KL11/DL11

TELETYPE TESTS

MD-11-DZKLA-E

EP-DZKLA-E-DL-A

FICHE 1 OF 1

NOV 1976

digital

MADE IN USA

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                                .ABS
                                .LIST   ME
                                .NLIST  MD,MC
                        ;PRG0- COMBINED INPUT-OUTPUT LOGIC TESTS.
                        ;PRG1- READER TEST.
                        ;PRG2- PRINTER TEST.
                        ;PRG3- PUNCH TEST.
                        ;PRG4- KEYBOARD TEST.
                        ;PRG5- COMBINED TEST.
                        ;PRG6- READER EXERCISER. SPECIAL BINARY COUNT PATTERN.
                        ;PRG7- PRINTER EXERCISER.
                        ;PRG10- SPECIAL BINARY COUNT PATTERN TAPE GENERATOR.
                        ;PRG11- PUNCH CLOCK ADJUSTMENT ROUTINE.
                        ;PRG12- READER CLOCK ADJUSTMENT ROUTINE.
                        ;PRG13- MAINTENANCE MODE SINGLE CHARACTER DATA TEST.
                        ;PRG14- MAINTENANCE MODE SPECIAL BINARY COUNT PATTERN DATA TEST.
                        ;
                        ;STANDARD SR SWITCH OPTIONS (SWITCH SET TO A 1 )
                        ;
                        ;SR 15 - HALT AT END OF ROUTINE.
                        ;SR 14 - SCOPE.
                        ;SR 11 - INHIBIT ITERATION.
                        ;SR 10 -  LOOP PROGRAM
                        ;SR  9 - SELECT ROUTINE.
                        ;SR 8 - DISABLE STALL MODE AND RUN FULL SPEED.
                        ;SR 6 THROUGH SR 0 - NUMBER OF ROUTINE TO BE SELECTED.
000000 000000                   .=0
000000 000002                   .+2                     ;UNASSIGNED TRAP
000002 000000                   HALT
000004 000006           MACHER: .+2                     ;SP OVERFLOW, BUS ERROR TRAP
000006 000000                   HALT
000010 000012                   .+2                     ;RESERVED INSTRUCTION TRAP
000012 000000                   HALT
000014 000016                   .+2                     ;TRACE TRAP
000016 000000                   HALT
000020 000022                   .+2                     ;TRAP TO CALL IOX
000022 000000                   HALT
000024 000026                   .+2                     ;POWER FAIL TRAP
000026 000000                   HALT
000030 002170                   EMTINT                  ;EMT TRAP
000032 000340                   PRTY7
000034 003344                   DLYX                    ;TRAP TRAP. SIMILAR TO EMT
000036 000340                   PRTY7
                        ;LOC 40 THROUGH 776 ARE FILLED WITH .+2 AND HALT.'

000046                          .=46
000046 002062                   LOGIC                   ;SET TO ADDRESS OF ACT 11 HOOkS

                        ;EQUATE STATEMENTS
177776                          CC=177776
177776                          PSW=177776
001200                          SPBOT=1200
000240                          NOP=240
000000                          OPEN=0
100000                          MANUAL=BIT15
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```
                000000                  R0=%0
                000006                  R6=%6
                000007                  PC=%7
                100000                  BIT15=100000
                040000                  BIT14=40000
                020000                  BIT13=20000
                010000                  BIT12=10000
                004000                  BIT11=4000
                002000                  BIT10=2000
                001000                  BIT9=1000
                000400                  BIT8=400
                000200                  BIT7=200
                000100                  BIT6=100
                000040                  BIT5=40
                000020                  BIT4=20
                000010                  BIT3=10
                000004                  BIT2=4
                000002                  BIT1=2
                000001                  BIT0=1
                005726                  POPSP=5726              ;POP THE STACK. SAME AS TST (6)+
                022626                  POPSP2=022626           ;POP STACK TWICE. SAME AS CMP (6)+,(6)+
                000340                  PRTY7=340               ;PRIORITY LEVEL DEFINITIONS
                000300                  PRTY6=300
                000240                  PRTY5=240
                000200                  PRTY4=200
                000140                  PRTY3=140
                000100                  PRTY2=100
                000040                  PRTY1=40
                000000                  PRTY0=0
                000000                  EMTX=0
                104400                  DELAYX=TRAP+0
                000007                  BELL=007
                015142                  BLOCKA=DEND
                015144                  BLOCK1=BLOCKA+2
                015254                  BLOCKB=BLOCKA+112
                015265                  BLKB8=BLOCKA+123
                015256                  BLOCK2=BLOCKA+114
                015267                  BLK2=BLOCKA+125
                015366                  BLOCKC=BLOCKA+224
                015377                  BLKCC=BLOCKA+235
                177777                  P0TLST=-1
                177777                  P1TLST=-1
                177777                  P2TLST=-1
                177777                  P3TLST=-1
                177777                  P4TLST=-1
                000174                  .=174
000174  177570                  SRPTR:  177570
000176  000000                  SOFTSR: 000000
                000200                  .=200
000200  012706  001200                  MOV     #SPBOT,%6               ;SET BOTTOM OF THE STACK
000204  016746  177576                  MOV     6,-(SP)         ;SAVE CURRENT VECTOR
000210  016746  177570                  MOV     4,-(SP)
000214  012767  000230  177562          MOV     #1$,4                   ;SET UP TIME OUT VECTOR
000222  005777  177746                  TST     @SRPTR                  ;TRY TO REFERENCE THE
                                                                        ;HARDWARE SWITCH REGISTER
000226  000404                  BR      2$                      ;BRANCH IF NO TIME OUT TRAP OCCURRS
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                                                                ;CHANGE THE SWITCH REGISTER POINTER
                                                                ;TO POINT TO A SOFTWARE  SWITCH REGISTER
                                                                ;RESTORE THE STACK
                                                                ;RESTORE TIME OUT VECTOR
                                                        ;GO TO START OF PROGRAM.
                                                        ;LSR CSR
                                                        ;LSR BUFFER
                                                        ;LSP CSR
                                                        ;LSP BUFFER
                                                        ;LSR INTERRUPT VECTOR
                                                        ;LSR PRIORITY LEVEL
                                                        ;LSP INTERRUPT VECTOR
                                                        ;LSP PRIORITY LEVEL
                                                        ;CONTAINS CURRENT PROGRAM#
                                                        ;CURRENT PROGRAM START ADDRESS.
                                                        ;CONTAINS ADDR OF CURRENT TEST.
                                                        ;CONTAINS CURRENT TEST #.
                                                        ;CONTAINS ADDR OF NEXT TEST.
                                                        ;CONTAINS CURRENT ITERATION COUNT
                                                        ;CONTAINS CURRENT SCOPE POINTER.
                                                        ;CONTAINS PROGRAM INDICATORS
                                                        ;PRG0 START ADDRESS
                                                        ;PRG1 START ADDRESS
                                                        ;PRG2 START ADDRESS
                                                        ;PRG3 START ADDRESS
                                                        ;PRG4 START ADDRESS
                                                        ;PRG5 START ADDRESS
                                                        ;PRG6 START ADDRESS
                                                        ;PRG7 START ADDRESS
                                                        ;PRG10 START ADDRESS
                                                        ;PRG11 START ADDRESS
                                                        ;PRG12 START ADDRESS
                                                        ;PRG13 START ADDRESS
                                                        ;PRG14 START ADDRESS
                                                        ;POINTER FOR EMT CALL TYPE
                                                        ;POINTER FOR EMT CALL TYPES
                                                        ;POINTER FOR EMT CALL STALL
                                                        ;POINTER FOR EMT CALL ERROR
                                                        ;POINTER FOR EMT CALL DATCHK
                                                        ;POINTER FOR EMT CALL CHALT
                                                        ;POINTER FOR EMT CALL STRDRV
                                                        ;POINTER FOR EMT CALL STPCHV
                                                        ;POINTER FOR EMT CALL EHALT
                                                        ;POINTER FOR EMT CALL SRESET
                                                        ;POINTER FOR EMT CALL SCOPE
                                                        ;POINTER FOR EMT CALL CK33
                                                        ;POINTER FOR EMT CALL CK35
                                                        ;POINTER FOR EMT CALL CK37
                                                        ;POINTER FOR EMT CALL TYPLN3
                                                        ;POINTER FOR EMT CALL DATHLT
                                                        ;POINTER FOR EMT CALL SAVREG
                                                        ;POINTER FOR EMT CALL RSTREG
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113	000230	012767	000176	177736	1$:	MOV	#SOFTSR,SRPTR	
114								
115	000236	022626				CMP	(6)+,(6)+	
116	000240	012667	177540		2$:	MOV	(6)+,4	
117	000244	012667	177536			MOV	(6)+,6	
118	000250	000167	001254			JMP	START	
119		001210				.=1210		
120	001210	177560			TKS:	177560		
121	001212	177562			TKB:	177562		
122	001214	177564			TPS:	177564		
123	001216	177566			TPB:	177566		
124	001220	000060			TKVTR:	60		
125	001222	000200			TKLVL:	PRTY4		
126	001224	000064			TPVTR:	64		
127	001226	000200			TPLVL:	PRTY4		
128	001230	000000			TTYTYP:	OPEN		
129	001232	000000			PRGNUM:	OPEN		
130	001234	000000			KSTART:	OPEN		
131	001236	000000			CURTST:	OPEN		
132	001240	000000			RTNNO:	OPEN		
133	001242	000000			NXTST:	OPEN		
134	001244	000000			ICTR:	OPEN		
135	001246	000000			SCOPTR:	OPEN		
136	001250	000000			PRGID:	OPEN		
137	001252	005144			PRGTAB:	PRG0		
138	001254	007652				PRG1		
139	001256	010026				PRG2		
140	001260	011462				PRG3		
141	001262	012110				PRG4		
142	001264	012410				PRG5		
143	001266	013370				PRG6		
144	001270	013454				PRG7		
145	001272	013626				PRG10		
146	001274	013662				PRG11		
147	001276	013672				PRG12		
148	001300	013762				PRG13		
149	001302	014034				PRG14		
150	001304				EMTTAB:			
151	001304	003665				TYP		
152	001306	003014				TYPS		
153	001310	003146				STAL		
154	001312	001466				ERR		
155	001314	001446				DTCHK		
156	001316	001422				CHLT		
157	001320	002414				STLSRV		
158	001322	002444				STLSPV		
159	001324	001434				EHLT		
160	001326	002474				SRSETT		
161	001330	001754				CHAINN		
162	001332	002210				CHK33		
163	001334	002226				CHK35		
164	001336	002224				CHK33B		
165	001340	004574				TYPL3		
166	001342	001456				DTHLT		
167	001344	002264				SAVRG		
168	001346	002324				RSTRG		

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                                                CKASR                   ;POINTER FOR EMT CALL CHKASR
                                                RSETT2                  ;POINTER FOR EMT CALL RESET2
                                                DLY                     ;POINTER FOR EMT CALL DELAY
                                                RDLY                    ;POINTER FOR EMT CALL RDELAY
                                                RSTAL                   ;POINTER FOR EMT CALL RSTALL
                                    RCNT:       OPEN                    ;CHARACTER COUNT
                                    CRBUF:      OPEN                    ;HOLDS ONE CHARACTER FROM READER.
                                    CHR1:       OPEN
                                    CHR2:       OPEN
                                    CHR3:       OPEN
                                    CHR1A:      OPEN
                                    CHR2A:      OPEN
                                    CHR3A:      OPEN
                                    ERCTR:      OPEN
                                    CTRA:       OPEN
                                    CTRB:       OPEN
                                    CTRC:       OPEN
                                    CTRD:       OPEN
                                    BRCTR:      OPEN
                                    DVDND:      OPEN
                                    DVQUOT:     OPEN
                                    ;COMMON HALT ROUTINE
                                    CHLT:       MOV     @#6,-(0         ;DEVELOP ADDRESS OF CALLER.
                                                SUB     #2,(0
                                                HALT                    ;HALT. ADDRESS OF CALL INSTRUCTION
                                                RTI                     ;IN DATA LIGHTS.
                                    ;UNCONDITIONAL ERROR HALT ROUTINE.
                                    EHLT:       MOV     @#6,-(0         ;DEVELOP ADDRESS OF CALLER.
                                                SUB     #2,(0
                                                HALT                    ;HALT. ADDR OF ERROR CALL
                                                RTI                     ;IN DATA LIGHTS.
                                    ;DATA CHECK ROUTINE.
001446  126767  177712  177711    DTCHK:      CMPB    CRBUF,CRBUF+1   ;COMPARE EXPECTED AND RECEIVED
001454  001403                              BEQ     DTCHKA          ;CHARS. BRANCH IF SAME.
001456  016700  177702              DTHLT:      MOV     CRBUF,(0        ;MOVE S/B AND WAS CHARS TO R0.
001462  000000                              HALT                    ;DATA ERROR HALT. GOOD CHAR IN
                                                                        ;DATA LIGHTS LEFT. BAD CHAR IN DATA
001464  000002                    DTCHKA: RTI                         ;LIGHTS RIGHT. EXIT.
                                    ;CONDITIONAL ERROR HALT.
001466  032777  040000  176500    ERR:        BIT     #BIT14,@SRPTR   ;SCOPE SWITCH SET?
001474  001004                              BNE     ERRA            ;BR IF YES.
001476  011600                              MOV     @#6,(0          ;DEVELOP CALLER'S ADDRESS.
001500  162700  000002                      SUB     #2,(0
001504  000000                              HALT                    ;ERROR HALT.
001506  000002                    ERRA:       RTI                     ;EXIT.
                                    ;ROUTINE END HALT SUBROUTINE.
001510  032777  100000  176456    SHALT:      BIT     #BIT15,@SRPTR   ;HALT AT END OF TEST?
001516  001403                              BEQ     SHLTA           ;BR IF NOT.
001520  116700  177514                      MOVB    RTNNO,(0        ;CURRENT TEST # TO R0.
001524  000000                              HALT                    ;ROUTINE END HALT.
001526  000207                    SHLTA:      RTS     %7              ;EXIT.
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001530  012706  001200          START:   MOV     #SPBOT,%6          ;SET BOTTOM OF SP STACK.
001534  005067  176236                   CLR     PSW
001540  012767  000006  176236           MOV     #6,MACHER
001546  005067  177466                   CLR     RTNNO
001552  005737  000042                   TST     @#42               ;CHAIN OR AUTO-ACCEPTANCE?
001556  001404                           BEQ     1$                 ;BR IF NOT.
001560  004767  001616                   JSR     PC,TIMCAL          ;CALIBRATE DELAY ROUTINE.
001564  000167  012244                   JMP     PRG14              ;GO RUN PRG14.
001570  017700  176400          1$:      MOV     @SRPTR,%0                  ;(@SRPTR) TO R0
001574  042700  177760                   BIC     #177760,%0         ;LIMIT (SR) TO BITS 3-0
001600  020027  000014                   CMP     %0,#14             ;COMPARE (SR) TO PROGRAM LIMIT
001604  101402                           BLOS    CRTA               ;VALID PROGRAM NUMBER?
001606  104010                  INCPRG:  EHALT                      ;NO. INCORRECT PRG NUMBER
001610  000747                           BR      START              ;START OVER.
001612  005067  177432          CRTA:    CLR     PRGID
001616  010067  177410                   MOV     %0,PRGNUM          ;SAVE PROGRAM NUMBER AT PRGNUM
001622  001404                           BEQ     CRTB               ;BR IF 0.
001624  004767  001552                   JSR     PC,TIMCAL          ;CALIBRATE DELAY ROUTINE.
001630  016700  177376                   MOV     PRGNUM,%0          ;PRGNUM BACK TO R0.
001634  000241                  CRTB:    CLC
001636  006100                           ROL     %0                 ;R0X2
001640  000170  001252                   JMP     @PRGTAB(0)         ;GO TO SELECTED PROGRAM.
001644  104005                  SRSET:   CHALT                      ;SET SR OPTIONS DESIRED
001646  016767  177362  177366  GETRDY:  MOV     KSTART,NXTST       ;ADDR OF 1ST ROUTINE TO NXTST
001654  012767  000006  176122  CLEAN:   MOV     #6,MACHER          ;RESET MACHER TRAP.
001652  012706  001200                   MOV     #SPBOT,%6          ;SET UP BOTTOM OF STACK.
001666  104400                           DELAYX
001670  104011                           SRESET
001672  005067  176100                   CLR     PSW
001676  004767  000210          GTRDYA:  JSR     %7,FORWD           ;ROLL FORWARD TO "NEXT" ROUTINE.
001702  032777  001000  176264  GTRDYB:  BIT     #BIT9,@SRPTR       ;SELECT ROUTINE SWITCH SET?
001710  001002                           BNE     GTRDYC             ;BRANCH IF YES.
001712  000177  177320                   JMP     @CURTST            ;RUN CURRENT ROUTINE.
001716  017700  176252          GTRDYC:  MOV     @SRPTR,%0          ;(@SRPTR) TO R0
001722  042700  177600                   BIC     #177600,%0         ;MASK UNDESIRED BITS
001726  126700  177306                   CMPB    RTNNO,%0           ;COMPARE RTNNO TO (R0)
001732  001002                           BNE     GTRDYD             ;BRANCH IF ROUTINE NOT FOUND YET.
001734  000177  177276                   JMP     @CURTST            ;GO RUN ROUTINE.
001740  022767  177777  177274  GTRDYD:  CMP     #-1,NXTST          ;NO. CHECK FOR LAST ROUTINE.
001746  001353                           BNE     GTRDYA             ;LAST ROUTINE?
001750  104010                  INCRTN:  EHALT                      ;YES. INCORRECT ROUTINE SELECTED.
001752  000735                           BR      GETRDY             ;START OVER.
001754  012706  001200          CHAINN:  MOV     #SPBOT,R6          ;RESET STACK.
001760  032777  040000  176206           BIT     #BIT14,@SRPTR      ;SCOPE?
001766  001406                           BEQ     CHNA               ;BR IF NOT.
001770  022767  177777  177250           CMP     #-1,SCOPTR         ;YES. SCOPE POINTER = -1?
001776  001402                           BEQ     CHNA               ;BRANCH IF SCOPE ENTRY IS -1.
002000  000177  177242                   JMP     @SCOPTR            ;RETURN TO ROUTINE.
002004  032777  004000  176162  CHNA:    BIT     #BIT11,@SRPTR      ;INHIBIT ITERATION?
002012  001005                           BNE     CHNAA              ;BR IF YES.
002014  005367  177224                   DEC     ICTR               ;NO. ICTR 0?
002020  001402                           BEQ     CHNAA              ;BR IF YES.
002022  000177  177220                   JMP     @SCOPTR            ;NO. RETURN TO TEST ROUTINE
002026  004767  177456          CHNAA:   JSR     %7,SHALT           ;GO HALT IF HALT SWITCH IS SET
002032  032777  001000  176134  CHNB:    BIT     #BIT9,@SRPTR       ;SELECT ROUTINE?
002040  001302                           BNE     GETRDY             ;BR IF YES.
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   276  002042  022767  177777  177172          CMP     #-1,NXTST       ;NO. LAST TEST?
   277  002050  001301                          BNE     CLEAN           ;BR IF NOT.
   278  002052  013700  000042          CHNC:   MOV     @#42,R0         ;GET CONTENTS OF 42.
   279  002056  001407                          BEQ     HERE            ;BR IF 0.
   280  002060  000005                          RESET
   281  002062  004710                  LOGIC:  JSR     PC,(0)          ;RETURN TO MONITOR.
   282  002064  000240  000240  000240          .WORD   NOP,NOP,NOP
   283  002072  000167  011736                  JMP     PRG14           ;RETURN TO PRG14.
   284  002076  032777  002000  176070  HERE:   BIT     #BIT10,@SRPTR   ;LOOP PROGRAM?
   285  002104  001260                          BNE     GETRDY          ;BR IF YES.
   286  002106  000000                          HALT                    ;PROGRAM END HALT.
   287  002110  000656                          BR      GETRDY          ;RESTART.
   28   002112  016705  177124          FORWD:  MOV     NXTST,%5        ;ADDR OF NEXT ROUTINE TO R5.
   289  002116  012567  177116                  MOV     (5)+,RTNNO      ;GET NEXT ROUTINE NUMBER.
   290  002122  012567  177114                  MOV     (5)+,NXTST      ;GET ADDR OF NEXT "NEXT" ROUTINE.
   291  002126  105767  177116                  TSTB    PRGID           ;CHECK IF PROGRAM SCOPE AND I COUNT
   292  002132  100407                          BMI     FORWD8          ;PARAMETERS. BRANCH IF NOT.
   293  002134  012567  177104                  MOV     (5)+,ICTR       ;GET ITERATION COUNT.
   294  002140  012567  177102                  MOV     (5)+,SCOPTR     ;GET SCOPE LOOP ENTRY POINTER.
   295  002144  010567  177066          FORWDA: MOV     %5,CURTST       ;ADDR OF NOW CURRENT TEST TO CURTST.
   296  002150  000207                          RTS     %7              ;EXIT FORWD SUBROUTINE.
   297  002152  012767  177777  177066  FORWD8: MOV     #-1,SCOPTR      ;FORCE "NO SCOPE"
   298  002160  012767  000001  177056          MOV     #1,ICTR         ;FORCE I COUNT OF 1
   299  002166  000766                          BR      FORWDA
   300                                  ;EMT INTERPRTER ROUTINE.
   301  002170  010046                  EMTINT: MOV     R0,-(6)         ;PUSH R0.
   302  002172  016600  000002                  MOV     2(6),R0         ;GET EMT PC.
   303  002176  014000                          MOV     -(0),R0         ;GET EMT CALL.
   304  002200  006300                          ASL     R0              ;TIMES 2.
   305  002202  016000  171304                  MOV     EMTTAB-10000(0),R0 ;DEVELOP EMT ADDR.
   306  002206  000200                          RTS     R0              ;GO TO EMT RTN. RESTORE R0.
   307                                  ;ROUTINES TO DETERMINE TTY TYPES.
   308  002210  032767  000001  177012  CHK33:  BIT     #1,TTYTYP       ;CHECK FOR 33
   309  002216  001002                          BNE     CHK33B          ;BR IF NOT 33.
   310  002220  062716  000002          CHK33A: ADD     #2,(6)          ;SET UP 33 EXIT.
   311  002224  000002          CHK33B: RTI                             ;EXIT.
   312  002226  032767  000001  176774  CHK35:  BIT     #1,TTYTYP       ;CHECK FOR 35.
   313  002234  001371                          BNE     CHK33A          ;BR IF 35.
   314  002236  000002                          RTI                     ;NOT 35.
   315  002240  032767  000010  176762  CKASR:  BIT     #BIT3,TTYTYP    ;CHECK FOR ASR TTY.
   316  002246  001001                          BNE     .+4             ;BRANCH IF NOT ASR.
   317  002250  000002                          RTI                     ;ASR. EXIT.
   318  002252  022626                          POPSP2                  ;POP STACK TWICE.
   319  002254  012767  000001  176762          MOV     #1,ICTR         ;FORCE I COUNT TO A 1.
   320  002262  104012                          SCOPE                   ;SCOPE TO BYPASS ROUTINE.
   321                                  ;SAVE REGS 0 TO 4 SUBROUTINE.
   322  002264  012667  000030          SAVRG:  MOV     (6)+,SVRPC      ;SAVE PC AND PSW.
   323  002270  012667  000026                  MOV     (6)+,SVRPSW
   324  002274  010446                          MOV     %4,-(6)         ;SAVE REGS 0 - 4
   325  002276  010346                          MOV     %3,-(6)         ;IN STACK.
   326  002300  010246                          MOV     %2,-(6)
   327  002302  010146                          MOV     %1,-(6)
   328  002304  010046                          MOV     %0,-(6)
   329  002306  016746  000010                  MOV     SVRPSW,-(6)     ;RESTORE PC AND PSW.
   330  002312  016746  000002                  MOV     SVRPC,-(6)
   331  002316  000002                          RTI                     ;EXIT.
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  332  002320  000000                    SVRPC:  OPEN
  333  002322  000000                    SVRPSW: OPEN
  334                                    ;RESTORE REGS 0 TO 4 SUBROUTINE.
  335  002324  012667  000030            RSTRG:  MOV     (6)+,RSTPC      ;SAVE PC AND PSW.
  336  002330  012667  000026                    MOV     (6)+,RSTPSW
  337  002334  012600                            MOV     (6)+,%0         ;RESTORE REGS 0 - 4
  338  002336  012601                            MOV     (6)+,%1         ;FROM STACK.
  339  002340  012602                            MOV     (6)+,%2
  340  002342  012603                            MOV     (6)+,%3
  341  002344  012604                            MOV     (6)+,%4
  342  002346  016746  000010                    MOV     RSTPSW,-(6)     ;RESTORE PC AND PSW.
  343  002352  016746  000002                    MOV     RSTPC,-(6)
  344  002356  000002                            RTI                     ;EXIT
  345  002360  000000                    RSTPC:  OPEN
  346  002362  000000                    RSTPSW: OPEN
  347                                    ;ROUTINE TO FETCH A CHARACTER
  348  002364  012767  000310  177022    AREAD:  MOV     #200.,BRCTR     ;SET UP DELAY COUNT.
  349  002372  005277  176612                    INC     @TKS            ;ENABLE READER.
  350  002376  104400                            DELAYX                  ;WAIT.
  351  002400  105777  176604                    TSTB    @TKS            ;DONE SET?
  352  002404  100402                            BMI     ARDB            ;BR IF YES.
  353  002406  104010                            EHALT                   ;ERROR. NO RESPONSE FROM READER.
  354  002410  000765                            BR      AREAD           ;TRY AGAIN.
  355  002412  000207                    ARDB:   RTS     %7              ;EXIT
  356                                    ;ROUTINE TO SET LSR INTERRUPT VECTOR AND PRIORITY
  357  002414  017667  000000  000012    STLSRV: MOV     @(6),STPRA+2    ;MOVE VECTOR ADDR TO STPRA+2
  358  002422  062716  000002                    ADD     #2,@%6          ;SET UP EXIT
  359  002426  016701  176566                    MOV     TKVTR,%1
  360  002432  012721  000000            STPRA:  MOV     #OPEN,(1)+      ;SET VECTOR ADDRESS
  361  002436  016721  176560                    MOV     TKLVL,(1)+      ;SET PRIORITY
  362  002442  000002                            RTI                     ;EXIT
  363                                    ;ROUTINE TO SET LSP INTERRUPT VECTOR AND PRIORITY.
  364  002444  017667  000000  000012    STLSPV: MOV     @(6),STPPA+2    ;MOVE VECTOR ADDR TO STPPA+2
  365  002452  062716  000002                    ADD     #2,@%6          ;SET UP EXIT
  366  002456  016701  176542                    MOV     TPVTR,%1
  367  002462  012721  000000            STPPA:  MOV     #OPEN,(1)+      ;SET VECTOR ADDRESS.
  368  002466  016721  176534                    MOV     TPLVL,(1)+      ;SET PRIORITY
  369  002472  000002                            RTI                     ;EXIT.
  370                                    ;ROUTINE TO ISSUE RESET.
  371  002474  012700  052525            SRSETT: MOV     #52525,%0               ;DATA TO R0.
  372  002500  005100                            COM     %0              ;COMPLEMENT (R0).
  373  002502  010067  177770                    MOV     %0,SRSETT+2     ;(R0) TO SRSETT+2.
  374  002506  000005                            RESET                   ;ISSUE RESET. (R0) IS
  375  002510  000002                            RTI                     ;DISPLAYED. EXIT.
  376                                    ;DOUBLE RESET SUBROUTINE.
  377  002512  104011                    RSETT2: SRESET
  378  002514  104011                            SRESET
  379  002516  000002                            RTI                     ;EXIT.
  380                                    ;RANDOM NUMBER GENERATOR. ROUTINE EXITS WITH NUMBER IN REGISTER 0.
  381  002520  016700  000042            RNGEN:  MOV     RP1,%0
  382  002524  006100                            ROL     %0
  383  002526  006100                            ROL     %0
  384  002530  066700  000034                    ADD     RP2,%0
  385  002534  010067  000026                    MOV     %0,RP1
  386  002540  006100                            ROL     %0
  387  002542  006100                            ROL     %0
```

