SA     T04      3
BSR59     SA     T07
BSR60     MJ                        EXIT


SRL       RA     V09      C01       BUMP TALLY
SRL 1     TP     C00      T07       STORE IN V09
SRL 2     TP     W02      Q
SRL 3     QT     C04      A
SRL 4     SS     C02
SRL 5     ZJ     SRL07    SRL06
SRL 6     TP     C21      T07
SRL 7     QT     CRC19    RLT00
SRL 8     RA     SRL07    C01
SRL 9     SP     W03
SRL10     RJ     BSR60    BSR55
SRL11     LA     A        15
SRL12     AT     T07      T07
SRL13     SP     W04
SRL14     RJ     BSR60    BSR55
SRL15     AT     T07      LT00
SRL16     RA     SRL15    C01
SRL17     MJ               CRF48


SRT       LQ     W02      18
SRT 1     SP     Q        6
SRT 2     LT              A
SRT 3     TJ     C02      SRT06
SRT 4     SP     CC34     36
SRT 5     LQ     Q
SRT 6     SA     Q        18
SRT 7     LT              W02
SRT 8     RP     3   8    SRT10
SRT 9     TP     W02      2RR00
SRT10     TP     W01      RR00
SRT11     RA     SRT09    CRC18
SRT12     RA     SRT10    C01
SRT13     RA     V08      C01
SRT14     MJ               CRF48


CST       RS     V06      C01       TEST FOR NEW
CST 1     SJ     CST26    CST02      INSTRUCTIONS
CST 2     TP     W03      CW27      STORE U
CST 3     TP     BW01     CW28      STORE SEQ OF U
CST 4     TP     W11      CW26      STORE OCTAL LOC
CST 5     TP     CRC25    CER05     SET ERROR EXIT
CST 6     TP     CRC26    W19       SET NEW
CST 7     RP     30009    CST09     LOAD NEW
CST 8     TP     NEW00    W01        INSTRUCTION
```

```
CST 9      RA    CST08    CRC27      BUMP LOAD
CST10      TP      C22    Q          MASK OUT
CST11      QT      W01    A           SEQ OF LOC
CST12      RJ      Q44      Q37      CONV TO BINARY
CST13      TP    A          BW00     STORE BIN SEQ
CST14      RJ    BSR08    BSR00      CONV SEQ OF U V
CST15      RJ    LUV16    LUV00      MODIFY U AND V
CST16      RJ     QR10     QR00      TRANSLATE LOC
CST17      RJ     QR31     QR11      TRANSLATE
CST18      RJ     RL20     RL07      RELOCATE U V
CST19      RJ    BSR36    BSR14      PK AND WRT TAPE
CST20      IJ      V06    CST07      TEST TALLY
CST21      RP    10011    CST23      CLEAR
CST22      TP      C00      W00       W00 THRU W10
CST23      TP     CW27      W03      LOAD U OF START
CST24      TP     CW28     BW01      LOAD SEQ OF U
CST25      TP     CW26      W11      LOAD OCTAL U
CST26      EF              CRC28      REWIND TAPE 4
CST27      RP    10004    CST29      CLEAR
CST28      TP      C00      W16       W16 THRU W19
CST29      SP     CW20               LOAD NEW START
CST30      EJ      W03    CST35      CF WITH OLD
CST31      TP      W03      W16      STORE OLD
CST32      TP      W11      W17       START ADDR
CST33      TP    A          W03      LOAD NEW START
CST34      RJ    BSR08    BSR00      CONV SEQ OF U V
CST35      RJ    LUV16    LUV00      MODIFY U AND V
CST36      SP      W03              LOAD U
CST37      TP    A          W01      U TO LOC
CST38      RJ     QR10     QR00      TRANSL LOC
CST39      TP     BW01     BW00      USEQ TO LOC SEQ
CST40      RJ     RL20     RL00      RELOCATE
CST41      TP      W01      W03      STORE REG LOC
CST42      TP      C11      W01      SET UP START
CST43      MJ               ST03     EXIT TO MISHAP


CDR        RJ     DR22     DR00      PUT IN DIRECTRY
CDR 1      LQ      W02    31006
CDR 2      QT      C05      T03      REGION
CDR 3      RP    20075    CDR47      TEST RELOCATION
CDR 4      EJ    RLT00    CDR05       TABLE
CDR 5      TP      X01      W16      STORE
CDR 6      TP      W03      W17       OLD
CDR 7      TP      W04      W18         D INSTR
CDR 8      TP      C00      T04      CLEAR T04
CDR 9      SN    Q
CDR10      AT      T19      T07      SET UP STORE
CDR11      AT    CRC17    CDR40
CDR12      SP      T07       15      SET UP LOAD
CDR13      AT    CRC21    CDR14
```

```
CDR14     TP    LT00    Q                LOAD
CDR15     QT      C22     T00            LOCATION
CDR16     LQ    Q         21
CDR17     QT      C22     T01            TAG
CDR18     TP    A         T05            STORE TAG
CDR19     LQ    Q         15
CDR20     QJ    CDR21   CDR23            TEST TAG NEG
CDR21     TN    A         T05            MAKE TAG NEG
CDR22     TP      C02     T04            XS3 MINUS
CDR23     LA      T03     66
CDR24     AT      T04     W02            OP PTR OUTPUT
CDR25     TP      T00   A                LOAD LOC
CDR26     ST      X03     T06            DELTA LOC
CDR27     SJ    CDR28   CDR30            TEST NEG
CDR28     TM    A       A
CDR29     AT      C06     T06            SET MINUS FLAG
CDR30     SP      X01                    LOAD BIN OP
CDR31     SS      C02                    TEST FOR NEG
CDR32     ZJ    CDR34   CDR33
CDR33     TN      X02     X02            SET OLD TAG NEG
CDR34     TP      T05   A                LOAD NEW TAG
CDR35     ST      X02   A                DELTA TAG
CDR36     LA              16
CDR37     SJ    CDR38   CDR40            TEST FOR NEG
CDR38     TM    A       A
CDR39     SA      C18   A                NEW TAG
CDR40     AT      T06     LT00           STORE IN T/BLE
CDR41     LQ      T00     21             LOAD NEW LOC
CDR42     RJ    CDR59   CDR54            CONV TO OCT
CDR43     AT      C19     W04            OCTAL XS3 LOC
CDR44     LQ      T01     21             LOAD NEW TAG
CDR45     RJ    CDR59   CDR54            CONV TO OCT
CDR46     AT      C19     W03            OCTAL XS3 TAG
CDR47     RJ    PTS27   PTS23            PACK PTR TAPE
CDR48     SP      V05                    TEST PTR TAPE
CDR49     TJ      C90   CDR51             BLOCK FULL
CDR50     RJ    WPT05   WPT00            WRITE TAPE
CDR51     RP    10005   CDR53            CLEAR
CDR52     TP      C00     W15             W15 THRU W19
CDR53     MJ              ABC00          EXIT
CDR54     TP      C33     T02
CDR55     LQ    Q         3
CDR56     LA    A           6
CDR57     QA    CRC22   A
CDR58     IJ      T02   CDR55
CDR59     MJ                             SUB EXIT


CER       LQ      C05                    MASK OUT REG
CER 1     QT      W01     CW23           STORE
CER 2     SP      V05                    LOAD P TP TALLY
CER 3     TJ      C90   CER05            TEST FULL BLOCK
CER 4     RJ    WPT05   WPT00            WRITE PTR TAPE
```

```
CER 5       SP     QR31                    LOAD TRANS EXIT
CER 6       EJ     CRC29     CER08         TEST ABC OP INF
CER 7       MJ               ABC00         EXIT TO ABC
CER 8       MJ               INF17         EXIT TO INF
CER 9       TV     CRC29      QR31         LOC ENTRY
CER10       MJ               ERR19         LOC EXIT
CER11       TU     CRC35      ST49         SET UP OLD PROG
CER12       MJ               ERR01         TAPE READ FAILS