```
                                                ADD     RP2,%0
                                                ROL     %0
                                                ROL     %0
                                                MOV     %0,RP2
                                                MOV     RP1,%0
                                                RTS     %7              ;EXIT. NUMBER IN R0
                                        RP1:    1233
                                        RP2:    7622
                                        BREAD:  STRDRV                  ;SET READER VECTOR
                                                BREADB                  ;TO BREADB
                                                BIS     #101,@TKS       ;ENABLE LSR AND LSRI.
                                                DELAY                   ;AWAIT INTERRUPT.
                                                200.
                                                CLR     @TKS            ;CLEAR LSRI ENABLE.
                                                EHALT                   ;NO RESPONSE HALT.
                                                BR      BREAD           ;TRY AGAIN.
                                        BREADA: POPSP2
                                                MOVB    @TKB,CRBUF      ;CHAR READ TO CRBUF.
                                                RTS     %7              ;EXIT SUBROUTINE.
                                        BREADB: CLR     @TKS            ;CLEAR LSR INTERRUPT ENABLE.
                                                TSTB    @TKS            ;TEST FOR DONE.
                                                BPL     BREADC          ;BRANCH IF DONE NOT SET.
                                                MOV     #BREADA,@%6     ;MODIFY INTERRUPT EXIT TO BREADA.
                                                RTI                     ;OK. EXIT INTERRUPT.
                                        BREADC: HALT                    ;HALT. DONE BIT NOT SET AFTER INTERRUPT.
                                                MOV     #BREADD,(6)     ;POINT TO BREADD.
                                                RTI                     ;EXIT INTERRUPT.
                                        BREADD: POPSP2
                                                BR      BREAD           ;TRY AGAIN.
                                        ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
                                        TYP:    MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS.
                                                ADD     #2,@%6          ;SET UP EXIT.
                                                MOV     @%0,%0          ;ADDRESS OF MESSAGE TO R0.
                                        TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
                                                CMPB    #100,TYPDAT     ;CHECK FOR"@"CHARACTER
                                                BNE     TYPC            ;BRANCH IF NOT"@".
                                                DELAY                   ;WAIT 100 MSECS.
                                                100.
                                                RTI                     ;TERMINATOR CHAR. DONE. EXIT.
                                        TYPC:   CMPB    #45,TYPDAT      ;CHECK FOR"%".
                                                BEQ     TYPF            ;BRANCH IF"%"
                                                CMPB    #43,TYPDAT      ;NOT"%".CHECK FOR"#".
                                                BEQ     TYPG            ;BRANCH IF "#"
                                                JSR     %7,TYPD         ;TYPE CHAR IN TYPDAT
                                                BR      TYPA
                                        TYPD:   MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
                                                TSTB    @TPS            ;WAIT FOR DONE FLAG.
                                                BPL     .-4
                                                RTS     %7              ;EXIT
                                        TYPF:   MOVB    #15,TYPDAT      ;MOVE CARRIAGE RETURN CODE TO TYPDAT
                                                JSR     %7,TYPD         ;GO TYPE CHAR.
                                        TYPG:   MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT.
                                                JSR     %7,TYPD         ;GO TYPE CHAR.
                                                BR      TYPA
                                        TYPDAT: OPEN
                                        ;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
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   444  003014  011600                    TYPS:   MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
   445  003016  062716  000002                    ADD     #2,@%6          ;UPDATE TO NEXT MESSAGE ADDRESS
   446  003022  011067  000014                    MOV     @%0,TYPSB       ;ADDRESS OF MESSAGE TO TYPSB
   447  003026  022767  177777  000006            CMP     #-1,TYPSB       ;CHECK FOR TERMINATOR
   448  003034  001001                            BNE     TYPSA           ;BRANCH IF NOT TERMINATOR.
   449  003036  000002                            RTI                     ;TERMINATOR, EXIT
   450  003040  104000                    TYPSA:  TYPE                    ;CALL ON TYP SUB TO TYPE MESSAGE
   451  003042  000000                    TYPSB:  OPEN                    ;ADDRESS OF MESSAGE GOES HERE
   452  003044  000763                            BR      TYPS            ;GO PROCESS NEXT MESSAGE
   453                                    ;SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS
   454          003050                    DLCNT=.+2
   455  003046  011627  000000            DLY:    MOV     (6),#0          ;GET DELAY COUNT ADDRESS.
   456  003052  062716  000002                    ADD     #2,@%6          ;SET UP EXIT ADDRESS
   457  003056  017767  177766  177764            MOV     @DLCNT,DLCNT    ;DELAY COUNT TO STACK
   458  003064  005067  174706                    CLR     PSW             ;SET PRIORITY 0
   459          003072                    MSEC=.+2
   460  003070  012767  000000  000046    DLYA:   MOV     #0,DLYT         ;1 MSEC COUNT TO DLYT
   461  003076  016767  000042  000040    DLYB:   MOV     DLYT,DLYT
   462  003104  016767  000034  000032            MOV     DLYT,DLYT
   463  003112  016767  000026  000024            MOV     DLYT,DLYT
   464  003120  016767  000020  000016            MOV     DLYT,DLYT
   465  003126  005367  000012                    DEC     DLYT            ;DECREMENT DLYT.
   466  003132  001361                            BNE     DLYB            ;BRANCH IF NOT 0.
   467  003134  005367  177710                    DEC     DLCNT           ;DECREMENT COUNT
   468  003140  001353                            BNE     DLYA            ;BR IF NOT DONE DELAYING
   469  003142  000002                            RTI                     ;EXIT.
   470  003144  000000                    DLYT:   OPEN
   471                                    ;SUBROUTINE TO STALL A RANDOM NUMBER OF MILLISECONDS. MAXIMUM STALL
   472                                    ;DETERMINED BY CONTENTS OF LOC STLMSK.
   473  003146  032767  040000  176074    STAL:   BIT     #BIT14,PRGID    ;TEST FOR STALLS ALLOWED.
   474  003154  001001                            BNE     STALAA          ;ALLOWED.
   475  003156  000002                            RTI                     ;NOT ALLOWED.
   476  003160  004767  177334            STALAA: JSR     %7,RNGEN        ;GO GET RANDOM NUMBER.
   477  003164  046700  000014                    BIC     STLMSK,%0       ;# IN R0. APPLY STALL MASK.
   478  003170  001404                            BEQ     STALB           ;BRANCH IF RESULT IS 0.
   479  003172  010067  000002                    MOV     %0,STALA
   480  003176  104024                            DELAY                   ;DELAY
   481  003200  000000                    STALA:  OPEN                    ;DELAY COUNT
   482  003202  000002                    STALB:  RTI                     ;DONE. EXIT.
   483  003204  000000                    STLMSK: OPEN                    ;STALL MASK.
   484                                    ;READER DELAY ROUTINE.
   485          003210                    RDLCNT=.+2
   486  003206  011627  000000            RDLY:   MOV     (6),#0
   487  003212  062716  000002                    ADD     #2,(6)
   488  003216  017767  177766  177764            MOV     @RDLCNT,RDLCNT  ;GET DELAY COUNT.
   489  003224  005067  174546                    CLR     PSW
   490  003230  016767  177636  000046    RDLYA:  MOV     MSEC,DLYR
   491  003236  016767  000042  000040    RDLYB:  MOV     DLYR,DLYR
   492  003244  016767  000034  000032            MOV     DLYR,DLYR
   493  003252  016767  000026  000024            MOV     DLYR,DLYR
   494  003260  016767  000020  000016            MOV     DLYR,DLYR
   495  003266  005367  000012                    DEC     DLYR            ;DECREMENT DLYR.
   496  003272  001361                            BNE     RDLYB           ;BR IF NOT 0.
   497  003274  005367  177710                    DEC     RDLCNT          ;DECREMENT COUNT.
   498  003300  001353                            BNE     RDLYA           ;BR IF NOT 0.
   499  003302  000002                            RTI                     ;EXIT.
```

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                                DLYR:   OPEN
                                ;READER STALL ROUTINE.
003306  032767  040000  175734  RSTAL:  BIT     #BIT14,PRGID    ;STALL?
003314  001001                          BNE     RSTLA           ;BR IF YES.
003316  000002                          RTI                     ;NO. EXIT.
003320  004767  177174          RSTLA:  JSR     PC,RNGEN        ;GET RANDOM NUMBER.
003324  046700  177654                  BIC     STLMSK,%0
003330  001404                          BEQ     RSTLB
003332  010067  000002                  MOV     %0,RSTLAA
003336  104025                          RDELAY                  ;DELAY.
003340  000000          RSTLAA: OPEN
003342  000002          RSTLB:  RTI                             ;DONE. EXIT.
                                ;SUB TO DELAY % TIME.
                                DLYR0=DLYX+4
                                DLYR1=DLYXA+4
003344  012727  000144  000000  DLYX:   MOV     #100.,#0        ;
003352  005067  174420                  CLR     PSW
003356  012727  001750  000000  DLYXA:  MOV     #1000.,#0       ;COUNT TO DLYR1.
003364  005367  177772          DLYXB:  DEC     DLYR1           ;DECREMENT DLYR1.
003370  001375                          BNE     DLYXB           ;BR IF NOT 0.
003372  005367  177752                  DEC     DLYR0           ;DECREMENT DLYR0.
003376  001367                          BNE     DLYXA           ;BR IF NOT 0.
003400  000002                          RTI                     ;EXIT.
                                ;DELAY ROUTINE CALIBRATE ROUTINE.
003402  004767  000050          TIMCAL: JSR     PC,TSPCH        ;OUTPUT CHAR.
003406  004767  000044                  JSR     PC,TSPCH        ;OUTPUT CHAR.
003412  104400                          DELAYX
003414  104011                          SRESET
003416  005067  175776                  CLR     DVQUOT
003422  016767  175766  175766          MOV     BRCTR,DVDND     ;SAVE BRCTR CONTENTS.
003430  162767  000144  175760  TIMCLA: SUB     #100.,DVDND     ;DVDND-100
003436  103403                          BLO     TIMCLB          ;BR IF UNSUCCESFUL.
003440  005267  175754                  INC     DVQUOT          ;INCR QUOTIENT.
003444  000771                          BR      TIMCLA
003446  016767  175746  177416  TIMCLB: MOV     DVQUOT,MSEC     ;SAVE 1 MSEC CONSTANT.
003454  000207                          RTS     PC              ;EXIT.
003456  104007                  TSPCH:  STPCHV                  ;SET UP VECTOR.
003460  003542                          TSPCHA
003462  005067  175726                  CLR     BRCTR
003466  005077  175524                  CLR     @TPB            ;LOAD BUFFER WITH 0.
003472  052777  000100  175514          BIS     #BIT6,@TPS      ;ENABLE INTERRUPT.
003500  016767  175710  175706  TSPCHC: MOV     BRCTR,BRCTR
003506  016767  175702  175700          MOV     BRCTR,BRCTR
003514  016767  175674  175672          MOV     BRCTR,BRCTR
003522  016767  175666  175664          MOV     BRCTR,BRCTR
003530  005267  175660                  INC     BRCTR
003534  001361                          BNE     TSPCHC          ;BR IF RESULT NOT 0.
003536  001434                          EHLT                    ;NO INTERRUPT FROM PUNCH/PRINTER.
003540  000777                          BR      .
003542  012716  003550          TSPCHA: MOV     #TSPCHB,(6)     ;MODIFY INTERRUPT EXIT TP STPCHB.
003546  000002                          RTI                     ;EXIT INTERRUPT.
003550  000207                  TSPCHB: RTS     PC              ;EXIT.
                                ;SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT
003552  004767  176742          GRCNT:  JSR     %7,RNGEN        ;GET RANDOM NUMBER
003556  046700  000010                  BIC     RCMSK,%0        ;APPLY MASK
003562  001773                          BEQ     GRCNT           ;TRY AGAIN IF RESULT 0
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   556  003564  010067  000004                  MOV     %0,RNCNT        ;COUNT TO RNCNT
   557  003570  000207                          RTS     %7              ;EXIT.
   558  003572  000000                  RCMSK:  OPEN                    ;RANDOM CHARACTER MASK.
   559  003574  000000                  RNCNT:  OPEN                    ;RANDOM CHARACTER COUNT.
   560                                  ;SUB TO COMPARE READER DATA AGAINST EXPECTED DATA AND REPORT ERRORS.
   561  003576  004767  000262          BCHECK: JSR     %7,GTBIN        ;GET BIN CHARACTER(IN R0)
   562  003602  110067  175557                  MOVB    %0,CRBUF+1      ;S/B CHAR TO CRBUF+1
   563  003606  126767  175552  175551        CMPB    CRBUF,CRBUF+1   ;COMPARE S/B AND WAS CHARS.
   564  003614  001001                          BNE     .+4             ;BRANCH IF NOT SAME.
   565  003616  000207                          RTS     %7              ;SAME. EXIT.
   566  003620  104017                          DATHLT                  ;GO HALT AND DISPLAY DATA.
   567  003622  005367  175554                  DEC ERCTR               ;3 ERRORS?
   568  003626  001002                          BNE     .+6             ;BRANCH IF NOT 3 YET.
   569  003630  004767  000002                  JSR     %7,BSYNC        ;3 ERRORS. RESYNC READER.
   570  003634  000207                          RTS     %7              ;EXIT.
   571                                  ;SUBROUTINE TO SYNC THE LSR TO A SPECIAL BINARY COUNT PATTERN TEST TAPE.
   572  003636  004767  000164          BSYNC:  JSR     %7,INBIN        ;INITIALIZE BINARY PATTERN
   573  003642  004767  176724                  JSR     %7,BREAD        ;READ CHAR AND STORE AT CHR1
   574  003646  116767  175512  175512        MOVB    CRBUF,CHR1
   575  003654  004767  176712                  JSR     %7,BREAD        ;READ CHAR AND STORE AT CHR2
   576  003660  116767  175500  175502        MOVB    CRBUF,CHR2
   577  003666  004767  176700                  JSR     %7,BREAD        ;READ CHAR AND STORE AT CHR3.
   578  003672  116767  175466  175472        MOVB    CRBUF,CHR3
   579  003700  004767  000012                  JSR     %7,SYNCA        ;GO SYNC
   580  003704  000754                          BR      BSYNC           ;NO SYNC. TRY AGAIN.
   581  003706  012767  000003  175466        MOV     #3,ERCTR
   582  003714  000207                          RTS     %7              ;SUCCESS.EXIT.
   583  003716  012767  001000  000100  SYNCA:  MOV     #512.,SYCTRA    ;512 TO SYCTRA.
   584  003724  004767  000134          SYNCB:  JSR     %7,GTBIN        ;BIN CHAR TO CHR1A.
   585  003730  010067  175440                  MOV     %0,CHR1A
   586  003734  004767  000124                  JSR     %7,GTBIN        ;BIN CHAR TO CHR2A.
   587  003740  010067  175432                  MOV     %0,CHR2A
   588  003744  004767  000114                  JSR     %7,GTBIN        ;BIN CHAR TO CHR3A.
   589  003750  010067  175424                  MOV     %0,CHR3A
   590  003754  026767  175406  175412        CMP     CHR1,CHR1A      ;MATCH?
   591  003762  001013                          BNE     SYNCC           ;BR IF NOT.
   592  003764  026767  175430  175404        CMP     CHR2,CHR2A      ;MATCH?
   593  003772  001007                          BNE     SYNCC           ;BR IF NOT.
   594  003774  026767  175372  175376        CMP     CHR3,CHR3A      ;MATCH?
   595  004002  001003                          BNE     SYNCC           ;BR IF NOT.
   596  004004  062716  000002                  ADD     #2,(6)          ;SET UP SYNCED EXIT.
   597  004010  000207                          RTS     %7              ;EXIT.
   598  004012  005367  000006          SYNCC:  DEC     SYCTRA          ;TRIED 512 TIMES?
   599  004016  001342                          BNE     SYNCB           ;BR IF NOT.
   600  004020  104010                          EHALT                   ;YES. SYNC ERROR.
   601  004022  000207                          RTS     %7              ;SYNC ERROR EXIT.
   602  004024  000000                  SYCTRA: OPEN
   603                                  ;SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS.
   604  004026  012767  177777  000014  INBIN:  MOV     #-1,RIND        ;SET ALL VARIABLES
   605  004034  004567  000300                  JSR     %5,BMOVE        ;TO MINUS 1.
   606  004040  004050                          RIND
   607  004042  004051                          RIND+1
   608  004044  000013                          11.
   609  004046  000207                          RTS     %7              ;EXIT
   610  004050  000000                  RIND:   OPEN
   611  004052  000000                  PTO:    OPEN
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   612  004054  000000                  PT1:    OPEN
   613  004056  000000                  PIND:   OPEN
   614  004060  000000                  PTOP:   OPEN
   615  004062  000000                  PT1P:   OPEN
   616                                  ;SPECIAL BINARY COUNT PATTERN SUBROUTINE. EXITS WITH BIN CHAR IN R0
   617  004064  016767  177762  177762 GTBIN:  MOV     PT0,PT1          ;PREVIOUS BIN CHAR TO PT1
   618  004072  005167  177756         COM     PT1
   619  004076  005167  177746         COM     RIND
   620  004102  001002                  BNE     .+6
   621  004104  005267  177744         INC     PT1
   622  004110  042767  177400  177736 BIC     #177400,PT1      ;MASK TO 8 BITS
   623  004116  016767  177732  177726 MOV     PT1,PT0          ;SAVE BIN CHAR IN PT0
   624  004124  016700  177724         MOV     PT1,%0           ;BIN CHAR TO R0.
   625  004130  000207                  RTS     %7               ;EXIT.
   626  004132  016767  177722  177722 GTBINP: MOV     PTOP,PT1P        ;PREVIOUS BIN CHAR TO PT1P
   627  004140  005167  177716         COM     PT1P
   628  004144  005167  177706         COM     PIND
   629  004150  001002                  BNE     .+6
   630  004152  005267  177704         INC     PT1P
   631  004156  042767  177400  177676 BIC     #177400,PT1P     ;MASK TO 8 BITS.
   632  004164  016767  177672  177666 MOV     PT1P,PTOP        ;SAVE BIN CHAR IN PTOP.
   633  004172  016701  177664         MOV     PT1P,%1          ;BIN CHAR TO R1.
   634  004176  000207                  RTS     %7               ;EXIT.
   635                                  ;OCTAL TO ASCII CONVERT ROUTINE
   636  004200  012500                  ACNV6:  MOV     (5)+,%0          ;CONVERT TO 6 ASCII. GET OCTAL ADDRESS
   637  004202  012567  000012         MOV     (5)+,ACNVB       ;GET ASCII ADDRESS
   638  004206  004767  000052         JSR     %7,ACNV          ;CONVERT TO ASCII
   639  004212  004567  000122         JSR     %5,BMOVE         ;MOVE 6 CHARS TO ASCII ADDRESS
   640  004216  004254                  A1ST
   641  004220  000000                  ACNVB:  OPEN
   642  004222  000006                  6
   643  004224  000205                  RTS     %5               ;EXIT
   644  004226  012500                  ACNV4:  MOV     (5)+,%0          ;CONVERT TO 4 ASCII. GET OCTAL ADDRESS
   645  004230  012567  000012         MOV     (5)+,ACNVC       ;GET ASCII ADDRESS
   646  004234  004767  000024         JSR     %7,ACNV          ;CONVERT TO ASCII
   647  004240  004567  000074         JSR     %5,BMOVE         ;MOVE 4 CHARS TO ASCII ADDRESS.
   648  004244  004256                  A1ST+2
   649  004246  000000                  ACNVC:  OPEN
   650  004250  000004                  4
   651  004252  000205                  RTS     %5               ;EXIT
   652  004254  000000                  A1ST:   OPEN
   653  004256  000000                  OPEN
   654  004260  000000                  OPEN
   655  004262  000000                  ACNVX:  OPEN
   656  004264  012701  004262         ACNV:   MOV     #A1ST+6,%1       ;ADDR TO STORE ASCII TO R1
   657  004270  012702  000006         MOV     #6,%2            ;6 TO R2
   658  004274  011067  177762         MOV     @%0,ACNVX        ;OCTAL WORD TO ACNVX
   659  004300  016703  177756         ACNVM:  MOV     ACNVX,%3
   660  004304  042703  177770         BIC     #177770,%3       ;ISOLATE LEAST SIGNIFICANT OCTAL #
   661  004310  062703  000060         ADD     #60,%3           ;ADD 60 TO CONVERT TO ASCII
   662  004314  110341                  MOVB    %3,-(1)          ;STORE ASCII BYTE
   663  004316  006067  177740         ROR     ACNVX            ;MOVE NEXT OCTAL DIGIT TO LEAST
   664  004322  006067  177734         ROR     ACNVX            ;SIGNIFICANT POSITION
   665  004326  006067  177730         ROR     ACNVX
   666  004332  005302                  DEC     %2               ;DONE 6 TIMES?
   667  004334  001361                  BNE     ACNVM            ;NO. REPEAT.
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                                        RTS     %7              ;YES. EXIT.
                                ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
                                BMOVE:  SAVREG                  ;SAVE REGS.
                                        MOV     (5)+,%1         ;GET"FROM"ADDRESS
                                        MOV     (5)+,%2         ;GET"TO"ADDRESS
                                        MOV     (5)+,%3         ;GET COUNT
                                BMOVA:  MOVB    (1)+,(2)+       ;MOVE BYTE
                                        DEC     %3              ;DECREMENT COUNT
                                        BNE     BMOVA           ;BRANCH IF NOT DONE.
                                        RSTREG                  ;RESTORE REGS.
                                        RTS     %5              ;DONE EXIT
                                ;SUBROUTINE TO CHECK FOR PUNCH READY.
                                CPRDY:  TSTB    @TPS            ;TEST FOR READY BIT.
                                        BPL     CPRDYA          ;BRANCH IF READY NOT SET.
                                        RTS     %7              ;OK. EXIT.
                                CPRDYA: EHALT                   ;NOT READY. HALT.
                                        BR      CPRDY
                                ;SUBROUTINE TO PUNCH ON LSP CHARACTER IN REG 0.
                                LSPCH:  JSR     %7,CPRDY        ;GO CHECK FOR PUNCH READY.
                                        MOV     %0,@TPB         ;LOAD PUNCH BUFFER.
                                        TSTB    @TPS            ;WAIT FOR DONE.
                                        BPL     .-4
                                        CLR     %0
                                        RTS     %7              ;DONE. EXIT.
                                ;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.
                                BDCNV:  MOV     #DECVAL,%0      ;SET UP ADDR TO STORE DECIMAL ASCII IN R0
                                        MOV     @(5)+,%1        ;BINARY VALUE TO R1.
                                        MOV     #ADTENP,%2      ;ADDR OF TEN POWER STRING TO R2.
                                        MOV     #5,CNVCTR       ;SET UP FOR 5 POWER CONVERSIONS.
                                BDCNVA: MOV     (2)+,TENPWR     ;MOVE POWER OF TEN VALUE TO TENPWR.
                                        JSR     %7,SUBTEN       ;PERFORM CONVERSION
                                        DEC     CNVCTR          ;DONE 5 CONVERSIONS?
                                        BNE     BDCNVA          ;BRANCH IF NOT YET 5.
                                        RTS     %5              ;YES, EXIT.
                                SUBTEN: CLR     DIGIT           ;CLEAR DIGIT
                                SUBTNA: SUB     TENPWR,%1       ;SUBTRACT TEN POWER FROM BINARY VALUE.
                                        BCS     SUBTNB          ;BRANCH IF UNSUCCESSFUL SUBTRACTION.
                                        INC     DIGIT
                                        BR      SUBTNA
                                SUBTNB: ADD     TENPWR,%1       ;RESTORE SUBTRACTED VALUE.
                                        ADD     #60,DIGIT       ;CONVERT (DIGIT) TO ASCII
                                        MOVB    DIGIT,(0)+      ;MOVE ASCII CHAR TO DECVAL FIELD.
                                        RTS     %7              ;EXIT.
                                CNVCTR: OPEN
                                DIGIT:  OPEN
                                TENPWR: OPEN
                                ADTENP: 10000.
                                        1000.
                                        100.
                                        10.
                                        1
                                ;SUBROUTINE TO TYPE A LINE OF CHARACTERS
                                TYPLN:  MOV     #76.,TCTR       ;76 TO CHAR COUNT
                                TYPLA:  MOV     #BLOCKA,%4      ;SET LINE ADDRESS IN R4.
                                TYPLB:  STALL                   ;STALL IF ALLOWED.
                                        MOVB    (4)+,%0         ;GET CHARACTER
```

```
  724  004556  004767  177614                    JSR     %7,LSPCH        ;GO OUTPUT CHARACTER.
  725  004562  005367  000004                    DEC     TCTR            ;DONE?
  726  004566  001371                            BNE     TYPLB           ;BRANCH IF NOT DONE.
  727  004570  000207                            RTS     %7              ;DONE. EXIT
  728  004572  000000                TCTR:       OPEN
  729                                 ;SUBROUTINE TO TYPE LINE OF 3 CHARACTERS
  730  004574  011667  000016        TYPL3:      MOV     @%6,TPL3A       ;DEVELOP AND SET ADDRESS OF
  731  004600  017767  000012  000010            MOV     @TPL3A,TPL3A    ;DATA IN TPL3A.
  732  004606  062716  000002                    ADD     #2,@%6          ;SET UP EXIT.
  733  004612  004567  000064                    JSR     %5,FBF3         ;FILL BUFFER WITH 3 CHARACTERS
  734  004616  000000                TPL3A:      OPEN
  735  004620  042767  040000  174422            BIC     #BIT14,PRGID    ;DISABLE STALLS.
  736  004626  004767  177706                    JSR     %7,TYPLN        ;GO TYPE LINE OF CHARACTERS.
  737  004632  000002                            RTI                     ;EXIT.
  738  004634  112767  000015  010300  STBF:     MOVB    #15,BLOCKA      ;SUB TO SET UP BUFFER AREA.
  739  004642  112767  000012  010273            MOVB    #12,BLOCKA+1
  740  004650  112767  000015  010376  STBFA:    MOVB    #15,BLOCKB
  741  004656  112767  000012  010371            MOVB    #12,BLOCKB+1
  742  004664  112767  000015  010474            MOVB    #15,BLOCKC
  743  004672  112767  000012  010467            MOVB    #12,BLOCKC+1
  744  004700  000207                            RTS     %7              ;EXIT
  745                                 ;SUBROUTINE TO FILL CHARACTER BUFFER WITH 3 CHARACTERS.
  746  004702  012567  000004        FBF3:       MOV     (5)+,FBF3A
  747  004706  004567  17742*                    JSR     %5,BMOVE        ;MOVE 3 CHARS TO BUFFER.
  748  004712  000000                FBF3A:      OPEN
  749  004714  015144                            BLOCK1
  750  004716  000003                            3
  751  004720  004567  177414        FBF38:      JSR     %5,BMOVE        ;FILL 72 CHARACTERS BUFFER
  752  00[+724  015144                            BLOCK1                  ;WITH 3 CHARACTERS
  753  004726  015147                            BLOCK1+3
  754  004730  000105                            69.
  755  004732  004567  177402                    JSR     %5,BMOVE
  756  004736  015144                            BLOCK1
  757  004740  015256                            BLOCK2
  758  004742  000110                            72.
  759  004744  000205                            RTS     %5              ;EXIT
  760                                 ;SUBROUTINE TO FILL BUFFER WITH ALL CHARACTERS
  761  004746  004567  177366        FBALL:      JSR     %5,BMOVE        ;FILL 72 CHAR BUFFER WITH
  762  004752  014176                            A                       ;ALL CHARACTERS.
  763  004754  015144                            BLOCK1
  764  004756  000077                            63.
  765  004760  004567  177354                    JSR     %5,BMOVE
  766  004764  014176                            A
  767  004766  015243                            BLOCK1+63.
  768  004770  000011                            9.
  769  004772  004567  177342                    JSR     %5,BMOVE
  770  004776  015144                            BLOCK1
  77:  005000  015256                            BLOCK2
  772  005002  000110                            72.
  773  005004  000207                            RTS     %7              ;EXIT.
  774                                 ;SUB TO FILL BUFFER WITH 33 WORST CASE PATTERN.
  775  005006  004567  177326        FW336:      JSR     %5,BMOVE        ;6 CHARACTER PATTERN TO BUFFER
  776  005012  014162                            A33WP6
  777  005014  015144                            BLOCK1
  778  005016  000006                            6
  779  005020  004567  177314                    JSR     %5,BMOVE        ;FILL BUFFER WITH PATTERN.
```

```
   780  005024  015144                          BLOCK1
   781  005026  015152                          BLOCK1+6
   782  005030  000102                          66.
   783  005032  004567  177302                  JSR     %5,BMOVE
   784  005036  015144                          BLOCK1
   785  005040  015256                          BLOCK2
   786  005042  000110                          72.
   787  005044  000207                          RTS     %7              ;EXIT
   788                          ;SUB TO FILL BUFFER WITH 35 WORST CASE PATTERN.
   789  005046  004567  177266          FW356:  JSR     %5,BMOVE        ;6 CHARACTER PATTERN TO BUFFER
   790  005052  014170                          A3SWP6
   791  005054  015144                          BLOCK1
   792  005056  000006                          6
   793  005060  004567  177254                  JSR     %5,BMOVE        ;FILL BUFFER WITH PATTERN.
   794  005064  015144                          BLOCK1
   795  005066  015152                          BLOCK1+6
   796  005070  000102                          66.
   797  005072  004567  177242                  JSR     %5,BMOVE
   798  005076  015144                          BLOCK1
   799  005100  015256                          BLOCK2
   800  005102  000110                          72.
   801  005104  000207                          RTS     %7              ;EXIT.
   802                          ;ROUTINE TO GET CHARACTER FROM KEYBOARD.
   803  005106  005777  174100          GKBCR:  TST     @TKB            ;CLEAR DONE.
   804  005112  105777  174072                  TSTB    @TKS            ;WAIT FOR DONE FLAG.
   805  005116  100375                          BPL     .-4
   806  005120  117767  174066  174236          MOVB    @TKB,CRBUF      ;CHARACTER TO CRBUF.
   807  005126  116723  174232                  MOVB    CRBUF,(3)+      ;CHARACTER TO LINE BUFFER.
   808  005132  116700  174226                  MOVB    CRBUF,%0
   809  005136  004767  177234                  JSR     %7,LSPCH        ;ECHO CHARACTER.
   810  005142  000207                          RTS     %7
```

D02


```
                                                .SBTTL  PRG0 - INPUT-OUTPUT LOGIC TESTS
                    000000                      Z=0
                    177777                      X=-1
005144  012767  005156  174062  PRG0:   MOV     #POT0,KSTART    ;ADDRESS OF 1ST ROUTINE TO KSTART.
005152  000167  174466          JMP     SRSET           ;GO GET STARTED.
                                ;*******************************************************************
005156  000000                  POT0:   0                       ; PRG0 TEST ROUTINE 0                 *
005160  005206                          POT1                    ;ADDRESS OF NEXT ROUTINE              *
005162  001750                          1000.                   ;TEST ITERATION COUNT                 *
005164  005174                          POAA                    ;SCOPE ENTRY POINT                    *
                                ;*******************************************************************
                                ;TEST ABILITY TO REFERENCE THE KEYBOARD/READER STATUS WORD (TKS)
005166  012767  005202  172610          MOV     #POAE,MACHER    ;SET UP MACHINE ERROR TRAP.
005174  005777  174010  POAA:   TST     @TKS            ;REFERENCE CODER STATUS WORD.
005200  104012                          SCOPE                   ;SCOPE
005202  104003  POAE:   ERROR                           ;ERROR. TRAPPED WHEN REFERENCING READER.
005204  104012                          SCOPE                   ;STATUS WORD (TKS).
                                ;*******************************************************************
005206  000001                  POT1:   1                       ; PRG0 TEST ROUTINE 1                 *
005210  005236                          POT2                    ;ADDRESS OF NEXT ROUTINE              *
005212  001750                          1000.                   ;TEST ITERATION COUNT                 *
005214  005224                          POBA                    ;SCOPE ENTRY POINT                    *
                                ;*******************************************************************
                                ;TEST ABILITY TO REFERENCE THE KEYBOARD/READER BUFFER (TKB).
005216  012767  005232  172560          MOV     #POBE,MACHER    ;SET UP MACHINE ERROR TRAP
005224  005777  173762  POBA:   TST     @TKB            ;REFERENCE READER BUFFER.
005230  104012                          SCOPE                   ;SCOPE
005232  104003  POBE:   ERROR                           ;ERROR. TRAPPED WHEN REFERENCING
005234  104012                          SCOPE                   ;READER BUFFER. (TKB).
                                ;*******************************************************************
005236  000002                  POT2:   2                       ; PRG0 TEST ROUTINE 2                 *
005240  005266                          POT3                    ;ADDRESS OF NEXT ROUTINE              *
005242  001750                          1000.                   ;TEST ITERATION COUNT                 *
005244  005254                          POCA                    ;SCOPE ENTRY POINT                    *
                                ;*******************************************************************
                                ;TEST ABILITY TO REFERENCE PUNCH/PRINTER STATUS WORD (TPS).
005246  012767  005262  172530          MOV     #POCE,MACHER    ;SETUP MACHINE ERROR TRAP.
005254  005777  173734  POCA:   TST     @TPS            ;REFERENCE PUNCH/PRINTER STATUS WORD.
005260  104012                          SCOPE                   ;SCOPE
005262  104003  POCE:   ERROR                           ;ERROR. TRAPPED WHEN REFERENCING
005264  104012                          SCOPE                   ;PUNCH/PRINTER STATUS WORD (TPS).
                                ;*******************************************************************
005266  000003                  POT3:   3                       ; PRG0 TEST ROUTINE 3                 *
005270  005316                          POT4                    ;ADDRESS OF NEXT ROUTINE              *
005272  001750                          1000.                   ;TEST ITERATION COUNT                 *
005274  005304                          PODA                    ;SCOPE ENTRY POINT                    *
                                ;*******************************************************************
                                ;TEST ABILITY TO REFERENCE PUNCH/PRINTER BUFFER (TPB).
005276  012767  005312  172500          MOV     #PODE,MACHER    ;SETUP MACHINE ERROR TRAP.
005304  005777  173706  PODA:   TST     @TPB            ;REFERENCE PUNCH/PRINTER BUFFER.
005310  104012                          SCOPE                   ;SCOPE
005312  104003  PODE:   ERROR                           ;ERROR. TRAPPED WHEN REFERENCING
005314  104012                          SCOPE                   ;PUNCH/PRINTER BUFFER. (TPS).
                                ;*******************************************************************
005316  000004                  POT4:   4                       ; PRG0 TEST ROUTINE 4                 *
005320  005400                          POT5                    ;ADDRESS OF NEXT ROUTINE              *
```

```
                                        1000.                   ;TEST ITERATION COUNT                   *
                                        POEA                    ;SCOPE ENTRY POINT                      *
                                ;*******************************************************************
                                ;TEST ABILITY TO SET AND CLEAR READER/KYBD IE BIT.
                                        MOV     #PRTY7,PSW      ;SET PRIORITY 7.
                                POEA:   BIS     #BIT6,@TKS      ;SET ID BIT IN TKS.
                                        BIT     #BIT6,@TKS      ;CHECK ID BIT IN TKS
                                        BNE     POEB            ;BRANCH IF ID BIT IS SET.
                                        ERROR                   ;ERROR 1 ID BIT NOT SET.
                                        SCOPE
                                POEB:   BIC     #BIT6,@TKS      ;CLEAR ID BIT IN TKS
                                        BIT     #BIT6,@TKS      ;CHECK ID BIT IN TKS.
                                        BEQ     POEC            ;BRANCH IF ID BIT IS CLEARED.
                                        ERROR                   ;ERROR. ID BIT FAILED TO CLEAR.
                                POEC:   SCOPE                   ;SCOPE
                                ;*******************************************************************
                                POT5:   5                       ; PRG0 TEST ROUTINE 5                   *
                                        POT6                    ;ADDRESS OF NEXT ROUTINE                *
                                        100.                    ;TEST ITERATION COUNT                   *
                                        POFA                    ;SCOPE ENTRY POINT                      *
                                ;*******************************************************************
                                ;TEST ABILITY TO CLEAR ID BIT WITH RESET INSTRUCTION.
                                        MOV     #PRTY7,PSW      ;SET PRIORITY 7.
                                POFA:   BIS     #BIT6,@TKS      ;SET ID BIT IN TKS
                                        SRESET                  ;RESET
                                        BIT     #BIT6,@TKS      ;TEST ID BIT.
                                        BEQ     .+4             ;BRANCH IF ID BIT IS CLEAR.
                                        ERROR                   ;ERROR. RESET FAILED TO CLEAR ID BIT.
                                        SCOPE                   ;SCOPE
                                ;*******************************************************************
                                POT6:   6                       ; PRG0 TEST ROUTINE 6                   *
                                        POT7                    ;ADDRESS OF NEXT ROUTINE                *
                                        20.                     ;TEST ITERATION COUNT                   *
                                        POGA                    ;SCOPE ENTRY POINT                      *
                                ;*******************************************************************
                                ;TEST THAT READER DONE BIT SETS SOMETIME AFTER RDR ENABLE.
                                        CHKASR
                                POGA:   RESET2
                                        INC     @TKS            ;ENABLE READER.
                                        DELAYX                  ;WAIT.
                                        TSTB    @TKS            ;CHECK FOR DONE
                                        BMI     .+4             ;BRANCH IF DONE BIT SET.
                                        ERROR                   ;DONE NOT SET SOMETIME AFTER RDR ENB.
                                        SCOPE                   ;SCOPE
                                ;*******************************************************************
                                POT7:   7                       ; PRG0 TEST ROUTINE 7                   *
                                        POT10                   ;ADDRESS OF NEXT ROUTINE                *
                                        1000.                   ;TEST ITERATION COUNT                   *
                                        POHA                    ;SCOPE ENTRY POINT                      *
                                ;*******************************************************************
                                ;TEST THAT DONE BIT READS RELIABLY.
                                        CHKASR
                                        RESET2
                                        JSR     %7,AREAD        ;ENABLE READER. COME BACK WHEN DONE SET.
                                POHA:   TSTB    @TKS            ;TEST FOR DONE
                                        BMI     .+4             ;BRANCH IF DONE FOUND SET.
```

```
                                        ERROR                   ;ERROR. DONE BIT NOT FOUND SET.
                                        SCOPE                   ;SCOPE
                                ;***************************************************************
                                POT10:  10                      ; PRGO TEST ROUTINE 10         *
                                        POT11                   ;ADDRESS OF NEXT ROUTINE       *
                                        20.                     ;TEST ITERATION COUNT          *
                                        POIA                    ;SCOPE ENTRY POINT             *
                                ;***************************************************************
                                ;TEST THAT RESET CLEARS DONE BIT
                                        CHKASR
                                        RESET2
                                POIA:   JSR     %7,AREAD        ;ENABLE READER. COME BACK WHEN DONE SET.
                                        SRESET                  ;ISSUE RESET.
                                        TSTB    @TKS            ;TEST FOR DONE BIT
                                        BPL     .+4             ;BRANCH IF DONE BIT RESET.
                                        ERROR                   ;ERROR. RESET FAILED TO CLEAR DONE.
                                        SCOPE                   ;SCOPE
                                ;***************************************************************
                                POT11:  11                      ; PRGO TEST ROUTINE 11         *
                                        POT12                   ;ADDRESS OF NEXT ROUTINE       *
                                        20.                     ;TEST ITERATION COUNT          *
                                        POJA                    ;SCOPE ENTRY POINT             *
                                ;***************************************************************
                                ;TEST THAT REFERENCING READER DATA BUFFER CLEARS DONE
                                        CHKASR
                                        RESET2
                                POJA:   JSR     %7,AREAD        ;ENABLE READER. RETURN WHEN DONE SET.
                                        TSTB    @TKB            ;REFERENCE READ BUFFER.
                                        TSTB    @TKS            ;TEST FOR DONE BIT
                                        BPL     .+4             ;BRANCH IF DONE NOT SET.
                                        ERROR                   ;REFERENCE TO BUFFER DID NOT RESET DONE.
                                        SCOPE                   ;SCOPE
                                ;***************************************************************
                                POT12:  12                      ; PRGO TEST ROUTINE 12         *
                                        POT13                   ;ADDRESS OF NEXT ROUTINE       *
                                        20.                     ;TEST ITERATION COUNT          *
                                        POKA                    ;SCOPE ENTRY POINT             *
                                ;***************************************************************
                                ;CHECK THAT BUSY SETS SOMETIME BEFORE DONE SETS.
                                        CHKASR
                                POKA:   RESET2
                                        INC     @TKS            ;ENABLE READER.
```

```
  965  005642  032777  004000  173340  POKB:   BIT     #BIT11,@TKS     ;BUSY SET?
  966  005650  001004                          BNE     POKC            ;BR IF YES.
  967  005652  105777  173332                  TSTB    @TKS            ;NO.DONE SET?
  968  005656  100371                          BPL     POKB            ;BR IF NOT.
  969  005660  104003                          ERROR                   ;BUSY BIT FAILED TO SET BEFORE DONE SET.
  970  005662  104012                  POKC:   SCOPE
  971                                   ;*************************************************************************
  972  005664  000013                  POT13:  13                      ; PRG0 TEST ROUTINE 13                  *
  973  005666  005732                          POT14                   ;ADDRESS OF NEXT ROUTINE                *
  974  005670  000024                          20.                     ;TEST ITERATION COUNT                   *
  975  005672  005676                          POLA                    ;SCOPE ENTRY POINT                      *
  976                                   ;*************************************************************************
  977                                   ;TEST THAT DONE IS RESET BY START BIT (WHEN BUSY BECOMES SET).
  978  005674  104022                          CHKASR
  979  005676  104023                  POLA:   RESET2
  980  005700  004767  174460                  JSR     %7,AREAD        ;ENABLE READER. RETURN WHEN DONE SET.
  981  005704  005277  173300                  INC     @TKS            ;ENABLE READER.
  982  005710  032777  004000  173272          BIT     #BIT11,@TKS     ;WAIT FOR BUSY TO SET.
  983  005716  001774                          BEQ     .-6
  984  005720  105777  173264                  TSTB    @TKS            ;TEST FOR DONE BIT.
  985  005724  100001                          BPL     .+4             ;BRANCH IF DONE NOT SET.
  986  005726  104003                          ERROR                   ;ERROR. START BIT FAILED TO RESET DONE.
  987  005730  104012                          SCOPE                   ;SCOPE
  988                                   ;*************************************************************************
  989  005732  000014                  POT14:  14                      ; PRG0 TEST ROUTINE 14                  *
  990  005734  006006                          POT15                   ;ADDRESS OF NEXT ROUTINE                *
  991  005736  001750                          1000.                   ;TEST ITERATION COUNT                   *
  992  005740  005760                          POMA                    ;SCOPE ENTRY POINT                      *
  993                                   ;*************************************************************************
  994                                   ;TEST THAT READ BUFFER CAN BE READ RELIABLY.
  995  005742  104022                          CHKASR
  996  005744  104023                          RESET2
  997  005746  004767  174412                  JSR     %7,AREAD        ;ENABLE READER. RETURN WHEN DONE SET.
  998  005752  117767  173234  173405          MOVB    @TKB,CRBUF+1    ;BUFFER CONTENTS TO CRBUF+1
  999  005760  117767  173226  173376  POMA:   MOVB    @TKB,CRBUF      ;BUFFER CONTENTS TO CRBUF
 1000  005766  126767  173372  173371          CMPB    CRBUF,CRBUF+1   ;COMPARE CONTENTS OF CRBUF AND CRBUF+1
 1001  005774  001403                          BEQ     POMB            ;BRANCH IF SAME.
 1002  005776  016700  173362                  MOV     CRBUF,%0        ;NOT SAME. ERROR. HALT WITH 1ST READ CHAR
 1003  006002  000000                          HALT                    ;IN DATA BYTES LEFT. SUBSEQUENT READ IN DATA BYTES RIGHT
 1004  006004  104012                  POMB:   SCOPE
 1005                                   ;*************************************************************************
 1006  006006  000015                  POT15:  15                      ; PRG0 TEST ROUTINE 15                  *
 1007  006010  006056                          POT16                   ;ADDRESS OF NEXT ROUTINE                *
 1008  006012  001750                          1000.                   ;TEST ITERATION COUNT                   *
 1009  006014  006032                          PONA                    ;SCOPE ENTRY POINT                      *
 1010                                   ;*************************************************************************
 1011                                   ;TEST THAT READER DONE BIT IS ABLE TO CAUSE INTERRUPT. IF THE INTERRUPT IS
 1012                                   ;SERVICED, IT WILL HAVE OCURRED AT CORRECT VECTOR.
 1013  006016  104022                          CHKASR
 1014  006020  104006                          STRDRV                  ;SET UP READER VECTOR TO PONC
 1015  006022  006054                          PONC
 1016  006024  104023                          RESET2
 1017  006026  004767  174332                  JSR     PC,AREAD        ;ENABLE READER. RETURN WHEN DONE SET.
 1018  006032  005077  173152          PONA:   CLR     @TKS            ;DISABLE READER INTERRUPTS
 1019  006036  005067  171734                  CLR     PSW             ;ENABLE READER. RETURN WHEN DONE SET.
 1020  006042  052777  000100  173140          BIS     #BIT6,@TKS      ;ENABLE READER INTERRUPT,
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1021  006050  000240                          NOP
1022  006052  104003                AT20E:    ERROR                   ;ERROR. READER FAILED TO INTERRUPT.
1023  006054  104012                PONC:     SCOPE                   ;HERE IF INTERRUPT OCCURS.
1024                                          ;*************************************************************************
1025  006056  000016                POT16:    16                      ; PRG0 TEST ROUTINE 16                  *
1026  006060  006136                          POT17                   ;ADDRESS OF NEXT ROUTINE                *
1027  006062  001750                          1000.                   ;TEST ITERATION COUNT                   *
1028  006064  006102                          POOA                    ;SCOPE ENTRY POINT                      *
1029                                          ;*************************************************************************
1030                                          ;TEST THAT DONE DOES NOT CAUSE INTERRUPT WITH PROCESSOR AT SAME
1031                                          ;PRIORITY LEVEL AS THE READERS INTERRUPT REQUEST LEVEL.
1032  006066  104022                          CHKASR
1033  006070  104006                          STRDRV                  ;SET READER VECTOR TO POOE.
1034  006072  006132                          POOE
1035  006074  104023                          RESET2
1036  006076  004767  174262                 JSR       %7,AREAD      ;ENABLE READER. RETURN WHEN DONE SET.
1037  006102  005077  173102       POOA:     CLR       @TKS          ;DISABLE READER INTERRUPTS.
1038  006106  016767  173110  171662         MOV       TKLVL,PSW     ;SET PROCESSOR TO SAME PRIORITY AS READER'S.
1039  006114  052777  000100  173066         BIS       #BIT6,@TKS    ;ENABLE READER INTERRUPTS.
1040  006122  000240                          NOP                     ;NO OP.
1041  006124  005077  173060                 CLR       @TKS          ;OK IF NO INTERRUPT OCCURS.
1042  006130  104012                          SCOPE                   ;SCOPE
1043  006132  104003                POOE:     ERROR                   ;ERROR. READER ERRONEOUSLY INTERRUPTED
```

```
                                                        ;WITH PROCESSOR AT SAME PRIORITY
                                                        ;LEVEL AS THE READER, OR THE READER
006134  104012                    SCOPE                 ;IS AT HIGHER PRIORITY THAN SPECIFIED AT TKLVL.
;*****************************************************************************
006136  000017            POT17:  17                    ; PRG0 TEST ROUTINE 17                *
006140  006222                    POT20                 ;ADDRESS OF NEXT ROUTINE              *
006142  001750                    1000.                 ;TEST ITERATION COUNT                 *
006144  006162                    POPA                  ;SCOPE ENTRY POINT                    *
;*****************************************************************************
;TEST THAT DONE CAUSES INTERRUPT WITH PROCESSOR AT PRIORITY ONE LEVEL LOWER
;THAN THE READER'S INTERRUPT PRIORITY LEVEL.
006146  104022                    CHKASR
006150  104006                    STRDRV                ;SET READER INTERRUPT SERVICE TO
006152  006214                    POPB                  ;POPB.
006154  104023                    RESET2
006156  004767  174202            JSR     %7,AREAD      ;ENABLE READER. RETURN WHEN DONE SET.
006162  005077  173022    POPA:   CLR     @TKS          ;DISABLE READER INTERRUPTS
006166  016767  173030  171602    MOV     TKLVL,PSW     ;SET PROCESSOR PRIORITY ONE LEVEL LOWER
006174  162767  000040  171574    SUB     #40,PSW       ;THAN READER.(SPECIFIED AT TKLVL).
006202  052777  000100  173000    BIS     #BIT6,@TKS    ;ENABLE READER INTERRUPTS.
006210  000240                    NOP
006212  104003                    ERROR                 ;FAILED TO INTERRUPT WITH PC AT PRIORITY ONE LEVEL LOWER
                                                        ;HERE IF INTERRUPT OCCURS. OK. POP STACK TWICE
006214  005077  172770    POPB:   CLR     @TKS          ;DISABLE READER INTERRUPTS
006220  104012                    SCOPE                 ;SCOPE
;*****************************************************************************
006222  000020            POT20:  20                    ; PRG0 TEST ROUTINE 20                *
006224  006326                    POT21                 ;ADDRESS OF NEXT ROUTINE              *
006226  001750                    1000.                 ;TEST ITERATION COUNT                 *
006230  006242                    POQA                  ;SCOPE ENTRY POINT                    *
;*****************************************************************************
;TEST THAT DONE DOES NOT REINTERRUPT AFTER RTI WHEN DONE IS NOT CLEARED.
006232  104022                    CHKASR
006234  104023                    RESET2
006236  004767  174122            JSR     %7,AREAD      ;ENABLE READER. RETURN WHEN DONE SET.
006242  104006    POQA:   STRDRV                        ;SET READER INTERRUPT SERVICE
006244  006276                    POQC                  ;TO POQC.
006246  005077  172736            CLR     @TKS          ;DISABLE READER INTERRUPTS.
006252  052777  000100  172730    BIS     #BIT6,@TKS    ;ENABLE READER INTERRUPTS.
006260  005067  171512            CLR     PSW           ;SET PRIORITY 0.
006264  000240                    NOP
006266  104003                    ERROR                 ;ERROR1 FAILED TO INTERRUPT
006270  005077  172714            CLR     @TKS          ;DISABLE READER INTERRUPTS.
006274  104012                    SCOPE                 ;SCOPE
006276  012777  006316  172714  POQC:   MOV     #POQE,@TKVTR  ;CHANGE INTERRUPT VECTOR TO POQE
006304  012716  006312            MOV     #POQD,@%6
006310  000002                    RTI                   ;RETURN FROM INTERRUPT
006312  000240            POQD:   NOP
006314  000401                    BR      .+4           ;OK IF NO REINTERRUPT OCCURS.
006316  104003            POQE:   ERROR                 ;DONE REINTERRUPTED AFTER
                                                        ;RTI WITH DONE BIT LEFT ON.
006320  005077  172664            CLR     @TKS          ;DISABLE READER INTERRUPTS.
006324  104012                    SCOPE                 ;SCOPE.
;*****************************************************************************
006326  000021            POT21:  21                    ; PRG0 TEST ROUTINE 21                *
006330  006410                    POT22                 ;ADDRESS OF NEXT ROUTINE              *
```