CHK         EF                 C49         REWIND TAPE 5
CHK 1       EF                 C44         REWIND TAPE 2
CHK 2       TP      DR23      DR22         SET DIR EXIT
CHK 3       SP       V09        15
CHK 4       SA     CRC04
CHK 5       TU     A          CDR03
CHK 6       TU     A           RL23
CHK 7       SS       C06
CHK 8       TU     A           T19
CHK 9       LQ       T19       T17
CHK10       SP       V07
CHK11       SA     CRC04
CHK12       TU     A          MDF01
CHK13       ST       C06      A
CHK14       TU     A            T16
CHK15       SP       V08         15
CHK16       SA     CRC04
CHK17       TU     A          ABC29
CHK18       ST       C06      A
CHK19       TU     A            T17
CHK20       TP       C00        V00
CHK21       MJ               ABC00


CRC         QT     CRC01        T01
CRC 1                        77777  B
CRC 2       TP       C00        T01
CRC 3       TP      LT00      Q
CRC 4                2              B
CRC 5               54304     65126  B                RELOC X53
CRC 6                1013     40000  B                O--I  XS3
CRC 7                           54  B                R
CRC 8                           27  B                D
CRC 9                           34  B                I
CRC10                          303  B
CRC11       TP     2RR         W02
CRC12                 24           B
CRC13                W11         X    BRR
CRC14       TP       W01       SS
CRC15                 543      5246  B                REPL
```

```
CRC16                        11  B          9 DEC
CRC17     AT      T 6      LT
CRC18                        10  B          8 DEC
CRC19               777   777   B
CRC20                     CRF17  BBR
CRC21     TP      LT       Q
CRC22                         7  B
CRC23     TP      SS         W01
CRC24                       167  B          119 DEC
CRC25     MJ                CST20
CRC26                503    71   B          NEW
CRC27                 11         B          9 DEC
CRC28      2          200  40000  B          REWIND TAPE 4
CRC29     MJ                INF15
CRC30     SP       MT01
CRC31     TP      2MT       A
CRC32                  17         B          15 DEC
CRC33                     MDF33  BBR
CRC34     TP       SS         T09
CRC35     45     47013       1520  B            TAPE        TW
CRC36      4     57640      44726  B            4  F
CRC37     30     14112      40404  B          AILS
CRC38      2       602      40000  B          READ TAPE 4
CRC39     MJ                ERR19
CRC40     MJ                CER00
CRC41     MJ                CER 9
CRC42     EJ      CRC43     ERR26
CRC43     MJ                CST39
CRC44                        177  B
CRC45      2          14    40001  B


CRF       TP      Q          T00          STORE Q
CRF 1     TP        C00      Q            Q TO ZERO
CRF 2     RJ       HK20       HK00
CRF 3     TP      CRC39     ERR12
CRF 4     TP      CRC40     ERR21
CRF 5     TP      CRC41     ERR25
CRF 6     TP      CRC42     ERR23
CRF 7     TP      CRC28     ERR06
CRF 8     TV      IRT08     FBF49
CRF 9     TP        T00     Q
CRF10     QT        C01     A
CRF11     ZJ      CRF12     CRF19        CRF12 IF CARDS
CRF12     TP      CRF14     CRF31        EF
CRF13     TV      CRC20     CRF48
CRF14     EF                  C23          CARD READ
CRF15     RJ      RCC50     RCC10        READ A CARD
CRF16     EF                  C23
CRF17     RJ      RCC50     RCC10
CRF18     MJ                CRF29
CRF19     SP        V00
CRF20     SS        C84
```

```
CRF21     ZJ    CRF25    CRF22
CRF22     RJ    FTR77    FTR82
CRF23     TP      C00      V00
CRF24     TU      C08    CRF26
CRF25     RP    3   9    CRF27
CRF26     TP    TIB00      W01
CRF27     RA    CRF26      C09
CRF28     RA      V00      C01
CRF29     SP      W01
CRF30     EJ      C11    CRF49      START
CRF31     MJ             CRF32
CRF32     EJ      C13     DR00      DIRECTORY
CRF33     EJ    CRC05    SRL00      RELOCATION
CRF34     EJ      C10    CRF48      BLANKS
CRF35     EJ      C19    CRF48      ZEROES
CRF36     TP    A        Q
CRF37     QT      C05      T03
CRF38     EJ    CRC06    IRT00      INSERTION WORD
CRF39     LQ      W02    31 18
CRF40     QT      C04    A
CRF41     EJ    CRC09    DTS00      INSERTION INST
CRF42     EJ    CRC08    DTS02      DELETION
CRF43     EJ    CRC07    SRT00      REPLACEMENT
CRF44     RP    3   9    CRF46      NEW INSTRUCTION
CRF45     TP      W01    NEW00
CRF46     RA    CRF45    CRC16
CRF47     RA      V06      C01      BUMP NI TALLY
CRF48     MJ             CRF19
CRF49     TP      W03     CW20
CRF50     MJ             DIS00


LUV       TP      W03      T09      LOAD U
LUV 1     TP     BW01      T10      LOAD SEQ OF U
LUV 2     TP      X02      T11      LOAD BIN U
LUV 3     RJ    LUV52    LUV30
LUV 4     TP      T12      W17      STORE OLD INSTR
LUV 5     TP      T09      W03      STORE U
LUV 6     TP      T10     BW01      STORE SEQ OF U
LUV 7     TP      T11      X02      STORE BIN U
LUV 8     TP      W04      T09      LOAD V
LUV 9     TP     BW02      T10      LOAD SEQ OF V
LUV10     TP      X03      T11      LOAD BIN V
LUV11     RJ    LUV52    LUV30
LUV12     TP      T12      W18      STORE OLD INSTR
LUV13     TP      T09      W04      STORE V
LUV14     TP      T10     BW02      STORE SEQ OF V
LUV15     TP      T11      X03      STORE BIN V
LUV16     MJ                       EXIT
LUV17     TP      C00      T12      CLEAR T12
LUV18     TP      W01      T09      LOAD LOC
```

```
LUV19     TP    BW00     T10      LOAD SEQ
LUV20     TV    CRC33    MDF16    SET FOR LOC
LUV21     LQ    T09               MASK OUT REGION
LUV22     QT    C05      T05       OF LOC
LUV23     RJ    MDF20    MDF00    MODIFY
LUV24     RA    BW00     CW25     SEQ
LUV25     RJ    BSR13    BSR09    CONVERT TO XS3
LUV26     AT    T05      W01      STORE LOC
LUV27     RA    X00      CW25     BIN LOC
LUV28     TP    T12      W16      STORE OLD LOC
LUV29     MJ                      EXIT
LUV30     TP    C00      T12      CLEAR T12
LUV31     LQ    T09               LOAD REG ADDR
LUV32     QT    C05      T05      MASK OUT REGION
LUV33     EJ    CRC06    LUV41
LUV34     TV    MDF15    MDF16    SET FOR UV
LUV35     RJ    MDF20    MDF00    MODIFY
LUV36     RA    T10      CW25     SEQ
LUV37     RJ    BSR13    BSR09    CONV TO XS3
LUV38     AT    T05      T09      REG ADDR
LUV39     RA    T11      CW25     BIN ADDR
LUV40     MJ               LUV52
LUV41     TP    Q        T12      STORE REG ADDR
LUV42     QT    C22      A        MASK OUT SEQ
LUV43     RJ    Q44      Q37      CONV TO BINARY
LUV44     LQ    A        15       MULT
LUV45     LQ    Q         3        BY
LUV46     SA    Q        A         9
LUV47     AT    CRC34    LUV48    SET UP LOAD
LUV48     TP    SS00     T09      LOAD
LUV49     QT    C22      A        MASK OUT SEQ
LUV50     RJ    Q44      Q37      CONV TO BINARY
LUV51     TP    A        T10      STORE SEQ
LUV52     MJ                      SUB EXIT