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1100  006332  001750                        1000.                   ;TEST ITERATION COUNT                   *
1101  006334  006344                        PORA                    ;SCOPE ENTRY POINT                      *
1102                                  ;*************************************************************************
1103                                  ;TEST ABILITY TO SET AND CLEAR PUNCH ID BIT
1104  006336  012767  000340  171432        MOV     #PRTY7,PSW      ;SET PRIORITY 7.
1105  006344  052777  000100  172642  PORA: BIS     #BIT6,@TPS      ;SET PUNCH ID BIT.
1106  006352  032777  000100  172634        BIT     #BIT6,@TPS      ;CHECK PUNCH ID BIT.
1107  006360  001002                        BNE     .+6             ;BRANCH IF PUNCH ID BIT IS SET.
1108  006362  104003                        ERROR                   ;ERROR1. PUNCH ID BIT DID NOT SET.
1109  006364  104012                        SCOPE
1110  006366  042777  000100  172620        BIC     #BIT6,@TPS      ;CLEAR PUNCH ID BIT.
1111  006374  032777  000100  172612        BIT     #BIT6,@TPS      ;CHECK PUNCH ID BIT.
1112  006402  001401                        BEQ     .+4             ;BRANCH IF PUNCH ID BIT IS CLEAR
1113  006404  104003                        ERROR                   ;ERROR2. PUNCH ID BIT FAILED TO CLEAR.
1114  006406  104012                        SCOPE                   ;SCOPE
1115                                  ;*************************************************************************
1116  006410  000022                  POT22: 22                      ; PRGO TEST ROUTINE 22                  *
1117  006412  006452                        POT23                   ;ADDRESS OF NEXT ROUTINE                *
1118  006414  000024                        20.                     ;TEST ITERATION COUNT                   *
1119  006416  006426                        POSA                    ;SCOPE ENTRY POINT                      *
1120                                  ;*************************************************************************
1121                                  ;TEST ABILITY TO CLEAR PUNCH ID BIT WITH RESET INSTRUCTION
1122  006420  012767  000340  171350        MOV     #PRTY7,PSW      ;SET PRIORITY 7.
1123  006426  052777  000100  172560  POSA: BIS     #BIT6,@TPS      ;SET PUNCH ID BIT.
1124  006434  104011                        SRESET                  ;RESET
1125  006436  032777  000100  172550        BIT     #BIT6,@TPS      ;CHECK PUNCH ID BIT.
1126  006444  001401                        BEQ     .+4             ;BRANCH IF PUNCH ID BIT IS CLEAR.
1127  006446  104003                        ERROR                   ;ERROR. RESET FAILED TO CLEAR PUNCH ID BIT.
1128  006450  104012                        SCOPE                   ;SCOPE
1129                                  ;*************************************************************************
1130  006452  000023                  POT23: 23                      ; PRGO TEST ROUTINE 23                  *
1131  006454  006526                        POT24                   ;ADDRESS OF NEXT ROUTINE                *
1132  006456  001750                        1000.                   ;TEST ITERATION COUNT                   *
1133  006460  006462                        POTA                    ;SCOPE ENTRY POINT                      *
1134                                  ;*************************************************************************
1135                                  ;TEST ABILITY TO SET AND CLEAR THE PUNCH MAINTENANCE BIT
1136  006462  052777  000004  172524  POTA: BIS     #BIT2,@TPS      ;SET MAINTANCE BIT.
1137  006470  032777  000004  172516        BIT     #BIT2,@TPS      ;CHECK MAINTENANCE BIT
1138  006476  001002                        BNE     .+6             ;BRANCH IF MAINTENANCE BIT SET.
1139  006500  104003                        ERROR                   ;ERROR1. MAINTENANCE BIT FAILED TO SET.
1140  006502  104012                        SCOPE
1141  006504  042777  000004  172502        BIC     #BIT2,@TPS      ;CLEAR MAINTENANCE BIT.
1142  006512  032777  000004  172474        BIT     #BIT2,@TPS      ;CHECK MAINTENANCE BIT
1143  006520  001401                        BEQ     .+4             ;BRANCH IF MAINTENANCE BIT IS CLEAR.
1144  006522  104003                        ERROR                   ;ERROR2. MAINTENANCE BIT FAILED TO CLEAR.
1145  006524  104012                        SCOPE                   ;SCOPE
1146                                  ;*************************************************************************
1147  006526  000024                  POT24: 24                      ; PRGO TEST ROUTINE 24                  *
1148  006530  006562                        POT25                   ;ADDRESS OF NEXT ROUTINE                *
1149  006532  000024                        20.                     ;TEST ITERATION COUNT                   *
1150  006534  006536                        POUA                    ;SCOPE ENTRY POINT                      *
1151                                  ;*************************************************************************
1152                                  ;TEST THAT RESET INSTRUCTION CLEARS THE MAINTENANCE BIT.
1153  006536  052777  000004  172450  POUA: BIS     #BIT2,@TPS      ;SET MAINTENANCE BIT.
1154  006544  104011                        SRESET                  ;ISSUE RESET
1155  006546  032777  000004  172440        BIT     #BIT2,@TPS      ;CHECK MAINTENANCE BIT
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1156  006554  001401                        BEQ     .+4             ;BRANCH IF MAINTENANCE BIT CLEAR.
1157  006556  104003                        ERROR                   ;ERROR. RESET FAILED TO CLEAR
1158  006560  104012                        SCOPE                   ;THE MAINTENANCE BIT. SCOPE.
1159                                ;*****************************************************************
1160  006562  000025                POT25:  25                      ; PRG0 TEST ROUTINE 25          *
1161  006564  006604                        POT26                   ;ADDRESS OF NEXT ROUTINE        *
1162  006566  001750                        1000.                   ;TEST ITERATION COUNT           *
1163  006570  006572                        POVA                    ;SCOPE ENTRY POINT              *
1164                                ;*****************************************************************
1165                                ;TEST THAT RESET SETS THE PUNCH READY BIT, AND THAT READY CAN BE READ RELIABLY.
1166  006572  105777  172416        POVA:   TSTB    @TPS            ;CHECK PUNCH READY.
1167  006576  100401                        BMI     .+4             ;BRANCH IF PUNCH READY IS SET.
1168  006600  104003                        ERROR                   ;ERROR. RESET FAILED TO SET READY, OR FAILED TO READ  IT
1169  006602  104012                        SCOPE                   ;SCOPE
1170                                ;*****************************************************************
1171  006604  000026                POT26:  26                      ; PRG0 TEST ROUTINE 26          *
1172  006606  006634                        POT27                   ;ADDRESS OF NEXT ROUTINE        *
1173  006610  000024                        20.                     ;TEST ITERATION COUNT           *
1174  006612  006614                        POWA                    ;SCOPE ENTRY POINT              *
1175                                ;*****************************************************************
1176                                ;TEST THAT PUNCH READY RESETS BY LOADING PUNCH BUFFER.
1177  006614  104023                POWA:   RESET2
1178  006616  005077  172374               CLR     @TPB            ;LOAD PUNCH BUFFER
1179  006622  105777  172366               TSTB    @TPS            ;CHECK PUNCH READY BIT.
1180  006626  100001                        BPL     .+4             ;BR IF PUNCH READY IS CLEAR.
1181  006630  104003                        ERROR                   ;ERROR. BUFFER LOAD FAILED TO CLEAR READY.
1182  006632  104012                        SCOPE                   ;SCOPE
1183                                ;*****************************************************************
1184  006634  000027                POT27:  27                      ; PRG0 TEST ROUTINE 27          *
1185  006636  006670                        POT30                   ;ADDRESS OF NEXT ROUTINE        *
1186  006640  000024                        20.                     ;TEST ITERATION COUNT           *
1187  006642  006644                        POXA                    ;SCOPE ENTRY POINT              *
1188                                ;*****************************************************************
1189                                ;TEST THAT BYTE LOAD OF PUNCH BUFFER +1 DOES NOT RESET READY.
1190  006644  104023                POXA:   RESET2
1191  006646  016700  172344               MOV     TPB,%0
1192  006652  005200                        INC     %0
1193  006654  105010                        CLRB    @%0             ;BYTE LOAD PUNCH BUFFER+1
1194  006656  105777  172332               TSTB    @TPS            ;CHECK PUNCH READY BIT
1195  006662  100401                        BMI     .+4             ;BRANCH IF PUNCH READY STILL SET.
1196  006664  104003                        ERROR                   ;ERROR. BYTE LOAD OF PUNCH BUFFER+1
1197  006666  104012                        SCOPE                   ;CLEARED READY. SCOPE
1198                                ;*****************************************************************
1199  006670  000030                POT30:  30                      ; PRG0 TEST ROUTINE 30          *
1200  006672  006722                        POT31                   ;ADDRESS OF NEXT ROUTINE        *
1201  006674  000024                        20.                     ;TEST ITERATION COUNT           *
1202  006676  006700                        POYA                    ;SCOPE ENTRY POINT              *
1203                                ;*****************************************************************
1204                                ;TEST THAT PUNCH BECOMES READY SOMETIME AFTER BUFFER LOAD.
1205  006700  104023                POYA:   RESET2
1206  006702  005077  172310               CLR     @TPB            ;LOAD PUNCH BUFFER.
1207  006706  104400                        DELAYX                  ;WAIT.
1208  006710  105777  172300               TSTB    @TPS            ;CHECK PUNCH READY BIT.
1209  006714  100401                        BMI     .+4             ;BRANCH IF PUNCH READY IS SET.
1210  006716  104003                        ERROR                   ;READY NOT SET SOMETIME AFTER BUFFER LOAD.
1211  006720  104012                        SCOPE                   ;SCOPE
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1212                                    ;*************************************************************************
1213  006722  000031                    POT31:  31                      ; PRGO TEST ROUTINE 31                  *
1214  006724  006762                            POT32                   ;ADDRESS OF NEXT ROUTINE                *
1215  006726  001750                            1000.                   ;TEST ITERATION COUNT                   *
1216  006730  006736                            POZA                    ;SCOPE ENTRY POINT                      *
1217                                    ;*************************************************************************
1218                                    ;TEST THAT PUNCH READY BIT CAN CAUSE AN INTERRUPT. IF THE INTERRUPT
1219                                    ;IS SERVICED, IT WILL HAVE OCCURRED AT THE CORRECT VECTOR.
1220  006732  104007                            STPCHV                  ;SET PUNCH INTERRUPT SERVICE
1221  006734  006760                            POZB                    ;TO POZB
1222  006736  005077  172252            POZA:   CLR     @TPS            ;DISABLE PUNCH INTERRUPTS
1223  006742  005067  171030                    CLR     PSW             ;SET PRIORITY 0.
1224  006746  052777  000100  172240            BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPTS.
1225  006754  000240                            NOP
1226  006756  104003                            ERROR                   ;PUNCH READY FAILED TO CAUSE
1227  006760  104012                    POZB:   SCOPE                   ;INTERRUPT. SCOPE
1228                                    ;*************************************************************************
1229  006762  000032                    POT32:  32                      ; PRGO TEST ROUTINE 32                  *
1230  006764  007032                            POT33                   ;ADDRESS OF NEXT ROUTINE                *
1231  006766  001750                            1000.                   ;TEST ITERATION COUNT                   *
1232  006770  006776                            POAAA                   ;SCOPE ENTRY POINT                      *
1233                                    ;*************************************************************************
1234                                    ;TEST THAT PUNCH READY DOES NOT CAUSE AN INTERRUPT WITH PROCESSOR
1235                                    ;AT SAME PRIORITY LEVEL AS THE PUNCH INTERRUPT REQUEST LEVEL.
1236  006772  104007                            STPCHV                  ;SET PUNCH INTERRUPT SERVICE
1237  006774  007026                            POAAE                   ;TO POAAE.
1238  006776  016767  172224  170772    POAAA:  MOV     TPLVL,PSW       ;SET PROCESSOR TO SAME PRIORITY AS PUNCH.
1239  007004  005077  172204                    CLR     @TPS            ;DISABLE PUNCH INTERRUPTS.
1240  007010  052777  000100  172176            BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPTS.
1241  007016  000240                            NOP
1242  007020  005077  172170            POAAB:  CLR     @TPS            ;OK IF NO INTERRUPT OCCURS.
1243  007024  104012                            SCOPE                   ;SCOPE
1244  007026  104003                    POAAE:  ERROR                   ;ERROR. PUNCH INTERRUPTED WITH PROCESSOR
1245  007030  000773                            BR      POAAB           ;SET TO SAVE PRIORITY AS THE PUNCH.
1246                                    ;*************************************************************************
1247  007032  000033                    POT33:  33                      ; PRGO TEST ROUTINE 33                  *
1248  007034  007106                            POT34                   ;ADDRESS OF NEXT ROUTINE                *
1249  007036  001750                            1000.                   ;TEST ITERATION COUNT                   *
1250  007040  007046                            POBAA                   ;SCOPE ENTRY POINT                      *
1251                                    ;*************************************************************************
1252                                    ;TEST THAT THE PUNCH INTERRUPTS WITH PROCESSOR AT PRIORITY ONE LEVEL LOWER
1253                                    ;THAN THE PUNCH PRIORITY.
1254  007042  104007                            STPCHV                  ;SET PUNCH INTERRUPT SERVICE
1255  007044  007100                            POBAC                   ;TO POBAC.
1256  007046  005077  172142            POBAA:  CLR     @TPS            ;DISABLE PUNCH INTERRUPTS
1257  007052  016767  172150  170716            MOV     TPLVL,PSW       ;SET PROCESSOR PRIORITY ONE LEVEL
1258  007060  162767  000040  170710            SUB     #40,PSW         ;LOWER THAN PUNCH PRIORITY
1259  007066  052777  000100  172120            BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPTS
1260  007074  000240                            NOP
1261  007076  104003                            ERROR                   ;ERROR. PUNCH FAILED TO INTERRUPT.
1262  007100  005077  172110            POBAC:  CLR     @TPS            ;THE STOCK TWICE. DISABLE PUNCH INTERRUPT
1263  007104  104012                            SCOPE                   ;SCOPE
1264                                    ;*************************************************************************
1265  007106  000034                    POT34:  34                      ; PRGO TEST ROUTINE 34                  *
1266  007110  007202                            POT35                   ;ADDRESS OF NEXT ROUTINE                *
1267  007112  001750                            1000.                   ;TEST ITERATION COUNT                   *
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1268  007114  007116                          PUCAA                   ;SCOPE ENTRY POINT                      *
1269                                  ;*************************************************************************
1270                                  ;TEST THAT PUNCH READY DOES NOT REINTERRUPT AFTER RTI WHEN READY
1271                                  ;BIT HAS NOT BEEN RESET.
1272  007116  104007                 POCAA:  STPCHV                  ;SET PUNCH INTERRUPT SERVICE TO
1273  007120  007152                         POCAC                   ;TO POCAC.
1274  007122  005077  172066                CLR     @TPS            ;DISABLE PUNCH INTERRUPTS
1275  007126  005067  170644                CLR     PSW             ;SET PROCESSOR PRIORITY TO 0
1276  007132  052777  000100  172054        BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPTS
1277  007140  000240                        NOP
1278  007142  104003                        ERROR                   ;ERROR 1. PUNCH FAILED TO INTERRUPT.
1279  007144  005077  172044                CLR     @TPS            ;DISABLE PUNCH INTERRUPT.
1280  007150  104012                        SCOPE                   ;SCOPE
1281  007152  012777  007172  172044 POCAC:  MOV     #POCAE,@TPVTR   ;HERE IF INTERRUPT OCCURS. CHANGE
1282  007160  012716  007166                MOV     #POCAD,@%6      ;PUNCH VECTOR TO POCAE AND EXIT
1283  007164  000002                        RTI                     ;INTERRUPT
1284  007166  000240                 POCAD:  NOP                     ;OK IF NO REINTERRUPT OCCURS
1285  007170  000401                        BR      POCAF
1286  007172  104003                 POCAE:  ERROR                   ;ERR 2. PUNCH REINTERRUPTED AFTER
1287  007174  005077  172014        POCAF:  CLR     @TPS            ;RTI WITH READY BIT LEFT ON
1288  007200  104012                        SCOPE                   ;SCOPE
1289                                  ;*************************************************************************
1290  007202  000035                 POT35:  35                      ; PRGO TEST ROUTINE 35                  *
1291  007204  007260                         POT36                   ;ADDRESS OF NEXT ROUTINE                *
1292  007206  001750                         1000.                   ;TEST ITERATION COUNT                   *
1293  007210  007216                         PODAA                   ;SCOPE ENTRY POINT                      *
1294                                  ;*************************************************************************
1295                                  ;TEST THAT THE PUNCH INTERRUPTS IMMEDIATELY UPON LOWERING
1296                                  ;PROCESSOR PRIORITY TO 0.
1297  007212  104007                         STPCHV                  ;SET PUNCH INTERRUPT
1298  007214  007252                         PODAC                   ;TO PODAC.
1299  007216  012767  000340  170552 PODAA:  MOV     #PRTY7,PSW      ;SET PROCESSOR PRIORITY TO 7.
1300  007224  005077  171764                CLR     @TPS            ;DISABLE PUNCH INTERRUPTS
1301  007230  052777  000100  171756        BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPTS
1302  007236  005067  170534                CLR     PSW             ;LOWER PROCESSOR PRIORITY TO 0.
1303  007242  012767  000340  170526        MOV     #PRTY7,PSW      ;RAISE PRIORITY TO 7.
1304  007250  104003                        ERROR                   ;ERROR. PUNCH FAILED TO INTERRUPT
1305                                                                ;IMMEDIATELY AFTER CP PRIORITY WAS SET TO 0.
1306  007252  005077  171736        PODAC:  CLR     @TPS            ;DISABLE PUNCH INTERRUPTS
1307  007256  104012                        SCOPE                   ;SCOPE
1308                                  ;*************************************************************************
1309  007260  000036                 POT36:  36                      ; PRGO TEST ROUTINE 36                  *
1310  007262  007342                         POT37                   ;ADDRESS OF NEXT ROUTINE                *
1311  007264  000024                         20.                     ;TEST ITERATION COUNT                   *
1312  007266  007276                         POEAA                   ;SCOPE ENTRY POINT                      *
1313                                  ;*************************************************************************
1314                                  ;TEST FOR CORRECT OPERATION OF THE WAIT INSTRUCTION.  A WAIT INSTRUCTION
1315                                  ;IS PERFORMED WHILE WAITING FOR A PUNCH INTERRUPT.  WHEN THE INTERRUPT
1316                                  ;OCCURS, THE SERVICE ROUTINE CHANGES THE WAIT INSTRUCTION TO AN ERROR
1317                                  ;CALL AND THEN EXITS THE INTERRUPT WITH AN RTI.  EXITING THE INTERRUPT
1318                                  ;SHOULD RETURN CONTROL TO THE INSTRUCTION FOLLOWING THE WAIT INSTRUCTION.
1319                                  ;IF CONTROL IS INSTEAD RETURNED TO THE SAME LOCATION WHERE THE WAIT
1320                                  ;INSTRUCTION WAS LOCATED AN ERROR CALL WILL OCCUR, INDICATING A FAILURE
1321                                  ;OF THE WAIT INSTRUCTION.
1322  007270  104023                         RESET2
1323  007272  104007                         STPCHV                  ;SET PUNCH INTERRUPT SERVICE
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 1324  007274  007332                          PUEAC                   ;TO POEAC.
 1325  007276  012767  000001  000016  POEAA:  MOV     #WAIT,POEAB     ;MOVE WAIT INSTRUCTION TO POEAB
 1326  007304  005077  171706                  CLR     @TPB            ;LOAD PUNCH BUFFER (ENABLES PUNCH)
 1327  007310  052777  000100  171676          BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPTS
 1328  007316  005067  170454                  CLR     PSW             ;SET PRIORITY 0.
 1329  007322  000000                  POEAB:  OPEN                    ;THIS LOCATION CAN BE EITHER
 1330                                                                  ;A WAIT INSTRUCTION OR AN ERROR CALL.
 1331                                                                  ;IF AN ERROR CALL IS EXECUTED, IT
 1332                                                                  ;INDICATES A FAILURE OF THE WAIT INSTRUCTION.
 1333  007324  005077  171664                  CLR     @TPS            ;DISABLE PUNCH INTERRUPTS
 1334  007330  104012                          SCOPE                   ;SCOPE
 1335  007332  012767  104003  177762  POEAC:  MOV     #ERROR,POEAB    ;MOVE ERROR CALL TO POEAB.
 1336  007340  000002                          RTI                     ;EXIT INTERRUPT.
 1337                          ;*****************************************************************
 1338  007342  000037                  POT37:  37                      ; PRGO TEST ROUTINE 37          *
 1339  007344  007402                          POT40                   ;ADDRESS OF NEXT ROUTINE        *
 1340  007346  000024                          20.                     ;TEST ITERATION COUNT           *
 1341  007350  007354                          POFAA                   ;SCOPE ENTRY POINT              *
 1342                          ;*****************************************************************
 1343                          ;TEST THAT LOADING THE PUNCH BUFFER WITH THE MAINTENANCE BIT SET
 1344                          ;CAUSES THE READER DONE BIT TO SET SOMETIME AFTER.
 1345  007352  104023                          RESET2
 1346  007354  052777  000004  171632  POFAA:  BIS     #BIT2,@TPS      ;SET MAINTENANCE BIT
 1347  007362  005077  171630                  CLR     @TPB            ;LOAD PUNCH BUFFER
 1348  007366  104400                          DELAYX                  ;WAIT.
 1349  007370  105777  171614                  TSTB    @TKS            ;TEST READER DONE BIT
 1350  007374  100401                          BMI     .+4             ;BRANCH IF READER DONE BIT SET.
 1351  007376  104003                          ERROR                   ;ERROR. SOMETIME AFTER PUNCH
 1352                                                                  ;BUFFER LOAD WITH MAINTENANCE BIT
 1353                                                                  ;SET THE READER DONE BIT WAS NOT SET
 1354  007400  104012                          SCOPE                   ;SCOPE
 1355                          ;*****************************************************************
 1356  007402  000040                  POT40:  40                      ; PRGO TEST ROUTINE 40          *
 1357  007404  007472                          POT41                   ;ADDRESS OF NEXT ROUTINE        *
 1358  007406  000024                          20.                     ;TEST ITERATION COUNT           *
 1359  007410  007416                          POGAA                   ;SCOPE ENTRY POINT              *
 1360                          ;*****************************************************************
 1361                          ;TEST THAT CLEARING PUNCH READY AND/OR IE BIT CLEARS PUNCH INTERRUPT REQUEST.
 1362  007412  104007                          STPCHV                  ;SET PUNCH VECTOR TO POGAB.
 1363  007414  007466                          POGAB
 1364  007416  104023                  POGAA:  RESET2
 1365  007420  012767  000340  170350          MOV     #PRTY7,PSW      ;SET PRIORITY 7.
 1366  007426  052777  000100  171560          BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPTS.
 1367  007434  005077  171556                  CLR     @TPB            ;OUTPUT CHAR.
 1368  007440  105777  171550                  TSTB    @TPS            ;WAIT FOR PUNCH READY.
 1369  007444  100375                          BPL     .-4
 1370  007446  005077  171542                  CLR     @TPS            ;DISABLE PUNCH INTERRUPTS.
 1371  007452  005077  171540                  CLR     @TPB            ;LOAD BUFFER TO CLEAR PUNCH READY.
 1372  007456  005067  170314                  CLR     PSW             ;SET PRIORITY 0.
 1373  007462  000240                          NOP
 1374  007464  104012                          SCOPE                   ;OK IF NO INTERRUPT OCCURS.
 1375  007466  104003                  POGAB:  ERROR                   ;READY CLEAR AND/OR IE BIT CLEAR DID NOT
 1376  007470  104012                          SCOPE                   ;PREVENT PUNCH/PRINTER INTERRUPT.
 1377                                                                  ;(INTERRUPT REQUEST DID NOT CLEAR.)
 1378                          ;*****************************************************************
 1379  007472  000041                  POT41:  41                      ; PRGO TEST ROUTINE 41          *
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1380  007474  007570                          PUT42                   ;ADDRESS OF NEXT ROUTINE                *
1381  007476  000024                          20.                     ;TEST ITERATION COUNT                   *
1382  007500  007506                          POHAA                   ;SCOPE ENTRY POINT                      *
1383                                  ;*****************************************************************************
1384                                  ;TEST THAT CLEARING READER DONE AND/OR IE BIT CLEARS READER INTERRUPT REQUEST.
1385  007502  104006                          STRDRV                  ;SET READER VECTOR TO POHAB.
1386  007504  007564                          POHAB
1387  007506  104023                  POHAA:  RESET2
1388  007510  012767  000340  170260          MOV     #PRTY7,PSW      ;SET PRIORITY 7.
1389  007516  052777  000004  171470          BIS     #BIT2,@TPS      ;SET MAINTENANCE MODE.
1390  007524  005077  171476                  CLR     @TPB            ;OUTPUT CHAR.
1391  007530  052777  000100  171452          BIS     #BIT6,@TKS      ;ENABLE READER INTERRUPTS.
1392  007536  105777  171446                  TSTB    @TKS            ;WAIT FOR READER DONE.
1393  007542  100375                          BPL     .-4
1394  007544  005077  171440                  CLR     @TKS            ;DISABLE READER INTERRUPTS.
1395  007550  005777  171436                  TST     @TKB            ;CLEAR READER DONE.
1396  007554  005067  170216                  CLR     PSW             ;SET PRIORITY 0.
1397  007560  000240                          NOP
1398  007562  104012                          SCOPE                   ;OK IF NO INTERRUPT OCCURS.
1399  007564  104003                  POHAB:  ERROR                   ;DONE CLEARED AND/OR IE CLEARED DID NOT
1400  007566  104012                          SCOPE                   ;PREVENT READER INTERRUPT.
1401                                  ;*****************************************************************************
1402  007570  000042                  POT42:  42                      ; PRGO TEST ROUTINE 42                  *
1403  007572  007620                          POT43                   ;ADDRESS OF NEXT ROUTINE                *
1404  007574  001000                          1000                    ;TEST ITERATION COUNT                   *
1405  007576  007600                          POJAA                   ;SCOPE ENTRY POINT                      *
1406                                  ;*****************************************************************************
1407                                  ;TEST THE DL11A,B KEYBOARD JUMPERS ARE CUT PROPERLY
1408  007600  012777  173476  171402  POJAA:  MOV     #173476,@TKS    ;ATTEMPT TO SET NON-SETABLE BITS
1409  007606  005777  171376                  TST     @TKS            ;DID ANY SET?
1410  007612  001401                          BEQ     .+4             ;BR IF NO
1411  007614  104003                          ERROR
1412  007616  104012                          SCOPE
1413                                  ;*****************************************************************************
1414  007620  000043                  POT43:  43                      ; PRGO TEST ROUTINE 43                  *
1415  007622  177777                          POTLST                  ;ADDRESS OF NEXT ROUTINE                *
1416  007624  001000                          1000                    ;TEST ITERATION COUNT                   *
1417  007626  007630                          POKAA                   ;SCOPE ENTRY POINT                      *
1418                                  ;*****************************************************************************
1419                                  ;TEST THE DL11A,B PRINTER JUMPERS ARE CUT PROPERLY
1420  007630  012777  177473  171356  POKAA:  MOV     #177473,@TPS    ;ATTEMPT TO SET NON-SETABLE BITS
1421  007636  022777  000200  171350          CMP     #BIT7,@TPS      ;DID ANY SET?
1422  007644  001401                          BEQ     .+4             ;BR IF NO
1423  007646  104003                          ERROR
1424  007650  104012                          SCOPE
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                                        .SBTTL  PRG1 READER TEST
                 000001                 Z=1
                 177777                 X=-1
007652  012767  007706  171354 PRG1:    MOV     #P1T0,KSTART    ;SET ADDRESS OF FIRST ROUTINE
007660  012767  177760  173704          MOV     #177760,RCMSK
007666  012767  177400  173310          MOV     #177400,STLMSK  ;SET STALL LIMIT.
007674  052767  040000  171346          BIS     #BIT14,PRGID    ;ALLOW STALLS
007702  000167  171736                  JMP     SRSET           ;GO GET STARTED.
                        ;*****************************************************************************
007706  000000          P1T0:   0                               ; PRG1 TEST ROUTINE 0                   *
007710  007734                  P1T1                            ;ADDRESS OF NEXT ROUTINE                *
007712  003720                  2000.                           ;TEST ITERATION COUNT                   *
007714  007722                  P1AA                            ;SCOPE ENTRY POINT                      *
                        ;*****************************************************************************
                        ;READ AND CHECK 2000 CHARACTERS OF SPECIAL BINARY COUNT PATTERN. FULL SPEED.
007716  004767  173714          JSR     %7,BSYNC                ;SYNC READER; SET ERROR COUNTER.
007722  004767  172644  P1AA:   JSR     %7,BREAD                ;GO READ CHARACTER
007726  004767  173644          JSR     %7,BCHECK               ;GO CHECK CHARACTER READ.
007732  104012                  SCOPE                           ;SCOPE
                        ;*****************************************************************************
007734  000001          P1T1:   1                               ; PRG1 TEST ROUTINE 1                   *
007736  007764                  P1T2                            ;ADDRESS OF NEXT ROUTINE                *
007740  001750                  1000.                           ;TEST ITERATION COUNT                   *
007742  007750                  P1BA                            ;SCOPE ENTRY POINT                      *
                        ;*****************************************************************************
                        ;READ AND CHECK 1000 CHARACTERS OF SPECIAL BINARY COUNT PATTERN.
                        ;RANDOM STALL BETWEEN CHARACTERS.
007744  004767  173666          JSR     %7,BSYNC                ;SYNC READER; SET ERROR COUNTER
007750  104002          P1BA:   STALL                           ;RANDOM STALL
007752  004767  172614          JSR     %7,BREAD                ;GO READ CHARACTER
007756  004767  173614          JSR     %7,BCHECK               ;GO CHECK CHARACTER READ
007762  104012                  SCOPE                           ;SCOPE
                        ;*****************************************************************************
007764  000002          P1T2:   2                               ; PRG1 TEST ROUTINE 2                   *
007766  177777                  P1TLST                          ;ADDRESS OF NEXT ROUTINE                *
007770  000310                  200.                            ;TEST ITERATION COUNT                   *
007772  010000                  P1CA                            ;SCOPE ENTRY POINT                      *
                        ;*****************************************************************************
                        ;READ AND CHECK 200 CHARACTER GROUPS OF SPECIAL BINARY COUNT PATTERN.
                        ;RANDOM LENGTH
                        ;GROUPS (BETWEEN 1 AND 15). RANDOM STALL BETWEEN GROUPS (0 TO 127 MSECS).
007774  004767  173636          JSR     %7,BSYNC                ;SYNC READER; SET ERROR COUNTER.
010000  004767  173546  P1CA:   JSR     %7,GRCNT                ;GENERATE RANDOM CHARACTER COUNT.
010004  104002                  STALL                           ;RANDOM STALL (0 TO 127 MSECS)
010006  004767  172560  P1CC:   JSR     %7,BREAD                ;GO READ CHARATER
010012  004767  173560          JSR     %7,BCHECK               ;GO CHECK CHARACTER READ
010016  005367  173552          DEC     RNCNT                   ;DECREMENT RANDOM CHAR COUNT
010022  001371                  BNE     P1CC                    ;GO READ AGAIN IF COUNT NOT 0.
010024  104012                  SCOPE                           ;SCOPE
```

D03


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                                                .SBTTL  PRG2-PRINTER TESTS
                000002                          Z=2
                177777                          X=-1
010026  012767  010060  171200  PRG2:   MOV     #P2T0,KSTART    ;SET ADDRESS IF 1ST ROUTINE.
010034  052767  000200  171206          BIS     #BIT7,PRGID
010042  012767  177600  173134          MOV     #177600,STLMSK  ;SET STALL LIMIT
010050  004767  174560                  JSR     %7,STBF         ;SET UP BUFFER AREA.
010054  000167  171564                  JMP     SRSET           ;GO GET STARTED.
                                ;*****************************************************************************
010060  000000                  P2T0:   0                       ; PRG2 TEST ROUTINE 0                       *
010062  010206                          P2T1                    ;ADDRESS OF NEXT ROUTINE                    *
                                ;*****************************************************************************
                                ;CARRIAGE RETURN TEST.
010064  104000                          TYPE                    ;TYPE TITLE.
010066  014366                          CRTST
010070  012767  000122  171264          MOV     #82.,RCNT
010076  104015                          CK37
010100  162767  000011  171254          SUB     #9.,RCNT
010106  112700  000134                  MOVB    #'\,%0          ;PRINT
010112  004767  174260                  JSR     %7,LSPCH        ;"\"
010116  016767  171240  171260          MOV     RCNT,CTRA       ;RCNT TO CTRA
010124  005367  171254          CT0A:   DEC     CTRA            ;DECREMENT CTRA
010130  001001                          BNE     CT0B            ;BRANCH IF NOT 0
010132  104012                          SCOPE                   ;0. SCOPE
010134  016767  171244  171244  CT0B:   MOV     CTRA,CTRB       ;SPACE COUNT TO CTRB.
010142  112700  000040          CT0C:   MOVB    #40,%0
010146  004767  174224                  JSR     %7,LSPCH        ;SPACE.
010152  005367  171230                  DEC     CTRB            ;DECREMENT CTRB.
010156  001371                          BNE     CT0C            ;BRANCH IF NOT DONE SPACING.
010160  112700  000015                  MOVB    #15,%0
010164  004767  174206                  JSR     %7,LSPCH        ;CARRIAGE RETURN.
010170  004767  174202                  JSR     %7,LSPCH        ;DUMMY CYCLE.
010174  112700  000057                  MOVB    #'/,%0
010200  004767  174172                  JSR     %7,LSPCH        ;PRINT "/".
010204  000747                          BR      CT0A
                                ;*****************************************************************************
010206  000001                  P2T1:   1                       ; PRG2 TEST ROUTINE 1                       *
010210  010272                          P2T2                    ;ADDRESS OF NEXT ROUTINE                    *
                                ;*****************************************************************************
                                ;RIGHT MARGIN TEST
                                        TYPE                    ;TYPE TITLE
                                        RMTST
010216  012767  000016  171160          MOV     #14.,CTRA       ;SET UP FOR 33/35
010224  012767  014347  000034          MOV     #RM33B,RMB
010232  104015                          CK37                    ;37
010234  000406                          BR      CT1A            ;NO
010236  012767  000017  171140          MOV     #15.,CTRA       ;YES.
010244  012767  014353  000014          MOV     #RM37A,RMB      ;SET UP FOR 37.
010252  104000          CT1A:   TYPE                            ;TYPE----I
010254  014341                          RM33A
010256  005367  171122                  DEC     CTRA            ;DONE N TIMES.
010262  001373                          BNE     CT1A            ;BRANCH IF NOT N TIMES
010264  104000                          TYPE                    ;TYPE-I-.
010266  000000          RMB:    OPEN
010270  104012                          SCOPE                   ;SCOPE.
                                ;*****************************************************************************
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1530  010272  000002                    P2T2:   2                       ; PRG2 TEST ROUTINE 2                   *
1531  010274  010426                            P2T3                    ;ADDRESS OF NEXT ROUTINE                *
1532                                    ;*************************************************************************
1533                                    ;SPACE TEST
1534  010276  104000                            TYPE                    ;TYPE TITLE.
1535  010300  014445                            SPTST
1536  010302  012767  000044  171074           MOV     #36.,CTRA       ;33/35 COUNT TO CTRA.
1537  010310  104000                    CT2A:   TYPE                    ;TYPE SPACE,\.
1538  010312  014363                            SPTSTC
1539  010314  005367  171064                   DEC     CTRA            ;DONE TIMES SET IN CTRA?
1540  010320  001373                            BNE     CT2A            ;BRANCH IF NOT DONE
1541  010322  012767  000044  171054           MOV     #36.,CTRA       ;SET UP CTRA COUNT FOR 33/35
1542  010330  012767  000001  171050    CT2B:   MOV     #1,CTRB
1543  010336  016767  171044  171044    CT2C:   MOV     CTRB,CTRC
1544  010344  112700  000015                   MOVB    #15,%0          ;CARRIAGE RETURN.
1545  010350  004767  174022                   JSR     %7,LSPCH
1546  010354  004767  174016                   JSR     %7,LSPCH        ;DUMMY CYCLE.
1547  010360  112700  000040            CT2D:  MOVB    #40,%0          ;SPACE NUMBER OF TIMES
1548  010364  004767  174006                   JSR     %7,LSPCH        ;SET IN CTRC.
1549  010370  005367  171014                   DEC     CTRC            ;DONE SPACING.
1550  010374  001371                            BNE     CT2D            ;BRANCH IF NOT DONE SPACING.
1551  010376  112700  000057                   MOVB    #'/,%0          ;DONE. TYPE A "/".
1552  010402  004767  173770                   JSR     %7,LSPCH
1553  010406  005367  170772                   DEC     CTRA            ;DONE 36 TIMES?
1554  010412  001001                            BNE     CT2E            ;BRANCH IF NOT DONE.
1555  010414  104012                            SCOPE                   ;DONE. SCOPE.
1556  010416  062767  000002  170762    CT2E:   ADD     #2,CTRB         ;MODIFY CTRB FOR NEXT TRY.
1557  010424  000744                            BR      CT2C            ;GO DO IT AGAIN.
1558                                    ;*************************************************************************
1559  010426  000003                    P2T3:   3                       ; PRG2 TEST ROUTINE 3                   *
1560  010430  010520                            P2T4                    ;ADDRESS OF NEXT ROUTINE                *
1561                                    ;*************************************************************************
1562                                    ;LINE FEED TEST
1563  010432  104000                            TYPE                    ;TYPE TITLE
1564  010434  014464                            LFTST
1565  010436  052767  040000  170604           BIS     #BIT14,PRGID    ;ALLOW STALLS.
1566  010444  012767  000110  170732           MOV     #72.,CTRA       ;SET 33/35 LINE FEED COUNT.
1567  010452  104015                            CK37                    ;37?
1568  010454  000403                            BR      CT3A            ;NO.
1569  010456  062767  000011  170720           ADD     #9.,CTRA        ;INCREMENT LINE FEED COUNT BY 9.
1570  010464  112700  000134            CT3A:  MOVB    #'\,%0          ;TYPE "\"
1571  010470  004767  173702                   JSR     %7,LSPCH
1572  010474  112700  000012                   MOVB    #12,%0          ;LINE FEED.
1573  010500  004767  173672                   JSR     %7,LSPCH
1574  010504  005367  170674                   DEC     CTRA            ;DONE N TIMES?
1575  010510  001001                            BNE     CT3B            ;BRANCH IF NOT DONE.
1576  010512  104012                            SCOPE                   ;DONE. SCOPE
1577  010514  104002                    CT3B:   STALL                   ;STALL
1578  010516  000762                            BR      CT3A            ;REPEAT
1579                                    ;*************************************************************************
1580  010520  000004                    P2T4:   4                       ; PRG2 TEST ROUTINE 4                   *
1581  010522  010732                            P2T5                    ;ADDRESS OF NEXT ROUTINE                *
1582                                    ;*************************************************************************
1583                                    ;TAB TEST
1584  010524  012767  000011  000074           MOV     #9.,TBCNT       ;SET TAB COUNT.
1585  010532  104014                            CK35                    ;35?
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1586  010534  104012                          SCOPE                   ;NO.
1587  010536  004567  000040                  JSR     %5,TPBM         ;TYPE MARKERS
1588  010542  000007                          7
1589  010544  104000                          TYPE
1590  010546  014315                          TBMRK+1
1591  010550  012767  000007  170626  CT4A:   MOV     #7,CTRA         ;LINE COUNT TO CTRA
1592  010556  005067  000046                  CLR     SPCNT           ;0 TO SPACE COUNT.
1593  010562  004767  000044          CT4B:   JSR     %7,TABP         ;GO SPACE-TAB.
1594  010566  005267  000036                  INC     SPCNT           ;INCREMENT SPACE COUNT.
1595  010572  005367  170606                  DEC     CTRA            ;DONE 7 LINES?
1596  010576  001371                          BNE     CT4B            ;BRANCH IF NOT DONE.
1597  010600  104012                          SCOPE                   ;DONE. SCOPE.
1598  010602  012567  170576          TPBM:   MOV     (5)+,CTRA       ;TYPE TEST TITLE.
1599  010606  104000                          TYPE
1600  010610  014300                          TBTST
1601  010612  104000                  TPBMA:  TYPE                    ;TYPE MARKERS
1602  010614  014326                          TBMRK1
1603  010616  005367  170562                  DEC     CTRA
1604  010622  001373                          BNE     TPBMA
1605  010624  000205                          RTS     %5              ;EXIT.
1606  010626  000000                  TBCNT:  OPEN                    ;TAB COUNT
1607  010630  000000                  SPCNT:  OPEN                    ;SPACE COUNT
1608  010632  104000                  TABP:   TYPE                    ;CRLF.
1609  010634  014337                          CRLF
1610  010636  016767  177764  170542          MOV     TBCNT,CTRB      ;TAB COUNT TO CTRB
1611  010644  016767  177760  170536  TABPA:  MOV     SPCNT,CTRC      ;SPACE COUNT TO CTRC
1612  010652  001407                          BEQ     TABPC           ;BRANCH IF SPACE COUNT IS 0.
1613  010654  112700  000040          TABPB:  MOVB    #40,%0          ;SPACE
1614  010660  004767  173512                  JSR     %7,LSPCH
1615  010664  005367  170520                  DEC     CTRC            ;DECREMENT SPACE COUNT
1616  010670  001371                          BNE     TABPB           ;BRANCH IF NOT YET 0.
1617  010672  112700  000011          TABPC:  MOVB    #11,%0          ;TAB
1618  010676  004767  173474                  JSR     %7,LSPCH
1619  010702  004767  173470                  JSR     %7,LSPCH        ;DUMMY CYCLE
1620  010706  004767  173464                  JSR     %7,LSPCH        ;DUMMY CYCLE.
1621  010712  112700  000057                  MOVB    #'/,%0          ;TYPE "/"
1622  010716  004767  173454                  JSR     %7,LSPCH
1623  010722  005367  170460                  DEC     CTRB            ;DECREMENT TAB COUNT.
1624  010726  001346                          BNE     TABPA           ;BRANCH IF NOT DONE TABBING.
1625  010730  000207                          RTS     %7              ;DONE. EXIT.
1626                  ;*****************************************************************************
1627  010732  000005          P2T5:   5                               ; PRG2 TEST ROUTINE 5          *
1628  010734  010750                  P2T6                            ;ADDRESS OF NEXT ROUTINE       *
1629                  ;*****************************************************************************
1630                  ;TYPE LINE OF CHARACTERS ABC
1631  010736  104000                  TYPE                            ;TYPE "CHARACTER TESTS"
1632  010740  014507                  CHRTST
1633  010742  104016                  TYPLN3                          ;TYPE LINE
1634  010744  014176                  A
1635  010746  104012                  SCOPE                           ;SCOPE
1636                  ;*****************************************************************************
1637  010750  000006          P2T6:   6                               ; PRG2 TEST ROUTINE 6          *
1638  010752  010762                  P2T7                            ;ADDRESS OF NEXT ROUTINE       *
1639                  ;*****************************************************************************
1640                  ;TYPE LINE OF CHARACTERS DEF
1641  010754  104016                  TYPLN3                          ;TYPE LINE
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 1642  010756  014201                        D
 1643  010760  104012                        SCOPE                   ;SCOPE
 1644                          ;*************************************************************************
 1645  010762  000007          P2T7:   7                               ; PRG2 TEST ROUTINE 7                 *
 1646  010764  010774                        P2T10                   ;ADDRESS OF NEXT ROUTINE              *
 1647                          ;*************************************************************************
 1648                          ;TYPE LINE OF CHARACTERS GHI
 1649  010766  104016                        TYPLN3                  ;TYPE LINE
 1650  010770  014204                        G
 1651  010772  104012                        SCOPE                   ;SCOPE
 1652                          ;*************************************************************************
 1653  010774  000C10          P2T10:  10                              ; PRG2 TEST ROUTINE 10                *
 1654  010776  011006                        P2T11                   ;ADDRESS OF NEXT ROUTINE              *
 1655                          ;*************************************************************************
 1656                          ;TYPE LINE OF CHARACTERS OF JKL
 1657  011000  104016                        TYPLN3                  ;TYPELINE
 1658  011002  014207                        J
 1659  011004  104012                        SCOPE                   ;SCOPE
 1660                          ;*************************************************************************
 1661  011006  000011          P2T11:  11                              ; PRG2 TEST ROUTINE 11                *
 1662  011010  011020                        P2T12                   ;ADDRESS OF NEXT ROUTINE              *
 1663                          ;*************************************************************************
 1664                          ;TYPE LINE OF CHARACTERS MNO
 1665  011012  104016                        TYPLN3                  ;TYPE LINE
 1666  011014  014212                        M
 1667  011016  104012                        SCOPE                   ;SCOPE
 1668                          ;*************************************************************************
 1669  011020  000012          P2T12:  12                              ; PRG2 TEST ROUTINE 12                *
 1670  011022  011032                        P2T13                   ;ADDRESS OF NEXT ROUTINE              *
 1671                          ;*************************************************************************
 1672                          ;TYPE LINE OF CHARACTERS PQR
 1673  011024  104016                        TYPLN3                  ;TYPE LINE
 1674  011026  014215                        P
 1675  011030  104012                        SCOPE                   ;SCOPE
 1676                          ;*************************************************************************
 1677  011032  000013          P2T13:  13                              ; PRG2 TEST ROUTINE 13                *
 1678  011034  011044                        P2T14                   ;ADDRESS OF NEXT ROUTINE              *
 1679                          ;*************************************************************************
 1680                          ;TYPE LINE OF CHARACTERS STU
 1681  011036  104016                        TYPLN3
 1682  011040  014220                        S
 1683  011042  104012                        SCOPE
 1684                          ;*************************************************************************
 1685  011044  000014          P2T14:  14                              ; PRG2 TEST ROUTINE 14                *
 1686  011046  011056                        P2T15                   ;ADDRESS OF NEXT ROUTINE              *
 1687                          ;*************************************************************************
 1688                          ;TYPE LINE OF CHARACTERS VWX
 1689  011050  104016                        TYPLN3                  ;TYPE LINE
 1690  011052  014223                        V
 1691  011054  104012                        SCOPE                   ;SCOPE
 1692                          ;*************************************************************************
 1693  011056  000015          P2T15:  15                              ; PRG2 TEST ROUTINE 15                *
 1694  011060  011070                        P2T16                   ;ADDRESS OF NEXT ROUTINE              *
 1695                          ;*************************************************************************
 1696                          ;TYPE LINE OF CHARACTERS YZ0
 1697  011062  104016                        TYPLN3                  ;TYPE LINE
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 1698  011064  014226                        Y
 1699  011066  104012                        SCOPE                   ;SCOPE
 1700                          ;*************************************************************************
 1701  011070  000016          P2T16:  16                              ; PRG2 TEST ROUTINE 16                  *
 1702  011072  011102                        P2T17                   ;ADDRESS OF NEXT ROUTINE                *
 1703                          ;*************************************************************************
 1704                          ;TYPE LINE OF CHARACTERS 123
 1705  011074  104016                        TYPLN3                  ;TYPE LINE
 1706  011076  014231                        ONE
 1707  011100  104012                        SCOPE                   ;SCOPE
 1708                          ;*************************************************************************
 1709  011102  000017          P2T17:  17                              ; PRG2 TEST ROUTINE 17                  *
 1710  011104  011114                        P2T20                   ;ADDRESS OF NEXT ROUTINE                *
 1711                          ;*************************************************************************
 1712                          ;TYPE LINE OF CHARACTERS 456
 1713  011106  104016                        TYPLN3                  ;TYPE LINE
 1714  011110  014234                        FOUR
 1715  011112  104012                        SCOPE                   ;SCOPE
 1716                          ;*************************************************************************
 1717  011114  000020          P2T20:  20                              ; PRG2 TEST ROUTINE 20                  *
 1718  011116  011126                        P2T21                   ;ADDRESS OF NEXT ROUTINE                *
 1719                          ;*************************************************************************
 1720                          ;TYPE LINE OF CHARACTERS 789
 1721  011120  104016                        TYPLN3                  ;TYPE LINE
 1722  011122  014237                        SEVEN
 1723  011124  104012                        SCOPE                   ;SCOPE
 1724                          ;*************************************************************************
 1725  011126  000021          P2T21:  21                              ; PRG2 TEST ROUTINE 21                  *
 1726  011130  011140                        P2T22                   ;ADDRESS OF NEXT ROUTINE                *
 1727                          ;*************************************************************************
 1728                          ;TYPE LINE OF CHARACTERS!"#
 1729  011132  104016                        TYPLN3                  ;TYPE LINE
 1730  011134  014242                        C41
 1731  011136  104012                        SCOPE                   ;SCOPE
 1732                          ;*************************************************************************
 1733  011140  000022          P2T22:  22                              ; PRG2 TEST ROUTINE 22                  *
 1734  011142  011152                        P2T23                   ;ADDRESS OF NEXT ROUTINE                *
 1735                          ;*************************************************************************
 1736                          ;TYPE LINE OF CHARACTERS $%&
 1737  011144  104016                        TYPLN3                  ;TYPE LINE
 1738  011146  014245                        C44
 1739  011150  104012                        SCOPE                   ;SCOPE
 1740                          ;*************************************************************************
 1741  011152  000023          P2T23:  23                              ; PRG2 TEST ROUTINE 23                  *
 1742  011154  011164                        P2T24                   ;ADDRESS OF NEXT ROUTINE                *
 1743                          ;*************************************************************************
 1744                          ;TYPE LINE OF CHARACTERS '()
 1745  011156  104016                        TYPLN3                  ;TYPE LINE
 1746  011160  014250                        C47
 1747  011162  104012                        SCOPE                   ;SCOPE.
 1748                          ;*************************************************************************
 1749  011164  000024          P2T24:  24                              ; PRG2 TEST ROUTINE 24                  *
 1750  011166  011176                        P2T25                   ;ADDRESS OF NEXT ROUTINE                *
 1751                          ;*************************************************************************
 1752                          ;TYPE LINE OF CHARACTERS *+,
 1753  011170  104016                        TYPLN3                  ;TYPE LINE
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 1754  011172  014253                        C52
 1755  011174  104012                        SCOPE                   ;SCOPE
 1756                          ;*************************************************************************
 1757  011176  000025          P2T25:  25                              ; PRG2 TEST ROUTINE 25                *
 1758  011200  011210                        P2T26                   ;ADDRESS OF NEXT ROUTINE              *
 1759                          ;*************************************************************************
 1760                          ;TYPE LINE OF CHARACTERS -./
 1761  011202  104016                        TYPLN3                  ;TYPE LINE
 1762  011204  014256                        C55
 1763  011206  104012                        SCOPE                   ;SCOPE
 1764                          ;*************************************************************************
 1765  011210  000026          P2T26:  26                              ; PRG2 TEST ROUTINE 26                *
 1766  011212  011222                        P2T27                   ;ADDRESS OF NEXT ROUTINE              *
 1767                          ;*************************************************************************
 1768                          ;TYPE LINE OF CHARACTERS :;<
 1769  011214  104016                        TYPLN3                  ;TYPE LINE
 1770  011216  014261                        C72
 1771  011220  104012                        SCOPE                   ;SCOPE
 1772                          ;*************************************************************************
 1773  011222  000027          P2T27:  27                              ; PRG2 TEST ROUTINE 27                *
 1774  011224  011234                        P2T30                   ;ADDRESS OF NEXT ROUTINE              *
 1775                          ;*************************************************************************
 1776                          ;TYPE LINE OF CHARACTERS =>?
 1777  011226  104016                        TYPLN3                  ;TYPE LINE
 1778  011230  014264                        C75
 1779  011232  104012                        SCOPE                   ;SCOPE.
 1780                          ;*************************************************************************
 1781  011234  000030          P2T30:  30                              ; PRG2 TEST ROUTINE 30                *
 1782  011236  011246                        P2T31                   ;ADDRESS OF NEXT ROUTINE              *
 1783                          ;*************************************************************************
 1784                          ;TYPE LINE OF CHARACTERS @[\
 1785  011240  104016                        TYPLN3                  ;TYPE LINE
 1786  011242  014267                        C100
 1787  011244  104012                        SCOPE                   ;SCOPE
 1788                          ;*************************************************************************
 1789  011246  000031          P2T31:  31                              ; PRG2 TEST ROUTINE 31                *
 1790  011250  011260                        P2T32                   ;ADDRESS OF NEXT ROUTINE              *
 1791                          ;*************************************************************************
 1792                          ;TYPE LINE OF CHARACTERS ]↑AND LEFT ARROW
 1793  011252  104016                        TYPLN3                  ;TYPE LINE
 1794  011254  014272                        C135
 1795  011256  104012                        SCOPE                   ;SCOPE
 1796                          ;*************************************************************************
 1797  011260  000032          P2T32:  32                              ; PRG2 TEST ROUTINE 32                *
 1798  011262  011316                        P2T33                   ;ADDRESS OF NEXT ROUTINE              *
 1799                          ;*************************************************************************
 1800                          ;TYPE 2 LINES OF ALL CHARACTERS, FIRST LINE FULL SPEED. SECOND LINE WITH STALLS.
 1801  011264  004767  173456          JSR     %7,FBALL        ;FILL BUFFER WITH ALL CHARACTERS.
 1802  011270  042767  040000  167752  BIC     #BIT14,PRGID    ;CLEAR STALL BIT IN PRGID
 1803  011276  004767  173236          JSR     %7,TYPLN        ;TYPE LINE.
 1804  011302  052767  040000  167740  BIS     #BIT14,PRGID    ;SET STALL BIT IN PRGID
 1805  011310  004767  173224          JSR     %7,TYPLN        ;TYPE LINE.
 1806  011314  104012                  SCOPE                   ;SCOPE.
 1807                          ;*************************************************************************
 1808  011316  000033          P2T33:  33                              ; PRG2 TEST ROUTINE 33                *
 1809  011320  011400                        P2T34                   ;ADDRESS OF NEXT ROUTINE              *
```

```
1810                                    ;*************************************************************************
1811                                    ;TYPE 12 LINES OF ASR33 WORST CASE PATTERN. ALTERNATE LINES WITH STALLS.
1812  011322  104013                            CK33                    ;33?
1813  011324  104012                            SCOPE                   ;NO. BYPASS TEST.
1814  011326  104000                            TYPE                    ;TYPE "WORST CASE PATTERN TEST"
1815  011330  014533                            WCPTST
1816  011332  004767  173450                    JSR     %7,FW336        ;PATTERN TO BUFFER.
1817  011336  012767  000006  170040            MOV     #6,CTRA         ;SET COUNT TO 6
1818  011344  042767  040000  167676  CT33A:    BIC     #BIT14,PRGID    ;CLEAR STALL BIT IN PRGID.
1819  011352  004767  173162                    JSR     %7,TYPLN        ;TYPE LINE
1820  011356  052767  040000  167664            BIS     #BIT14,PRGID    ;SET STALL BIT IN PRGID.
1821  011364  004767  173150                    JSR     %7,TYPLN        ;TYPE LINE.
1822  011370  005367  170010                    DEC     CTRA            ;DONE 6 TIMES?
1823  011374  001363                            BNE     CT33A           ;BRANCH IF NOT 6 TIMES YET.
1824  011376  104012                            SCOPE                   ;DONE. SCOPE.
1825                                    ;*************************************************************************
1826  011400  000034                    P2T34:  34                      ; PRG2 TEST ROUTINE 34                  *
1827  011402  177777                            P2TLST                  ;ADDRESS OF NEXT ROUTINE                *
1828                                    ;*************************************************************************
1829                                    ;TYPE 12 LINES OF ASR35 WORST CASE PATTERN. ALTERNATE LINES WITH STALLS.
1830  011404  104014                            CK35                    ;35?
1831  011406  104012                            SCOPE                   ;NO. BYPASS TEST.
1832  011410  104000                            TYPE                    ;TYPE "WORST CASE PATTERN TEST"
1833  011412  014533                            WCPTST
1834  011414  004767  173426                    JSR     %7,FW356        ;PATTERN TO BUFFER.
1835  011420  012767  000006  167756            MOV     #6,CTRA         ;SET COUNT TO 6.
1836  011426  042767  040000  167614  CT34A:    BIC     #BIT14,PRGID    ;CLEAR STALL BIT  IN PRGID.
1837  011434  004767  173100                    JSR     %7,TYPLN        ;TYPE LINE.
1838  011440  052767  040000  167602            BIS     #BIT14,PRGID    ;SET STALL BIT IN PRGID.
1839  011446  004767  173066                    JSR     %7,TYPLN        ;TYPE LINE
1840  011452  005367  167726                    DEC     CTRA            ;DONE 6 TIMES?
1841  011456  001363                            BNE     CT34A           ;BRANCH IF NOT 6 TIMES YET.
1842  011460  104012                            SCOPE                   ;DONE. SCOPE.
```

```
                                                .SBTTL  PRG3-PUNCH TEST
                                        ;PRG3 - PUNCH TEST
                    000003                      Z=3
                    177777                      X=-1
011462  012767  011510  167544  PRG3:   MOV     #P3T0,KSTART    ;ADDR OF 1ST ROUTINE TO KSTART.
011470  052767  040000  167552          BIS     #BIT14,PRGID    ;ALLOW STALLS.
011476  012767  177400  171500          MOV     #177400,STLMSK  ;SET STALL MASK
011504  000167  170134                  JMP     SRSET           ;GO GET STARTED
                                        ;*************************************************************************
011510  000000                  P3T0:   0                       ; PRG3 TEST ROUTINE 0                          *
011512  011566                          P3T1                    ;ADDRESS OF NEXT ROUTINE                       *
011514  000005                          5                       ;TEST ITERATION COUNT                          *
011516  011520                          P3AA                    ;SCOPE ENTRY POINT                             *
                                        ;*************************************************************************
                                        ;PUNCH SPECIAL BINARY COUNT PATTERN IN PUNCH MODE 0 (FULL SPEED)
011520  012767  001000  167634  P3AA:   MOV     #512.,RCNT      ;SET CHARACTER COUNT TO 512
011526  004767  000216                  JSR     %7,PFRNT        ;GO PUNCH FRONT END.
011532  004767  172270                  JSR     %7,INBIN        ;INITIALIZE SPECIAL BINARY COUNT
011536  004767  172322          P3AB:   JSR     %7,GTBIN        ;GET BINARY CHARACTER
011542  004767  172630                  JSR     %7,LSPCH        ;GO PUNCH THE CHARACTER
011546  005367  167610                  DEC     RCNT            ;DECREMENT CHAR COUNT.
011552  001371                          BNE     P3AB            ;BRANCH IF COUNT NOT YET 0 YET.
011554  004767  000206                  JSR     %7,PLTLR        ;PUNCH TRAILER.
011560  004767  000230                  JSR     %7,PCHECK       ;CHECK DATA PUNCHED.
011564  104012                          SCOPE                   ;SCOPE
                                        ;*************************************************************************
011566  000001                  P3T1:   1                       ; PRG3 TEST ROUTINE 1                          *
011570  011646                          P3T2                    ;ADDRESS OF NEXT ROUTINE                       *
011572  000005                          5                       ;TEST ITERATION COUNT                          *
011574  011576                          P3BA                    ;SCOPE ENTRY POINT                             *
                                        ;*************************************************************************
                                        ;PUNCH SPECIAL BINARY COUNT PATTERN IN PUNCH MODE 1 (RANDOM STALLS AFTER
                                        ;PUNCHING EACH CHARACTER.)
011576  012767  001000  167556  P3BA:   MOV     #512.,RCNT      ;SET CHARACTER COUNT TO 512.
011604  004767  000140                  JSR     %7,PFRNT        ;GO PUNCH FRONT END.
011610  004767  172212                  JSR     %7,INBIN        ;INITIALIZE SPECIAL BINARY COUNT.
011614  004767  172244          P3BB:   JSR     %7,GTBIN        ;GET BINARY CHARACTER.
011620  004767  172552                  JSR     %7,LSPCH        ;GO PUNCH THE CHARACTER.
011624  104002                          STALL                   ;RANDOM STALL.
011626  005367  167530                  DEC     RCNT            ;DECREMENT CHAR COUNT.
011632  001370                          BNE     P3BB            ;BRANCH IF COUNT NOT YET 0.
011634  004767  000126                  JSR     %7,PLTLR        ;PUNCH TRAILER.
011640  004767  000150                  JSR     %7,PCHECK       ;CHECK DATA PUNCHED.
011644  104012                          SCOPE                   ;SCOPE
                                        ;*************************************************************************
011646  000002                  P3T2:   2                       ; PRG3 TEST ROUTINE 2                          *
011650  177777                          P3TLST                  ;ADDRESS OF NEXT ROUTINE                       *
011652  000005                          5                       ;TEST ITERATION COUNT                          *
011654  011664                          P3CA                    ;SCOPE ENTRY POINT                             *
                                        ;*************************************************************************
                                        ;PUNCH SPECIAL BINARY COUNT PATTERN IN PUNCH MODE 2.
                                        ;(RANDOM STALL BEFORE PUNCHING RANDOM LENGTH GROUP OF CHARACTERS).
                                        ;MAXIMUM GROUP LENGTH: 15)
011656  012767  177760  171706          MOV     #177760,RCMSK   ;SET CHAR GROUP MASK FOR 17(8) MAX).
011664  012767  001000  167470  P3CA:   MOV     #512.,RCNT      ;SET CHARACTER COUNT TO 512.
011672  004767  000052                  JSR     %7,PFRNT        ;GO PUNCH FRONT END.
```

```
 1899  011676  004767  172124                    JSR     %7,INBIN        ;INITIALIZE SPECIAL BINARY COUNT.
 1900  011702  004767  171644          P3CB:     JSR     %7,GRCNT        ;GENERATE RANDOM CHARACTER COUNT
 1901  011706  104002                            STALL                   ;RANDOM STALL.
 1902  011710  004767  172150          P3CC:     JSR     %7,GTBIN        ;GET BINARY CHARACTER.
 1903  011714  004767  172456                    JSR     %7,LSPCH        ;PUNCH THE CHARACTER.
 1904  011720  005367  167436                    DEC     RCNT            ;DECREMENT CHAR COUNT
 1905  011724  001404                            BEQ     P3CD            ;BRANCH IF COUNT IS 0.
 1906  011726  005367  171642                    DEC     RNCNT           ;NOT 0. DECREMENT RANDOM CHAR COUNT.
 1907  011732  001366                            BNE     P3CC            ;BRANCH IF COUNT NOT YET 0.
 1908  011734  000762                            BR      P3CB            ;BRANCH IF COUNT 0.
 1909  011736  004767  000024          P3CD:     JSR     %7,PLTLR        ;PUNCH TRAILER.
 1910  011742  004767  000046                    JSR     %7,PCHECK       ;CHECK DATA PUNCHED.
 1911  011746  104012                            SCOPE                   ;SCOPE.
 1912                                  ;ROUTINE TO PUNCH FRONT END.
 1913  011750  004767  000012          PFRNT:    JSR     %7,PLTLR        ;PUNCH LEADER
 1914  011754  012700  000377                    MOV     #377,%0
 1915  011760  004767  172412                    JSR     %7,LSPCH        ;PUNCH SYNC CHARACTER. (RUBOUT)
 1916  011764  000207                            RTS     %7              ;EXIT.
 1917  011766  012767  000106  167410  PLTLR:    MOV     #70.,CTRA       ;SET CTRA TO 70.
 1918  011774  012700  000177          PLTRA:    MOV     #177,%0
 1919  012000  004767  172372                    JSR     %7,LSPCH        ;PUNCH CODE 177 FOR LEADER/TRAILER
 1920  012004  005367  167374                    DEC     CTRA            ;PUNCHED 70?
 1921  012010  001371                            BNE     PLTRA           ;BRANCH IF NOT YET 70.
 1922  012012  000207                            RTS     %7              ;DONE EXIT.
 1923  012014  012767  000226  167362  PCHECK:   MOV     #150.,CTRA      ;SET SYNC COUNT TO 150.
 1924  012022  004767  170544          PCHKA:    JSR     %7,BREAD        ;READ CHARACTER
 1925  012026  122767  000377  167330            CMPB    #377,CRBUF      ;IS IT SYNC CHARACTER? (377)
 1926  012034  001405                            BEQ     PCHKB           ;BRANCH IF SYNC CHAR FOUND.
 1927  012036  005367  167342                    DEC     CTRA            ;NOT FOUND. DECREMENT CTRA.
 1928  012042  001367                            BNE     PCHKA           ;BRANCH IF NOT 150 CHARS READ YET.
 1929  012044  104010                            EHALT                   ;150 CHARS READ AND NO SYNC. HALT.
 1930  012046  000762                            BR      PCHECK          ;TRY AGAIN.
 1931  012050  004767  171752          PCHKB:    JSR     %7,INBIN        ;INITIALIZE BINARY COUNT.
 1932  012054  012767  001000  167322            MOV     #512.,CTRA      ;SET CHARACTER COUNT TO 512.
 1933  012062  004767  170504          PCHKC:    JSR     %7,BREAD        ;READ CHARACTER.
 1934  012066  004767  171772                    JSR     %7,GTBIN        ;GET BINARY COUNT CHARACTER.
 1935  012072  110067  167267                    MOVB    %0,CRBUF+1
 1936  012076  104004                            DATCHK                  ;COMPARE CHARACTERS.
 1937  012100  005367  167300          PCHKD:    DEC     CTRA            ;512 CHARS READ?
 1938  012104  001366                            BNE     PCHKC           ;BRANCH IF NOT 512 CHARS YET.
 1939  012106  000207                            RTS     %7              ;EXIT.
```

```
                                                .SBTTL  PRG4-KEYBOARD TEST
                000004                          Z=4
                177777                          X=-1
012110  012767  012134  167116  PRG4:   MOV     #P4T0,KSTART
012116  052767  000200  167124          BIS     #BIT7,PRGID
012124  104000                          TYPE
012126  014567                          KMSG1
012130  000167  167510                  JMP     SRSET
                                        ;*************************************************************************
012134  000000                  P4T0:   0                       ; PRG4 TEST ROUTINE 0                           *
012136  012240                          P4T1                    ;ADDRESS OF NEXT ROUTINE                        *
                                        ;*************************************************************************
                                        ;TEST THAT PRESSING KEY SETS DONE FLAG.
012140  012767  000005  167236          MOV     #5,CTRA
012146  104006                  ETOA:   STRDRV
012150  012204                          ETOB
012152  104000                          TYPE                                    ;TYPE "PRESS A KEY WITHIN 10 SECS."
012154  014605                          KMSG2
012156  052777  000100  167024          BIS     #BIT6,@TKS                      ;ENABLE KYBD INTERRUPT.
012164  005067  165606                  CLR     PSW
012170  104024                          DELAY                                   ;WAIT 10 SECONDS
012172  023420                          10000.
012174  104000                          TYPE                                    ;TYPE "NO KEYBOARD REQUEST."
012176  015007                          KMSG6
012200  104010                          EHALT                                   ;HALT.
012202  000411                          BR      ETOCA
012204  105777  167000          ETOB:   TSTB    @TKS                            ;TEST FOR DONE BIT ON
012210  100403                          BMI     ETOC                            ;BRANCH IF DONE BIT SET.
012212  104000                          TYPE                                    ;DONE BIT NOT SET. TYPE:FALSE  KEY-
012214  015035                          KMSG7                                   ;BOARD OR READER INTERRUPT.
012216  104010                          EHALT                                   ;HALT
012220  012716  012226          ETOC:   MOV     #ETOCA,@#6
012224  000002                          RTI                                     ;EXIT INTERRUPT.
012226  104011                  ETOCA:  SRESET
012230  005367  167150                  DEC     CTRA                            ;DONE 5 TIMES?
012234  001344                          BNE     ETOA                            ;BRANCH IF NOT DONE.
012236  104012                          SCOPE                                   ;SCOPE
                                        ;*************************************************************************
012240  000001                  P4T1:   1                       ; PRG4 TEST ROUTINE 1                           *
012242  012320                          P4T2                    ;ADDRESS OF NEXT ROUTINE                        *
                                        ;*************************************************************************
                                        ;ECHO TEST. KEYED CHARACTER IS TYPED. RUBOUT ENDS ROUTINE.
012244  104000                          TYPE                                    ;TYPE TITLE AND INSTRUCTIONS.
012246  014645                          KMSG3
012250  105777  166734          ET1A:   TSTB    @TKS                            ;WAIT FOR DONE FLAG
012254  100375                          BPL     .-4
012256  117767  166730  167100          MOVB    @TKB,CRBUF                      ;MOVE KYBD CHAR TO CRBUF.
012264  116777  167074  166724          MOVB    CRBUF,@TPB                      ;ECHO CHAR READ.
012272  105777  166716                  TSTB    @TPS                            ;WAIT FOR PRINTER DONE.
012276  100375                          BPL     .-4
012300  042767  000200  167056          BIC     #BIT7,CRBUF                     ;CLEAR BIT 7 FROM CRBUF.
012306  122767  000177  167050          CMPB    #177,CRBUF                      ;COMPARE CRBUF TO RUBOUT (177)
012314  001355                          BNE     ET1A                            ;BRANCH IF NOT RUBOUT (177)
012316  104012                          SCOPE                                   ;SCOPE
                                        ;*************************************************************************
012320  000002                  P4T2:   2                       ; PRG4 TEST ROUTINE 2                           *
```