DTS       TP    CRC09    T00       I IN XS3
DTS 1     MJ               DTS03
DTS 2     TP    CRC08    T00
DTS 3     RA    V07      C01       BUMP TALLY
DTS 4     TP    W04      A
DTS 5     RJ    BSR60    BSR55     CONVERT N TO
DTS 6     TP    A        T01       BIN TO T01
DTS 7     LQ    W03
DTS 8     QT    C22      A
DTS 9     RJ    BSR60    BSR55     CONVERT I SEQ
DTS10     TP    A        T02       BIN TO T02
DTS11     TP    W01      Q
DTS12     QT    C22      A
DTS13     RJ    BSR60    BSR55     SEQ TO BIN
DTS14     TP    A        T04       INTO T04
DTS15     AT    T03      MT00
DTS16     SP    T04       6
```

```
DTS17       SA      T00       7
DTS18       SA      T02       15
DTS19       AT      T01       2MT00
DTS20       RA    DTS15       C01
DTS21       RA    DTS19       C01
DTS22       MJ                CRF48


DIS         SP      V07
DIS 1       ST      C01       T09
DIS 2       TP    A           T08
DIS 3       RS      T08       C01
DIS 4       TP    A           T04
DIS 5       TP    A           T05
DIS 6       TU    DIS14     DIS15
DIS 7       TU    DIS16     DIS17
DIS 8       TV    DIS20     DIS21
DIS 9       TV    DIS22     DIS23
DIS10       RA    DIS15       C06
DIS11       RA    DIS17       C06
DIS12       RA    DIS21       C01
DIS13       RA    DIS23       C01
DIS14       TP     MT00       T00
DIS15       TP     MT01       T01
DIS16       TP    2MT00       T02
DIS17       TP    2MT01       T03
DIS18       TP      T00     A
DIS19       TJ      T01     DIS24
DIS20       TP      T01      MT00
DIS21       TP      T00      MT01
DIS22       TP      T03     2MT00
DIS23       TP      T02     2MT01
DIS24       IJ      T04     DIS10
DIS25       RA    DIS14       C06
DIS26       RA    DIS16       C06
DIS27       RA    DIS20       C01
DIS28       RA    DIS22       C01
DIS29       IJ      T05     DIS03
DIS30       TP     MT00     Q
DIS31       QT      C05      MT00
DIS32       RA    DIS30       C06
DIS33       RA    DIS31       C01
DIS34       IJ      T09     DIS30
DIS35       TV    DIS31     DIS36
DIS36       TP      C00
DIS37       MJ                ARA00                EXIT


MDF         TP      C00       CW25                 CLEAR SUM
MDF 1       RP    20200     MDF17                  TEST TABLE FOR
```

```
MDF 2     EJ    MT00    MDF03     REGION
MDF 3     SN    Q         15
MDF 4     AT      T16     T06     R MINUS 1
MDF 5     AT    CRC31   MDF06     LOAD FROM
MDF 6     TP    2MT00   A          TABLE
MDF 7     LT      T02       8     SEQ
MDF 8     SP    A
MDF 9     LT    . T03       6     I OR D
MDF10     SP    A
MDF11     LT      T04       7     SEQ OF I
MDF12     SP    A
MDF13     LT      T07      15     N
MDF14     SP      T02             TEST FOR SEQ
MDF15     TJ      T10   MDF21      GREATER
MDF16     EJ      T10   MDF33      EQUAL
MDF17     SP     CW25             TEST SUM
MDF18     ZJ   MDF19   MDF20      FOR MOD
MDF19     TP      T09     T12     STORE OLD ADDR
MDF20     MJ                      EXIT
MDF21     SP      T03             MAKE N MINUS IF
MDF22     EJ    CRC09   MDF24      DELETION
MDF23     TN      T07     T07
MDF24     RA     CW25     T07     ADD N TO SUM
MDF25     SP      T06
MDF26     AT    CRC30   MDF27     GET NEXT REGION
MDF27     SP     MT01              FROM TABLE
MDF28     EJ      T05   MDF30     TEST REGION
MDF29     MJ            MDF17     TO EXIT
MDF30     RA      T06     C06     BUMP R MINUS 1
MDF31     RA    MDF06     C06     BUMP LOAD
MDF32     MJ            MDF06     TO NEXT ENTRY
MDF33     SP      T03             LOAD I OR D
MDF34     EJ    CRC08   MDF42     JUMP IF DELETE
MDF35     TP      C01     V10     SET I FLAG
MDF36     TP      T07    CW21     STORE N
MDF37     TP      T04    CW22     STORE SEQ OF I
MDF38     RA     CW25     T07     ADD N TO SUM
MDF39     MJ            MDF17     TO EXIT
MDF40     RS      T07     C02     SET TALLY
MDF41     SJ    ABC00   MDF42     TEST TALLY
MDF42     SP      V00             TEST FOR TAPE
MDF43     ZJ   MDF45   MDF44      READ
MDF44     RJ   BSR54   BSR45     READ TAPE
MDF45     RS      V00     C01     DECR TALLY
MDF46     RA    ABC04   CRC32     BUMP LOAD
MDF47     IJ      T07   MDF42     TEST TALLY
MDF48     MJ            ABC00     DELETE EXIT


INF       TP      C00     V10     CLEAR I FLAG
INF 1     RP    30019   INF03     STORE THIS
INF 2     TP      W01     CW01     INSTRUCTION
INF 3     RS     CW21     C01     N MINUS 1
```

```
INF 4      LA     CW22     32003      MULT BY 9
INF 5      SA     CW22        15
INF 6      AT     CRC23    INF11
INF 7      SP     CW22
INF 8      RJ     BSR13    BSR09      CONVERT TO XS3
INF 9      AT     CRC06      W16      SET UP IXX
INF10      RP     30009    INF12
INF11      TP      SS00      W01      LOAD
INF12      RJ     LUV16    LUV00      MODIFY U AND V
INF13      RJ      QR10     QR00      TRANSLATE LOC
INF14      RJ      QR31     QR11      TRANSLATE
INF15      RJ      RL20     RL00      RELOCATE
INF16      RJ     BSR36    BSR14      PK AND WRT TPS
INF17      RA     CW22       C01      BUMP SEQ
INF18      IJ     CW21     INF04      TEST TALLY
INF19      RP     30019    ABC46      EXIT
INF20      TP      CW01      W01      LOAD STORED CMD


IRT        SP       W01
IRT 1      QT       C22      A
IRT 2      RJ       Q44        Q37
IRT 3      MP     A          CRC16
IRT 4      AT     CRC14      IRT06
IRT 5      RP     3    9     IRT07
IRT 6      TP       W01       SS00
IRT 7      MJ                CRF48


RL         TP     CRC00      RL31      SET FOR LOC
RL 1       TP       W01        T09      LOCATION
RL 2       TP      BW00        T05      BIN SEQ
RL 3       TP       X00        T06      BIN LOC
RL 4       RJ      RL43      RL21      RELOCATE LOC
RL 5       TP       T09        W01      STORE LOC
RL 6       TP       T06        X00      STORE BIN LOC
RL 7       TP     CRC02      RL31      SET FOR U AND V
RL 8       TP       W03        T09      U
RL 9       TP      BW01        T05      BIN SEQ
RL10       TP       X02        T06      BIN U
RL11       RJ      RL43      RL21      RELOCATE U
RL12       TP       T09        W03      STORE U
RL13       TP       T06        X02      STORE BIN U
RL14       TP       W04        T09      V
RL15       TP      BW02        T05      BIN SEQ
RL16       TP       X03        T06      BIN V
RL17       RJ      RL43      RL21      RELOCATE V
RL18       TP       T09        W04      STORE V
RL19       TP       T06        X03      STORE BIN V
RL20       MJ                           MAIN EXIT
```