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 1996  012322  177777                          P4TLST                  ;ADDRESS OF NEXT ROUTINE                *
 1997                                ;*************************************************************************
 1998                                ;OCTAL EQUIVALENT TEST. THE OCTAL EQUIVALENT OF ANY CHARACTER KEYED
 1999                                ;IS PRINTED. RUBOUT ENDS ROUTINE.
 2000  012324  104001                          TYPES                                   ;TYPE TITLE AND INSTRUCTIONS.
 2001  012326  014747                          KMSG4
 2002  012330  014660                          KMSG3A
 2003  012332  177777                          -1
 2004  012334  005067  167024                  CLR     CRBUF
 2005  012340  105777  166644          ET2A:   TSTB    @TKS                    ;WAIT FOR DONE FLAG.
 2006  012344  100375                          BPL     .-4
 2007  012346  117767  166640  167010          MOVB    @TKB,CRBUF              ;CHARACTER TO CRBUF
 2008  012354  004567  171646                  JSR     %5,ACNV4                ;CONVERT CHAR IN CRBUF TO
 2009  012360  001364                          CRBUF                           ;PRINTABLE OCTAL
 2010  012362  015001                          OCTEQV
 2011  012364  104000                          TYPE                            ;TYPE OCTAL EQUIVALENT
 2012  012366  014777                          KMSG5
 2013  012370  042767  000200  166766          BIC     #BIT7,CRBUF             ;CLEAR BIT 7 FROM CRBUF
 2014  012376  022767  000177  165760          CMP     #177,CRBUF              ;TEST FOR RUBOUT CHARACTER.
 2015  012404  001355                          BNE     ET2A                    ;BRANCH IF NOT RUBOUT (177).
 2016  012406  104012                          SCOPE                           ;SCOPE.
```