```
RL21    LQ     C05                    MASK OUT.
RL22    QT     W01      T08            REGION
RL23    RP   20075     RL43           TEST FOR RELOC
RL24    EJ   RLT00     RL25            OF REGION
RL25    SN   Q           15           IF RELOC SET UP
RL26    AT     T18    A
RL27    AT   CRC03     RL28           LOAD FROM TABLE
RL28    TP    LT00    Q              LOAD
RL29    QT   CRC01      T00           DELTA ADDR
RL30    LQ   Q           20
RL31    QT   CRC01      T01           DELTA TAG
RL32    QJ    RL33     RL34           TEST MINUS ADDR
RL33    TN     T00      T00           MAKE NEG
RL34    LQ   Q           19
RL35    QJ    RL36     RL37           TEST MINUS TAG
RL36    TN     T01      T01           MAKE NEG
RL37    RA     T00      T01           DLTA TAG AND AD
RL38    AT     T06      T06           NEW BIN ADDR
RL39    SP     T05                    BIN SEQ
RL40    AT     T00    A               NEW BIN SEQ
RL41    RJ   BSR13    RSR09           CONV TO DEC XS3
RL42    AT     T08      T09           NEW REG ADDR
RL43    MJ                            SUB EXIT
```

OCTAL DUMP DIRECTORY

	D	DUM	40609	41141 OCT DUMP
	D	DKN	40704	41300 DMP CONST
QES	D	DAB	43741	47235 SEC TWO
QES	D	DCI	43456	46600 640 IMAGE
QES	D	M	1	
QES	D	MG	164	
QES	D	KN	92	

QES
QES
QES
QES
OCTAL DUMP


```
DUM      RP   30640   DUM02          SAVE TWO CORE
DUM 1    TP           DCI00           SECTIONS
DUM 2    RP   30112     M00          PROGRAM AND
DUM 3    TP   DUM04     M00           CONSTS TO CORE
DUM 4    SP   Q          21          MOOP DUM04 SAME
DUM 5    LT            KN21          START ADDRESS
DUM 6    SP   A          15
DUM 7    LT            KN22          STOP ADDRESS
DUM 8    RP   30320      M06         FIRST SECTION
DUM 9    11   DCI00      500  BRB     TO CORE+320
DUM10    TP    KN21     A            START
DUM11    ST     M36     A             MINUS CONST
DUM12    SJ     M09       M15         COREP +DRUM
DUM13    TP    KN00       M83        SET EXIT ABNORM
DUM14    TP    KN21     A
DUM15    ST    KN03     A
DUM16    SJ     M17       M13        FIRST OR SECOND
DUM17    RP   30355       M15        REPLACE SECOND
DUM18    11   DAB00       435  BRB     SECTION
DUM19    TP    KN01       M83        SET EXIT NORMAL
DUM20    TU    KN09      KN04        SET BUMP ZERO
DUM21    TP    KN22     A            LAST
DUM22    ST    KN21      KN23         MINUS START
DUM23    SJ     M84       M20         DONEP +CONTNUE
DUM24    ST    KN05     A             35
DUM25    SJ     M23       M22        35 OR LESS
DUM26    TP    KN05     . KN23       SET INDEX TO 35
DUM27    RP   10120       M25        SPACES TO
DUM28    TP    KN06      MG01         BLK IMAGE
DUM29    SP    KN21        15
DUM30    AT    KN04       M36        SET INIT ADDR
DUM31    TV    KN02       M35        SET WORD
DUM32    TV    KN19       M36         BUFFER
DUM33    TU    KN02       M49         ADDRESSES
DUM34    TV    KN20       M53        SET BLK IMAGE
DUM35    TV     M24       M54         ADDRESSES
DUM36    TP    KN23      KN24        SET
DUM37    RA    KN24      KN10         BUFFER INDEX
DUM38    TP    KN15      KN25        LINE INDEX TO 5
DUM39    TP    KN21                  ADDR TO BUFFER
DUM40                    37777  B     WORD TO BUFFER
DUM41    RA     M36       KN11        BUMP
DUM42    IJ    KN23       M40        IS BUFFER FULL
DUM43    MJ               M45        START CONV
DUM44    IJ    KN25       M36        IS LINE DONE
DUM45    RA     M35      KN16        BUMP
DUM46    RA    ~~KN21~~ M36  ~~KN16~~ KN10   BUFFER
DUM47    ~~RA~~RP  ~~M36~~ 00002  ~~KN10~~ M33   ADDRESSES
DUM48    ~~MJ~~RA  KN21          ~~M33~~ KN13  LOAD MORE BUFFER
DUM49    TP    KN10      KN26        SET ONE SHOT
```

```
DUM50     TV     M48     KN25          SET LINE INDEX
DUM51     TN     KN13    A              3 TO A
DUM52     SA     KN13       6          +3 AND SHIFT
DUM53     LQ                3          BUFFR WORD TO Q
DUM54     QA     KN16    A             DIGIT TO A
DUM55     LQ     KN07       1
DUM56     QJ     M48     M53           LOOP TEST
DUM57     AT     KN13                  AR TO IMAGE
DUM58     LT                           AL TO IMAGE
DUM59     IJ     KN26     M58          DEC CONV OR NOT
DUM60     IJ     KN24     M72          TEST BUFFR INDX
DUM61     MJ              M79          WRITE ON TAPE
DUM62     TV     M54      M70          OBTAIN DEC ADDR
DUM63     TU     M49      M63           SET ADDR
DUM64     TV     KN09     M66           SET SHIFT ZERO
DUM65     TP     KN09     KN26          SET SUM ZERO
DUM66     TP     KN14     M01           SET INDEX
DUM67     TP              M02           WORD TO TEMP
DUM68     TP     M02     A
DUM69     DV     KN17     M02           OBTAIN DIGIT
DUM70     SA     KN13                   +3 AND SHIFT
DUM71     AT     KN26     KN26          SUM
DUM72     RA     M66      KN25          SHIFT + SIX
DUM73     IJ     M01      M64
DUM74     TP     KN26                   STORE
DUM75     MJ              M56
DUM76     RA     M49      KN12          BUMP
DUM77     RA     M53      KN13           IMAGE
DUM78     RA     M54      KN13           ADDRESSES
DUM79     IJ     KN25     M47           IS LINE CONV
DUM80     RS     M53      KN10
DUM81     RS     M54      KN10
DUM82     MJ              M45           CONV NEXT LINE
DUM83     EF              KN18          WRITE ONE BLK
DUM84     RP     10120    M82
DUM85     EW     10000    MG01
DUM86     RA     KN21     KN16          BUMP START ADDR
DUM87                          B        JUMP
DUM88     RP     30640    M86           RESTORE
DUM89     TP     DCI00                   CORE
DUM90     MJ     10000    M90           MORE DUMPS
DUM91     EF              KN18          WRITE
DUM92     RP     120      M90            PRINTER STOP
DUM93     EW     10000    KN08           CONDITION
DUM94     MS              DUM00         STOP


DKN       MJ              M10           ABNORMAL EXIT
DKN 1     MJ              M17           NORMAL EXIT
DKN 2             KN27    KN27   BRR    BUFFER CONST
DKN 3                     434    B      SECTION TEST WD
```

DKN 4	11	500	B		BUMP CONST
DKN 5		43	B		
DKN 6	1	1010	10101	B	SPACES
DKN 7	37	77377	73777	B	LOOP TEST
DKN 8	60	60606	6060	B	STOP
DKN 9				B	ZERO
DKN10			1	B	ONE
DKN11		1	1	B	U AND V ADV
DKN12		1		B	U
DKN13			3	B	
DKN14			4	B	
DKN15			5	B	
DKN16			7	B	
DKN17			12	B	
DKN18	2	646	50001	B	WRITE ONE BLK
DKN19			KN28	BBR	BUFFER CONST
DKN20			MG02	BBR	

PRINT BINARY TAPE DIRECTORY

	D	PBT	40725	41325 PR BIN TP
	D	DTS	40766	
QES	D	TS		
QES	D	BT	64	

QES
QES
QES
QES
PRINT BINARY TAPE


```
PBT      RP    34096    PBT02                 STORE
PBT 1    11             70000   B              MEMORY
PBT 2    RP    30700    PBT04                 BRING IN
PBT 3    TP    DTS00     TS00                  FAP
PBT 4    RP    30035     BT06                 PROGRAM
PBT 5    TP    PBT06     BT06                  TO CORE
PBT 6    LQ    Q           12
PBT 7    QT     BT40     BT01                  STORE B
PBT 8    AT     BT39     BT03                  SET EF
PBT 9    LQ    Q           21
PBT10    QT     BT40     BT00                  STORE A
PBT11    AT     BT39     BT02                  SET EF
PBT12    LQ     BT00        9
PBT13    RA     BT19     BT00                  SET TAPE READ
PBT14    LQ     BT01        9
PBT15    RA     BT29     BT01                  SET TAPE WRITE
PBT16    EF              BT02                  REWIND A
PBT17    EF              BT03                  REWIND B
PBT18    MJ              BT19
PBT19    14    64010     3170   B              READ ONE BLOCK
PBT20    11     3170     A      BBR
PBT21    EJ     BT38      BT23                 TEST FIRST WD
PBT22    MJ               BT25
PBT23    11     3357     33     B              TEST LAST WORD
PBT24    EJ     BT38      BT31
PBT25    RP    30120     BT27                  MOVE
PBT26    11     3170     3000   B              BLOCK
PBT27    RJ     BT22      BT19
PBT28    TV     BT37      BT22
PBT29    14    73050     3000   B              WRITE 5 BLOCKS
PBT30    MJ               BT19
PBT31    RJ     BT30      BT29
PBT32    RP      120      BT34                  WRITE
PBT33    EW    1          BT38                  PRINTER STOP
PBT34    RP    34096      BT36                 RESTORE
PBT35    11    70000             B              CORE
PBT36    RJ     BT18      BT16
PBT37    FS               BT25                  FINAL STOP
PBT38    60    60606     6060   B
PBT39     2      200             B
PBT40                    7      B
```

	D	TS		00000	
	D	DC	35	00043	
QES	D	CP	46	00056	
QES	D	AW	77	00115	
QES	D	IP	87	00127	
QES	D	AD	186	00272	
QES	D	MP	210	00322	
QES	D	MA	222	00336	
QES	D	PM	234	00352	
QES	D	DV	239	00357	
QES	D	SF	257	00401	
QES	D	FS	269	00415	
QES	D	PK	282	00432	
QES	D	X	314	00472	
QES	D	LM	331	00513	
QES	D	SR	360	00550	
QES	D	RC	388	00604	
QES	D	SN	406	00626	
QES	D	NC	448	00700	
QES	D	XP	458	00712	
QES	D	PC	507	00773	
QES	D	LN	524	01014	
QES	D	LC	565	01065	
QES	D	AT	571	01073	
QES	D	TC	628	01164	
QES	D	QD	646	01206	
QES	D	QQ	684	01254	
QES	D	RR	374	00566	
QES	D	FC	684	01254	
QES	D	CV	747	01353	
QES	D	KV	774	01406	
QES	D	WF	783	01417	
QES	D	BT	849	01521	
QES	D	BL	684	01254	
QES	D	VV	753	01361	
QES	D	VK	788	01424	
QES	D	RF	796	01434	
QES	D	LA	684	01254	
QES	D	AL	723	01323	
QES	D	GA	764	01374	
QES	D	GB	793	01431	
QES	D	WW	804	01444	
QES	D	EF	844	01514	
QES	D	AB	904	01610	
QES	D	BB	928	01640	
QES	D	DTS	40766	41376	FAP
QES	D	DFC	41450		PACK 1
QES	D	DBL	41666		
QES	D	DLA	41874		
QES	D	MI	1024	2000	
QES	D	RTE	1055	2037	
QES	D	CB	1062	2046	
QES	D	DTP	1108	2124	
QES	D	DT	1150	2176	

QES					
QES					
QES					
QES					
QES	D	BC	1164	2214	
QES	D	R	1179	2233	
QES	D	P	1223	2307	
QES	D	GM	1251	2343	
QES	D	AM	1261	2355	
QES	D	RM	1273	2371	
QES	D	KM	1279	2377	
QES	D	TM	1285	2405	
QES	D	IM	1307	2433	
QES	D	MM	1384	2550	
QES	D	TR	1420	2614	
QES	D	PI	1435	2633	
QES	D	CL	1452	2654	
QES	D	RV	1473	2701	
QES	D	PA	1492	2724	

QES
QES
QES
QES
MAFIA

RAWOOP ASS. FORM

```
        IP57    QJ    PI00    KM00    A+PI TO B  CONS
        IP66    QJ    RM00    MM00    TRANSFER MULT
QES     IP67    QJ    AM07    AM00    SUB       ADD
        IP68    QJ    IM00    TM00    INVERSE  TRANSP
        IP75    QJ     P00     R00    WRITE MAT READ
QES     IP77    QJ    CL00    RV00    COL VEC ROW VEC
QES     IP78    QJ    DM00    TR00    DETERM     SPUR
        IP79    QJ    PA39    PA24    REPLACE   PART
        IP82    QJ    IP95    BC00    51       BANK


QES     MI      SP    TS04      15    T
        MI 1    AT    CB03    MI02     DIGIT ADDRESS
        MI 2    TP            CB00       STORAGE
        MI 3    SP    TS05      15    R
        MI 4    AT    CB04    MI05     DIGIT ADDRESS
        MI 5    TP            CB01       STORAGE
        MI 6    TP    TS17    A       I
        MI 7    AT    CB05    MI08     DIGIT ADDRESS
        MI 8    TP            CB02       STORAGE
        MI 9    RP   30007    MI11    STORE
        MI10    TP    TS08    CB25    CODING INDEX
        MI11    RP   30007    MI13    PLACE  INDEX
        MI12    TP    CB32    TS08     SUBROUTINE
        MI13    TP    TS00    RTE04   STORE EXIT RTE
        MI14    TP    DC08    RTE05   STORE Q
        MI15    TP    DC09    RTE06   STORE A
        MI16    RP   10002     MI18    CLEAR
        MI17    TP    CB08     CB06     CB06  CB07
        MI18    RA    CB06     CB00    STORE
        MI19    TU    CB06     MI21     DIMENSIONS
        MI20    RP   30004     MI22      OF MATRIX A
        MI21    TP             DT00       IN DT00-03
        MI22    RA    CB07     CB01    STORE
        MI23    TU    CB07     MI25     DIMENSIONS
        MI24    RP   30004     MI26      OF MATRIX B
        MI25    TP             DT04      IN DT04-07
        MI26    TP    CB07     DT09    STORE B DIM ADD
        MI27    TP    CB08     CB06    FIND AND
        MI28    RA    CB06     CB02     STORE C
        MI29    TP    CB06     DT10      DIMENSION ADD
        MI30    MJ                     EXIT


RTE             RP   30007    RTE02    RESTORE
RTE 1           TP    CB25     TS08     INDEX REGISTER
RTE 2           TP   RTE05    Q       RESTORE Q
RTE 3           TP   RTE06    A       RESTORE A
```

```
        RTE 4          MJ                          TO PROGRAM
        RTE 5                              B       Q STORAGE
        RTE 6                              B       Q STORAGE



         CB                                B       T MATRIX A
         CB 1                              B       R MATRIX B
         CB 2                              B       I MATRIX C
         CB 3          TP      CB15      CB00
         CB 4          TP      CB15      CB01
         CB 5          TP      CB15      CB02
         CB 6                  1166      1166     B
         CB 7                  1166      1166     B
         CB 8                  1166      1166     B
         CB 9                  1161      1161     B
         CB10                  1161      1161     B
         CB11                            70000     B
         CB12                             7700     B
         CB13                               77     B
         CB14                     1         1     B
         CB15                  2000      2000     B       MATRIX INDEX 0
         CB16                  3174      3174     B                    1
         CB17                  4370      4370     B                    2
         CB18                     5         5     B       MATRIX INDEX 3
         CB19                 51174     51174     B                    4
         CB20                 52370     52370     B                    5
         CB21                 53564     53564     B                    6
         CB22                 54760     54760     B                    7
         CB23                 56154     56154     B       BANK TWO
         CB24                 64330     64330     B       BANK THREE
         CB25                                     B       INDEX STORE  1
         CB26                                     B                    2
         CB27                                     B       FOR          3
         CB28                                     B       PROGRAM      4
         CB29                                     B       INDEX        5
         CB30                                     B                    6
         CB31                                     B                    7
         CB32                                     B       INDICES      7
         CB33                                     B       SUB          2
         CB34                                     B       ROUTINES     3
         CB35                                     B                    4
         CB36                                     B       INDEX        5
         CB37                                     B                    6
         CB38                                     B                    7
         CB39                                     B       TEMP
         CB40                                     B        STORAGE
         CB41                              170     B       120  CONSTANT
         CB42                             1130     B       600  CONSTANT
         CB43                  1174       1174     B       INITIAL BANK CO
         CB44                     5          5     B       BANK ONE
         CB45          77      77777     77776     B       MINUS ONE