```
2017
2018  012410  104005                          PRGS:   CHALT                   ;SETUP HALT.
2019  012412  004767  172216                          JSR     %7,STBF         ;SETUP BUFFER
2020  012416  052767  040000  166624                  BIS     #BIT14,PRGID    ;ALLOW STALLS.
2021  012424  012767  177600  170552                  MOV     #177600,STLMSK  ;SETMAX STALL TO 255 MSECS.
2022  012432  005067  000054                          CLR     PCHCNT
2023  012436  005067  000046                          CLR     RBUSY
2024  012442  104006                                  STRDRV                  ;SET READER SERVICE TO RZERO.
2025  012444  013064                                  RZERO
2026  012446  104007                                  STPCHV                  ;SET PUNCH SERVICE TO PCHDAT.
2027  012450  012734                                  PCHDAT
2028  012452  012767  000241  000612                  MOV     #241,SEEDO      ;INITIALIZE PUNCH
2029  012460  004767  000574                          JSR     %7,INITO
2030  012464  012767  000077  166714                  MOV     #63.,CTRB
2031  012472  112377  166520                          MOVB    (3)+,@TPB       ;PUNCH FIRST CHAR.
2032  012476  052777  000100  166510                  BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPT.
2033  012504  104400                                  DELAYX                  ;STALL WHILE AWAITING INTERRUPTS.
2034  012506  000776                                  BR      .-2             ;BACK TO WAIT.
2035  012510  000000                          RBUSY:  OPEN
2036  012512  000000                          PCHCNT: OPEN
2037  012514  105777  166474                  TSTPCH: TSTB    @TPS            ;CHECK FOR DONE.
2038  012520  100401                                  BMI     .+4             ;BRANCH IF DONE SET.
2039  012522  104010                                  EHALT                   ;NOT DONE.  FALSE INTERRUPT.
2040  012524  005267  177762                          INC     PCHCNT          ;INCREMENT PUNCH COUNT.
2041  012530  000207                                  RTS     %7              ;EXIT.
2042  012532  026727  177754  000024  PCONT:  CMP     PCHCNT,#20.     ;CHECK PUNCH COUNT.
2043  012540  103424                                  BLO     PCONTC          ;BRANCH IF LESS THAN 20.
2044  012542  105767  177742                          TSTB    RBUSY           ;READER BUSY?
2045  012546  100406                                  BMI     PCONTA          ;BRANCH IF READER BUSY.
2046  012550  052767  000200  177732                  BIS     #BIT7,RBUSY     ;NOT BUSY.  SET IT BUSY.
2047  012556  052777  000101  166424                  BIS     #101,@TKS       ;ENABLE READER AND INTERRUPT.
2048  012564  026727  177722  000050  PCONTA: CMP     PCHCNT,#40.     ;RECHECK PUNCH COUNT.
2049  012572  101402                                  BLOS    PCONTB          ;BRANCH IF EQUAL OR LESS THAN 40.
2050  012574  005077  166414                          CLR     @TPS            ;DISABLE PUNCH INTERRUPT.
2051  012600  032777  000400  165366  PCONTB: BIT     #BIT8,@SRPTR    ;CHECK FOR FULL SPEED RUN.
2052  012606  001001                                  BNE     PCONTC          ;BRANCH IF FULL SPEED DESIRED.
2053  012610  104002                                  STALL                   ;GO STALL.
2054  012612  112377  166400                  PCONTC: MOVB    (3)+,@TPB       ;LOAD PUNCH BUFFER.
2055  012616  000002                                  RTI                     ;EXIT INTERRUPT.
2056  012620  105777  166364                  TSTRDR: TSTB    @TKS            ;CHECK FOR READER DONE.
2057  012624  100401                                  BMI     .+4             ;BRANCH IF DONE SET.
2058  012626  104010                                  EHALT                   ;NOT DONE.  FALSE INTERRUPT.
2059  012630  117767  166356  166526                  MOVB    @TKB,CRBUF      ;CHECK READ TO CRBUF.
2060  012636  005367  177650                          DEC     PCHCNT          ;DECREMENT PUNCH COUNT.
2061  012642  000207                                  RTS     %7              ;EXIT.
2062  012644  005767  177642                  RCONT:  TST     PCHCNT          ;TEST PUNCH COUNT.
2063  012650  001006                                  BNE     RCONTA          ;BRANCH IF COUNT NOT 0.
2064  012652  042767  000200  177630                  BIC     #BIT7,RBUSY     ;COUNT 0.  CLEAR RBUSY.
2065  012660  005077  166324                          CLR     @TKS            ;CLEAR READER INTERRUPT ENABLE.
2066  012664  000002                                  RTI                     ;EXIT INTERRUPT
2067  012666  026727  177620  000024  RCONTA: CMP     PCHCNT,#20.     ;COUNT LARGER THAN 20?
2068  012674  101014                                  BHI     RCONTC          ;BRANCH IF COUNT LARGER THAN 20.
2069  012676  032777  000100  166310                  BIT     #BIT6,@TPS      ;NOT LARGER.  PUNCH INTERRUPT ENABLED?
2070  012704  001003                                  BNE     RCONTB          ;BRANCH IF ENABLED.
2071  012706  052777  000100  166300                  BIS     #BIT6,@TPS      ;ENABLE PUNCH INTERRUPTS.
2072  012714  032777  000400  165252  RCONTB: BIT     #BIT8,@SRPTR    ;CHECK FOR FULL SPEED RUN.
```