        DTP            TP      DT03      A                 SAME  A B
```

```
DTP 1     RS   A      DT07      DIMENSION
DTP 2     ZJ   DTP36             TEST
DTP 3     TP    DT00  A        SQUARE   C EQ R
DTP 4     RS   A       DT01     DIMENSION
DTP 5     ZJ   DTP38             TEST
DTP 6     TP    DT00  A        C1 EQUALS
DTP 7     RS   A       DT05     R2 TEST
DTP 8     ZJ   DTP40             FOR MULT
DTP 9     TP    DT00   DT05     REVERSE
DTP10     TP    DT01   DT04      THE
DTP11     TP    DT02   DT06       DIMENSIONS
DTP12     TP    DT00  Q          OF
DTP13     QT    CP01   AB00       A
DTP14     TP    DT01  Q           TO
DTP15     QT    CP00  A            B
DTP16     RA   A       AB00     AND STORE R1 C1
DTP17     TP   A       DT07       AS   C1 R1
DTP18     MJ                    EXIT OF REVERSE
DTP19     TV    DT09   DTP21    TRANSFER
DTP20     RP   30004             DIMENSIONS
DTP21     TP                      TO B
DTP22     TV    DT10   DTP24    TRANSFER
DTP23     RP   30004               DIMENSIONS
DTP24     TP                        TO C
DTP25     TP    DT01   DT05     FORM
DTP26     TP    DT04  Q          DIMENSIONS
DTP27     QT    CP00   AB00      FOR
DTP28     TP    DT05  Q          PRODUCT
DTP29     QT    CP01   AB01       OF
DTP30     MP    AB00   AB01     TWO
DTP31     TP   A       DT06      MATRICES
DTP32     TU    DT04   DT08     AND STORE
DTP33     TV    DT05   DT08     IN
DTP34     TP    DT08   DT07      B POSITION
DTP35     MJ                     AND EXIT
DTP36     TP    AW08   LM29     NOSAME
DTP37     MJ           LM00     DIMENSION ERROR
DTP38     TP    AW09   LM29     NOSQAR
DTP39     MJ           LM00     DIMENSION ERROR
DTP40     TP    AW10   LM29     ROWCOL
DTP41     MJ           LM00     DIMENSION ERROR


DT                          B
DT 1                        B
DT 2                        B
DT 3                        B
DT 4                        B
DT 5                        B
DT 6                        B
DT 7                        B
DT 8                        B
DT 9                        B
```

```
DT10                          B
DT11          DT00            BRB
DT12          DT04            BRB
DT13          DT02            BRB


BC        TP    TS04    A                 T TO A
BC 1      EJ    CP04    BC06              V-JUMP ON ONE
BC 2      EJ    CP05    BC09              V-JUMP ON TWO
BC 3      EJ    CP06    BC12              V-JUMP ON THREE
BC 4      TP    AW00    LM29              ALARM 600FUP
BC 5      RJ    LM21    LM00               IF T IS 0 OR G
BC 6      TP    CB44    CB18                  SGT
BC 7      RP    10004    X14               BANK
BC 8      AT    CB43    CB19                 1
BC 9      TP    CB23    CB18              SET
BC10      RP    10004    X14                BANK
BC11      AT    CB43    CB19                    2
BC12      TP    CB24    CB18              SET
BC13      RP    10004    X14                BANK
BC14      AT    CB43    CB19                    3


 R        RJ    MI30    MI00               INTERPRET
 R 1      TP    CB08    CB06              FIND AND STORE
 R 2      RA    CB06    CB01               DIMENSION
 R 3      TV    CB01    TS03                ADDRESS
 R 4      TP    CP04    TS05               1 TO R
 R 5      TP    TS04    A                 T TO A
 R 6      EJ    TS07     R10              T EQUAL 0 JUMP
 R 7      RJ     X16    QD09              TAPE OCTAL READ
 R 8      TV     R42     R15              SET UP
 R 9      MJ             R12               JUMP FOR TAPE
R10       RJ     X16    QD03              CARD OCTAL READ
R11       TV     R41     R15
R12       RP       3     R14              FIND
R13       RA    CB06    CB14               ELEMENT ADD
R14       TV    CB01    TS03              V ADDRESS
R15       MJ                              JUMP
R16       TU    CB06     R17              SET E- CARDS
R17       DV             CP09              DIVIDE BY 6
R18       ZJ     R19     R20               REM EQ 0 TEST
R19       RA    Q       CP04              Q PLUS ONE
R20       TP    Q       TS05               TO  Q TO TS05
R21       RJ     X16    QD00              F1 DEC CARD REA
R22       MJ            RTE00             EXIT
R23       TU    CB06     R24              TAPE F1 DEC REA
R24       DV             CB41              DIV E BY 120
R25       ZJ     R25     R26               REM EQ 0 TEST
R26       RA    Q       CP04              ADD 1 TO Q
```

```
R27     EJ    CP09     R31              JUMP IF Q EQ 6
R28     TP    Q        TS05              Q TO TS05
R29     RJ     X16     QD06             F1 DEC READ
R30     MJ             RTE00            EXIT
R31     RS    Q        CP04             SET UP AND
R32     TP    Q        TS05              READ FIRST
R33     RJ     X16     QD06              5  BLOCKS
R34     TP    CP04     TS05
R35     TP     R43     TS03             BUFFER ADDRESS
R36     RJ     X16     QD06             READ INTO BUFFE
R37     RA    CB01     CB42              SETUP  AND
R38     TV    CB01      R40             TRANSFER
R39     RP   30025      R30              BB00-25
R40     TP    BB00                      TO MATRIX
R41                      R16  BBR        JUMP CONST
R42                      R16  BBR        JUMP CONST
R43                     BB00  BBR        BUFFER CONST


P       RJ    MI30     MI00             INTERP
P 1     TP    CB08     CB06             FIND
P 2     RA    CB06     CB01              AND SETUP
P 3     TV    CB06     TS03             DIMENSION ADD
P 4     TP    CP04     TS05             1 TO R
P 5     TP    TS04     A                T TO ACC
P 6     EJ    TS07      P15             T TEST 0 JUMP
P 7     RJ     X16     QD24             TAPE OCTAL WRIT
P 8     DV    DT02     CB41             DIV E BY 120
P 9     ZJ     P10      P11             REMAIN EQ 0 TES
P10     RA    Q        CP04
P11     TP    Q        TS05
P12     TV     CP01    TS03
P13     RJ     X16     QD21             F1 DEC WRITE-
P14     MJ             RTE00             EXIT    TAPE
P15     TP    CB10     CB09             PLACE
P16     RA    CB09     CB01              ZEROS
P17     TV    CB09      P19               IN
P18     RP   10005      P20                LAST
P19     TP    TS07                          FIVE POS
P20     RJ     X16     QD18             OCTAL PUNCH 1 C
P21     DV    DT02     CP09             DIV E BY 6
P22     ZJ     P23      P24             REMAINDER EQ 0
P23     RA    Q        CP04             ADD 1 TO Q
P24     TP    Q        TS05             Q TO TS05
P25     TV     CP01    TS03             MAT ADD TO TS03
P26     RJ     X16     QD15             F1 DEC PUNCH
P27     MJ             RTE00            EXIT


GM      TV    CB01     GM05
GM 1    TV    CB00     GM04
GM 2    TV    CB02     GM06
```

```
GM 3        TP      TS07     TS08
GM 4        14      1  1             BBR
GM 5        14                       BBR
GM 6        14      20  1            BBR
GM 7        RA       TS08    CP04
GM 8        EJ       DT02    RTE00
GM 9        MJ               GM04


AM          RJ       MI30    MI00                  INTERP
AM 1        RJ      DTP02   DTP00                  SAME DIM TEST
AM 2        TU       DT11   DTP24                  SET UP
AM 3        RJ      DTP23   DTP22                   AND TRANS DIM
AM 4        TP       AM06    GM05                  SET ADD COMM
AM 5        MJ               GM00                  TO 6M00
AM 6        14      2  1             BBR            ADD COMMAND
AM 7        RJ       AM05    AM00                  SUBTRACT ROUT
AM 8        TP       AM11    GM05                  SUB SETUP
AM 9        TP       AM10    AM05                  RESTORE AM05
AM10        MJ               GM00                  TO GM00
AM11        14      3  1             BBR            SUB COMMAND


RM          RJ       MI30    MI00                  INTERPRET
RM 1        TU       DT11   DTP24                  TRANSFER
RM 2        RJ      DTP23   DTP22                   DIMENSIONS
RM 3        TP       RM05     GM04                 SET NO OP COMM
RM 4        MJ               GM00                  TO GM00
RM 5        14      77                BBR           NO OP


KM          RJ       MI30    MI00                  INTERP
KM 1        TU       DT11   DTP21                  TRANSFER
KM 2        RJ      DTP20   DTP19                  DIMENS TO B
KM 3        TP       KM05    GM05                  SET MULT
KM 4        MJ               GM01                  TO GM01
KM 5        14       4       TS03   BBR            CONSTANT MULT


TM          RJ       MI30    MI00                  INTERPRET
TM 1        RJ      DTP18   DTP09                  REVERSE DIMS
TM 2        RP      10004    TM04                  CLEAR TO ZERO
TM 3        TP       TS07    AB00                   AB00-03
TM 4        TU       DT00    AB00                  00-C-00000
TM 5        RA       AB00    CP04                  00-C-00001
TM 6        TV       DT00    AB01                  00 00000-C-
TM 7        RA       AB01    CP03                  00 00001-C-
TM 8        TV       DT01    AB02                  00 00000-R-
```

```
TM 9        TU      CB00    TM21            FORM
TM10        TV      CB02    TM21             SET UP COMMAND
TM11        TV      DT00    AB03            00 00000-C-
TM12        TP      TM21    TM16            STORE SETUP
TM13        IJ      AB03    TM16            COUNT TO C
TM14        IJ      AB02    TM19            DOWN TO R
TM15        MJ              RTE00           EXIT
TM16        TP                              TRANSMIT
TM17        RA      TM16    AB01            BUMP TRANSMIT
TM18        MJ              TM13            TO TM13
TM19        RA      TM21    AB00            BUMP SETUP
TM20        MJ              TM11            TO PRESETUP
TM21        TP                              SETUP COMMAND


IM          RJ      MI30    MI00            INTERPRET
IM 1        RJ      DTP05   DTP03           TEST SQUARE MAT
IM 2        TU      DT11    DTP24           TRANSFER
IM 3        RJ      DTP23   DTP22           DIMENSIONS TO C
IM 4        RJ      TM15    TM02            TRANSPOST TO C
IM 5        TV      IM      TM15            RESTORE TM15
IM 6        RP      10006   IM08            CLEAR
IM 7        TP      TS07    AB00             AB00-05
IM 8        TV      CB00    AB04
IM 9        TV      CB02    AB05
IM10        TU      TS07    DT00            00 00000-C-
IM11        TP      AB05    AB06
IM12        RA      AB06    AB00            INDEX  AB06
IM13        TV      AB04    IM20            SETUP
IM14        TV      AB06    IM21             PROGRAM
IM15        TV      AB06    IM28              FOR
IM16        TV      AB06    IM30             CALCULATION
IM17        RP      10002   IM19            CLEAR
IM18        TP      TS07    TS08             TS08 AND TS09
IM19        14      1       TS07    BBR     LOAD FWR WITH 0
IM20        14        1             BBR     LOAD
IM21        14      5  2            BBR     MULT ADD
IM22        RA      TS09    DT00            BUMP BY C
IM23        RA      TS08    CP04            BUMP BY 1
IM24        EJ      DT00    IM26
IM25        MJ              IM20            RETURN TO FINDK
IM26        14    20 0      AB02    BBR     STORE K
IM27        TP      TS07    TS08            CLEAR I1
IM28        14      1  1            BBR     LOAD
IM29        14      7       AB02    BBR     DIVIDE BY K
IM30        14    20  1             BBR     RESTORE
IM31        RA      TS08    DT00            BUMP I1 BY C
IM32        RA      AB03    CP04            COUNTER
IM33        EJ      DT00    IM35             JUMP AFTER C
IM34        MJ              IM28            FINISH DIVS
IM35        RA      AB01    CP04
IM36        EJ      DT00    IM70            AB01 EQ C JUMP
IM37        EJ      AB00    IM35            AB01 EQ AB00 JP
```

```
IM38    TP    AB00    A                          ABOO TO A
IM39    EJ    TS07    IM75                       EQ O JUMP
IM40    TP    AB05    AB06                       FORM
IM41    RA    AB06    AB00                       SETUPS
IM42    TP    AB05    AB07                       DITTO
IM43    RA    AB07    AB01                       DITTO
IM44    TV    AB04    IM53                       SETUP
IM45    TV    AB06    IM61                        COMMANDS
IM46    TV    AB07    IM54                         FOR
IM47    TV    AB07    IM63                        CALCULATIONS
IM48    TV    AB07    IM65                       OF PROGRAM
IM49    RP    10002   IM51                       CLEAR
IM50    TP    TS07    TS08                        TS07 AND TS08
IM51    TP    TS07    AB03
IM52    14    1       TS07    BBR                LOAD FWR WITH 0
IM53    14      1             BBR                LOAD
IM54    14    5 2             BBR                MULT ADD FORM K
IM55    RA    TS09    DT00                       BUMP I2 BY C
IM56    RA    TS08    CP04                       BUMP I1 BY 1
IM57    EJ    DT00    IM59                       I1 C TESTWEQ JP
IM58    MJ            IM53                       RETURN TO FIN K
IM59    14    20 0    AB02    BBR                STORE K
IM60    TP    TS07    TS08                       CLEAR I1
IM61    14    1 1             BBR                LOAD
IM62    14    4       AB02    BBR                MULT BY K
IM63    14    3 1             BBR                SUB WRONG SIGN
IM64    14    4       CB45    BBR                CHANGE SIGN
IM65    14    20 01           BBR                STORE
IM66    RA    TS08    DT00                       BUMP I1
IM67    RA    AB03    CP04                       COUNTER
IM68    EJ    DT00    IM37                       JUMP AT LAST
IM69    MJ            IM61                       DO OTHERS
IM70    RA    AB00    CP04                       ADD 1
IM71    EJ    DT00    RTE00                      LAST ELEMENT
IM72    RA    AB04    DT00
IM73    TP    TS07    AB01
IM74    MJ            IM11
IM75    TP    CP04    AB01
IM76    MJ            IM40


MM      RJ    MI30    MI00                       INTERPRET
MM 1    RJ    DTP08   DTP06                      C1 EQ R2 TEST
MM 2    RP    10008   MM04                       CLEAR
MM 3    TP    TS07    AB00                        AB00-07
MM 4    TV    DT00    AB00                        C1
MM 5    TV    DT04    AB01                       C2
MM 6    TU    DT12    DTP24                      FORM
MM 7    RJ    DTP35   DTP25                       PROD DIMS
MM 8    RJ    DTP23   DTP22                      AND STORE IN C
MM 9    TV    CB02    MM25                       C ADDRESS
```