```
2073  012722  001001                          BNE     RCONTC          ;BRANCH IF FULL SPEED DESIRED.
2074  012724  104026                          RSTALL                  ;GO STALL.
2075  012726  005277  166256        RCONTC:   INC     @TKS            ;ENABLE READER.
2076  012732  000002                          RTI                     ;EXIT INTERRUPT.
2077  012734  004767  177554        PCHDAT:   JSR     %7,TSTPCH       ;CHECK PUNCH.
2078  012740  005367  166440                  DEC     CTRA            ;74 CHARS OUTPUTTED?
2079  012744  001272                          BNE     PCONT           ;BRANCH IF NOT.
2080  012746  005367  166434                  DEC     CTRB            ;63 LINES OUTPUTTED?
2081  012752  001405                          BEQ     PCHDTA          ;BRANCH IF YES.
2082  012754  005267  000312                  INC     SEEDO           ;NO.  SETUP FOR NEXT LINE.
2083  012760  004767  000274                  JSR     %7,INITO        ;SETUP LINE.  74 TO CTRA
2084  012764  000662                          BR      PCONT           ;CONTINUE.
2085  012756  105067  002152        PCHDTA:   CLRB    BLOCK1          ;FILL PUNCH BUFFER WITH ZEROES.
2086  012772  004567  171342                  JSR     %5,BMOVE
2087  012776  015144                          BLOCK1
2088  013000  015145                          BLOCK1+1
2089  013002  000107                          71.
2090  013004  012703  015142                  MOV     #BLOCKA,%3      ;PUNCH BUFFER ADDRESS TO R3.
2091  013010  012767  000024  166366          MOV     #20.,CTRA       ;SET CHAR COUNT TO 20.
2092  013016  104007                          STPCHV                  ;SET PUNCH SERVICE TO PCHZER.
2093  013020  013024                          PCHZER
2094  013022  000643                          BR      PCONT           ;CONTINUE.
2095  013024  004767  177464        PCHZER:   JSR     %7,TSTPCH       ;CHECK PUNCH.
2096  013030  005367  166350                  DEC     CTRA            ;ALL CHARS OUTPUTTED?
2097  013034  001236                          BNE     PCONT           ;BRANCH IF NOT.
2098  013036  012767  000241  000226          MOV     #241,SEEDO      ;YES
2099  013044  004767  000210                  JSR     %7,INITO        ;SETUP LINE. 74 TO CTRA
2100  013050  012767  000077  166330          MOV     #63.,CTRB       ;SET LINE COUNT TO 63
2101  013056  104007                          STPCHV                  ;SET PUNCH SERVICE TO PCHDAT.
2102  013060  012734                          PCHDAT
2103  013062  000623                          BR      PCONT           ;CONTINUE.
2104  013064  004767  177530        RZERO:    JSR     %7,TSTRDR       ;CHECK READER.
2105  013070  105767  166270                  TSTB    CRBUF           ;TEST CHARACTER READ.
2106  013074  001663                          BEQ     RCONT           ;BRANCH IF 0.
2107  013076  004767  000002                  JSR     %7,RZERA        ;SET UP TO READ DATA.
2108  013102  000415                          BR      RDATA
2109  013104  012767  000241  000204  RZERA:  MOV     #241,SEED1      ;SET UP LINE.  74 TO CTRC
2110  013112  004767  000166                  JSR     %7,INIT1
2111  013116  012767  000077  166266          MOV     #63.,CTRD       ;SET LINE COUNT TO 63.
2112  013124  104006                          STRDRV                  ;SET READER SERVICE TO RDAT.
2113  013126  013132                          RDAT
2114  013130  000207                          RTS     %7              ;EXIT
2115  013132  004767  177462        RDAT:     JSR     %7,TSTRDR       ;CHECK READER.
2116  013136  112467  166223        RDATA:    MOVB    (4)+,CRBUF+1    ;MOVE EXPECTED CHAR TO CRBUF+1
2117  013142  104004                          DATCHK                  ;CHECK DATA.
2118  013144  005367  166240                  DEC     CTRC            ;74 CHARACTERS CHECKED?
2119  013150  001235                          BNE     RCONT           ;BRANCH IF NOT.
2120  013152  005367  166234                  DEC     CTRD            ;63 LINES CHECKED?
2121  013156  001405                          BEQ     RDATB           ;BRANCH IF YES.
2122  013160  005267  000132                  INC     SEFD1           ;NO.  SETUP NEXT LINE AND
2123  013164  004767  000114                  JSR     %7,INIT1        ;74 TO CTRC.
2124  013170  000625                          BR      RCONT           ;CONTINUE.
2125  013172  105067  002060        RDATB:    CLRB    BLOCK2          ;FILL READ BUFFER WITH ZEROES.
2126  013176  004567  171136                  JSR     %5,BMOVE
2127  013202  015256                          BLOCK2
2128  013204  015257                          BLOCK2+1
```