```
MM10    TV    CB01    AB07          B ADDRESS
MM11    TV    CB00    AB05          A ADDRESS
MM12    RP    10002   MM14          CLEAR
MM13    TP    TS07    TS08           TS08 AND TS09
MM14    TP    AB07    AB06          MULT AND ADD IN
MM15    TP    AB05    AB04          LOAD INST
MM16    14    1       TS07   BBR    0 TO FWR
MM17    TV    AB04    MM19          TRANSMIT V LOAD
MM18    TV    AB06    MM20          TR V MULT ADD
MM19    14    1  1          BBR     LOAD
MM20    14    5  2          BBR     MULT ADD
MM21    RA    TS09    AB01          I2 BUMP BY C2
MM22    RA    TS08    CP04          I1 BUMP BY 1
MM23    EJ    AB00    MM25          IF I1 EQ C1 JP
MM24    MJ            MM19          FINISH ELEMENT
MM25    14    20              BBR   STORE ELEMENT
MM26    RA    MM25    CP04          BUMP STORE
MM27    RA    AB07    CP04          CHANGE FOR
MM28    RA    AB02    CP04           NEXT ELE
MM29    EJ    AB01    MM33          TEST END OF ROW
MM30    RA    AB03    CP04          ELEMENT COUNT
MM31    EJ    DT06    RTE00         TEST LAST ELE
MM32    MJ            MM12          DO NEXT ELE
MM33    RA    CB00    AB00          ACCOMADATE
MM34    TP    TS07    AB02           TO
MM35    MJ            MM10           NEXT ROW AND J


TR      RJ    MI30    MI00          INTERPRET
TR 1    TU    TS07    DT00          C
TR 2    TU    TS07    DT01          R
TR 3    RA    DT00    CP04          C PLUS 1
TR 4    TV    CB00    TR07          A11 ADDRESS
TR 5    14    1       TS07   BBR    0 TO FWR
TR 6    TP    TS07    TS08          CLEAR I1
TR 7    14    2  1          BBR     ADD DIAGONAL
TR 8    RA    TS08    DT00          BUMP I1
TR 9    RS    DT01    CP04          LAST
TR10    EJ    TS07    TR12           ELEMENT CHECK
TR11    MJ            TR07          DO OTHERS
TR12    TV    TS03    TR13          PLACE STORE
TR13    14    20              BBR   STORE SPUR
TR14    MJ            RTE00         EXIT


PI      RJ    MI30    MI00          INTERPRET
PI 1    RJ    GM08    RM01          TRANSFER
PI 2    TV    PI15    GM08          RESTORE GM08
PI 3    TP    TS07    AB00          CLEAR AB00
PI 4    TU    TS07    DT00          C
PI 5    RA    DT00    CP04           C PLUS 1
PI 6    TV    TS07    DT01          R
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PI 7        TV      CB00      PI10                SETUP LOAD
PI 8        TV      CB01      PI12                SETUP STORE
PI 9        TP      TS07      TS08                CLEAR I1
PI10        TV      TS03      PI12                CONST ADDRESS
PI11        14      1  1            BBR           LOAD AKK
PI12        14      2            BBR              ADD P
PI13        14      20  1        BBR              STORE BKK
PI14        RA      TS08      DT00                BUMP I2 BY C+1
PI15        RA      AB00      CP04                ELE COUNT
PI16        EJ      DT02      RTE00                LAST DIAG ELE
PI17        MJ                PI11                DO OTHERS


CL          RJ      MI30      MI00                INTERPRET
CL 1        TP      CB00      CB06
CL 2        SP      TS03        15                FORM
CL 3        AT      CP04      AB00                00-C-1-
CL 4        RA      CB06      AB00                FORM
CL 5        TP      CB14      DT04                00-1-1-
CL 6        TP      DT01      DT05                00-R-R
CL 7        TV      DT01      DT06                00 00000-R-
CL 8        TU      CB14      DT07                FORM
CL 9        TV      DT01      DT07                 00-1-R-
CL10        TU      DT12      DTP21               STORE
CL11        RJ      DTP20     DTP19                DIMENSIONS
CL12        TP       TS07      AB01               CLEAR AB01
CL13        TV      CP04      DT05                00-R-1-
CL14        TU      CB06      CL15                FORM
CL15        TV      CB01      CL16                 TRANSMIT
CL16        TP                                    TRANSMIT
CL17        RA      CL16      AB00                BUMP CL16
CL18        RA      AB01      CP04                ELE  COUNT
CL19        EJ      DT06      RTE00               LAST ELE JUMP
CL20        MJ                CL16                DO REST


RV          RJ      MI30      MI00                INTERPRET
RV 1        TP      CB00      CB06
RV 2        MP      DT00      TS03
RV 3        RA      CB06      Q
RV 4        TP      DT00      DT04                00-C-C-
RV 5        TP      CB14      DT05                00-1-1-
RV 6        TV      DT00      DT06                00 00000-C-
RV 7        TP      DT00      DT07
RV 8        TV      CP04      DT07                00-C-1
RV 9        TU      DT12      DTP21               STORE
RV10        RJ      DTP20     DTP19                DIMENSIONS
RV11        TP       TS07      AB00               CLEAR AB00
RV12        TU      CB06      RV14                SETUP
RV13        TV      CB01      RV14                 TRANSFER
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RV14	TP			TRANSFER
RV15	RA	RV14	DT05	BUMP RV14
RV16	RA	AB00	CP04	ELEMENT TEST
RV17	EJ	DT06	RTE00	LAST ELE JUMP
RV18	MJ		RV14	DO OTHERS
PA	RJ	MI30	MI00	INTERPRET
PA 1	TP	TS03	Q	V TO Q
PA 2	QT	CB11	AB00	QUADRANT
PA 3	QT	CB12	AB01	00 00000 0CC00
PA 4	QT	CB13	AB02	00 00000 000RR
PA 5	TP	CB00	CB06	
PA 6	LQ	AB00	22	POSITION QUAD
PA 7	QJ	PA08	PA15	TEST 0ω1 OR 2ω3
PA 8	TP	Q	AB00	0 OR 1 JUMP
PA 9	SP	DT02	15	2 OR 3 SEQUENCE
PA10	RA	A	DT02	MAKE
PA11	AT	CB06	CB06	CHANGES
PA12	MP	DT00	AB02	FORM
PA13	RS	CB06	Q	AND SUBTRACT
PA14	TP	AB00	Q	N TIMES M-R
PA15	LA	AB01	9	
PA16	LA	A	66	
PA17	AT	AB01	AB01	00-C-C-
PA18	QJ	PA19	PA23	TEST Q 0 OR2
PA19	RA	CB06	DT00	FORM
PA20	RS	CB06	AB01	AND ADD N-C
PA21	TP	DT00	AB00	FORM
PA22	RS	AB00	AB01	00-C1-C1-
PA23	MJ			EXIT
PA24	RJ	PA23	PA00	PARTITION ENTER
PA25	TP	AB01	DT04	FORM
PA26	TP	AB02	A	AND
PA27	LA	A	15	TRANSFER
PA28	AT	AB02	DT05	DIMENSIONS
PA29	MP	AB01	AB02	OF
PA30	TV	Q	DT06	PARTITION
PA31	TP	AB01	DT07	TO
PA32	TV	AB02	DT07	MATRIX
PA33	TU	DT12	DTP21	POSITION
PA34	RJ	DTP20	DTP19	B
PA35	TV	TS07	AB00	00-C-00000
PA36	TU	CB06	PA46	SETUP
PA37	TV	CB01	PA46	PARTITION
PA38	MJ		PA43	JUMP TO PARTIT
PA39	RJ	PA23	PA00	CONSOLIDAT ENT
PA40	TU	TS07	AB00	00 00000-C1-
PA41	TU	CB01	PA46	SETUP
PA42	TV	CB06	PA46	CONSOLIDATION
PA43	TU	TS07	AB01	00 00000-C-
PA44	RP	10002	PA46	CLEAR
PA45	TP	TS07	AB03	AB03 AND AB04

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PA46    TP                          TRANSMIT
PA47    RA      PA46    CB14
PA48    RA      AB03    CP04
PA49    EJ      AB01    PA51
PA50    MJ              PA46        END OF ROW JUMP
PA51    RA      AB04    CP04
PA52    EJ      AB02    RTE00       LAST ROW JUMP
PA53    RA      PA46    AB00        MODIFY TRANSMIT
PA54    TP      TS07    AB03        CLEAR AB03
PA55    MJ              PA46        DO NEXT ROW
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