```
 2129  013206  000107                          71.
 2130  013210  012704  015254                  MOV     #BLOCKB,%4      ;READ BUFFER ADDRESS TO R4
 2131  013214  012767  000024  166166          MOV     #20.,CTRC       ;SET CHAR COUNT TO 20.
 2132  013222  104006                          STRDRV                  ;SET READER SERVICE TO R2OZER
 2133  013224  013230                          R2OZER
 2134  013226  000606                  RDATC:  BR      RCONT           ;CONTINUE.
 2135  013230  004767  177364          R2OZER: JSR     %7,TSTRDR       ;CHECK READER
 2136  013234  112467  166125                  MOVB    (4)+,CRBUF+1    ;MOVE EXPECTED CHAR TO CRBUF+1
 2137  013240  104004                          DATCHK                  ;CHECK DATA.
 2138  013242  005367  166142                  DEC     CTRC            ;ALL CHARS CHECKED?
 2139  013246  001367                          BNE     RDATC           ;BRANCH IF NOT.
 2140  013250  004767  177630                  JSR     %7,RZERA        ;SET UP TO READ DATA.
 2141  013254  000167  177364                  JMP     RCONT
 2142  013260  012703  015142          INITO:  MOV     #BLOCKA,%3      ;PUNCH BUFFER ADDRESS TO R3
 2143  013264  004567  000040                  JSR     %5,DTFL         ;FILL PUNCH BUFFER WITH DATA
 2144  013270  015144                          BLOCK1                  ;STARTING WITH CHAR IN SEED0
 2145  013272  000000                  SEED0:  OPEN
 2146  013274  012767  000112  166102          MOV     #74.,CTRA
 2147  013302  000207                          RTS     %7              ;EXIT
 2148  013304  012704  015254          INIT1:  MOV     #BLOCKB,%4      ;READ BUFFER ADDRESS TO R4
 2149  013310  004567  000014                  JSR     %5,DTFL         ;FILL READ BUFFER WITH DATA
 2150  013314  015256                          BLOCK2                  ;STARTING WITH A CHAR IN SEED1.
 2151  013316  000000                  SEED1:  OPEN
 2152  013320  012767  000112  166062          MOV     #74.,CTRC
 2153  013326  000207                          RTS     %7              ;EXIT
 2154  013330  012502                  DTFL:   MOV     (5)+,%2         ;STARTING ADDRESS TO R2.
 2155  013332  012501                          MOV     (5)+,%1         ;SEED TO R1.
 2156  013334  012767  000110  166020          MOV     #72.,RCNT       ;CHAR COUNT TO RCNT.
 2157  013342  022701  000340          DTFLA:  CMP     #340,%1         ;(R1)EQUAL 340?
 2158  013346  001002                          BNE     DTFLB           ;BRANCH IF NOT.
 2159  013350  012701  000241                  MOV     #241,%1         ;EQUAL.  RESET TO 241.
 2160  013354  110122                  DTFLB:  MOVB    %1,(2)+         ;MOVE CHAR TO BUFFER
 2161  013356  005201                          INC     %1              ;INCREMENT (R1).
 2162  013360  005367  165776                  DEC     RCNT            ;BUFFER FULL?
 2163  013364  001366                          BNE     DTFLA           ;BRANCH IF NOT.
 2164  013366  000205                          RTS     %5              ;YES.  EXIT
```

DCLARE PRG6, PRG7

```
2165                                                    .SBTTL  PRG6, PRG7
2166                                            ;PRG6-READER EXERCISER. SPECIAL BINARY COUNT PATTERN
2167                                            ;SR15=HALT ON ERROR. SR14=0 STALL. SR14=1 FULL SPEED
2168  013370  012767  177600  167606  PRG6:   MOV     #177600,STLMSK  ;SET STALL LIMIT
2169  013376  012767  177760  170166          MOV     #177760,RCMSK   ;SET RANDOM CHARACTER LIMIT.
2170  013404  052767  040000  165636          BIS     #BIT14,PRGID    ;ALLOW STALLS.
2171  013412  004767  170220                  JSR     %7,BSYNC        ;SYNC READER.
2172  013416  004767  170130          GTA:    JSR     %7,GRCNT        ;GENERATE RANDOM CHAR COUNT.
2173  013422  032777  000400  164544          BIT     #BIT8,@SRPTR    ;CHECK FOR FULL SPEED RUN
2174  013430  001001                          BNE     GTB             ;BRANCH IF FULL SPEED DESIRED.
2175  013432  104002                          STALL                   ;STALL.
2176  013434  004767  167132          GTB:    JSR     %7,BREAD        ;READ CHARACTER
2177  013440  004767  170132                  JSR     %7,BCHECK       ;GO CHECK IT
2178  013444  005367  170124                  DEC     RNCNT           ;DECREMENT CHAR COUNT
2179  013450  001371                          BNE     GTB             ;BRANCH IF COUNT NOT 0.
2180  013452  000761                          BR      GTA             ;COUNT 0. START OVER.
2181                                          ;PRG7-PRINTER EXERCISER. KEYBOARD CONTROLLED.
2182                                          ;TYPES LINES WITH ANY 5 CHARACTERS. STALLS OR FULL SPEED.
2183  013454  004767  171154          PRG7:   JSR     %7,STBF         ;SET UP BUFFER.
2184  013460  104000                          TYPE                    ;TYPE TITLE
2185  013462  015063                          P7MG1
2186  013464  052767  040000  165556  HTA:    BIS     #BIT14,PRGID    ;SET STALL BIT IN PRGID.
2187  013472  012767  177600  167504          MOV     #177600,STLMSK  ;SET STALL MASK.
2188  013500  012703  015144                  MOV     #BLOCK1,%3
2189  013504  104000                          TYPE                    ;TYPE "TYPE IN DATA".
2190  013506  015111                          P7MG2
2191  013510  005777  165476                  TST     @TKB            ;CLEAR BUFFER.
2192  013514  012767  000006  165662          MOV     #6,CTRA         ;CHAR COUNT TO CTRA.
2193  013522  004767  171360          HTB:    JSR     %7,GKBCR        ;GET AND STORE KYBD CHARACTER.
2194  013526  005367  165652                  DEC     CTRA            ;GOT 6 CHARACTERS?
2195  013532  001373                          BNE     HTB             ;BRANCH IF NOT 6 CHARS YET.
2196  013534  042767  000200  165622          BIC     #BIT7,CRBUF
2197  013542  122767  000177  165614          CMPB    #177,CRBUF      ;CHECK 6TH CHAR FOR RUBOUT.
2198  013550  001013                          BNE     HTC             ;BRANCH IF NOT A RUBOUT.
2199  013552  042767  040000  165470          BIC     #BIT14,PRGID    ;RUBOUT. CLEAR STALL BIT IN PRGID.
2200  013560  104015                          CK37                    ;37?
2201  013562  000406                          BR      HTC             ;NO.
2202  013564  004567  170550                  JSR     %5,BMOVE        ;YES. FILL 81 CHAR LINE.
2203  013570  015144                          BLOCK1
2204  013572  015151                          BLOCK1+5
2205  013574  000114                          76.
2206  013576  000405                          BR      HTD
2207  013600  004567  170534          HTC:    JSR     %5,BMOVE        ;FILL 72 CHAR LINE.
2208  013604  015144                          BLOCK1
2209  013606  015151                          BLOCK1+5
2210  013610  000103                          67.
2211  013612  004767  170722          HTD:    JSR     %7,TYPLN        ;TYPE LINE.
2212  013616  005777  164352                  TST     @SRPTR          ;CHANGE DATA? (SR15=1).
2213  013622  100720                          BMI     HTA             ;YES. GO CHANGE DATA
2214  013624  000772                          BR      HTD             ;NO CONTINUE WITH SAME DATA.
```

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2215                                                    .SBTTL  PRG10, PRG11, PRG12
2216                                            ;PRG10. PUNCH SPECIAL BINARY COUNT PATTERN TEST TAPE
2217  013626  012746  000024                  PRG10:  MOV     #20.,-(6)       ;PUNCH 20 BLANK CHAR. LEADER
2218  013632  005000                                  CLR     %0
2219  013634  004767  170536                  PRG10A: JSR     %7,LSPCH
2220  013640  005316                                  DEC     @%6
2221  013642  001374                                  BNE     PRG10A
2222  013644  004767  170156                          JSR     %7,INBIN        ;INITIALIZE SPECIAL BINARY COUNT
2223  013650  004767  170210                  PRG10B: JSR     %7,GTBIN        ;GET BINARY CHARACTER.
2224  013654  004767  170516                          JSR     %7,LSPCH        ;PUNCH CHARACTER
2225  013660  000773                                  BR      PRG10B          ;REPEAT.
2226                                          ;
2227                                          ;
2228                                          ;PRG11-PUNCH CLOCK ADJUSTMENT ROUTINE.
2229                                          ;OUTPUTS CHARACTER SET IN LEFT HALF OF SR, AND
2230                                          ;STALLS FOR NUMBER OF MILLISECONDS SET IN RIGHT HALF OF SR.
2231  013662  104005                          PRG11:  CHALT                   ;HALT TO SET SR.
2232  013664  004767  000036                  ITA:    JSR     %7,C1112        ;GO OUTPUT CHARACTER SET IN LEFT
2233  013670  000775                                  BR      ITA             ;HALF OF SR AND STALL PER SR RIGHT.
2234                                          ;
2235                                          ;
2236                                          ;PRG12-READER CLOCK ADJUSTMENT ROUTINE.
2237                                          ;PERFORMS SAME FUNCTION AS PRG11, AND IN ADDITION,
2238                                          ;USING THE PUNCH MAINTENANCE BIT, SHIFTS OUTPUT OF PUNCH
2239                                          ;SHIFT REGISTER ONTO THE READER BUFFER. THE CONTENTS OF THE
2240                                          ;READER BUFFER ARE THEN "FIXED" ON THE CONSOLE DATA LIGHTS
2241                                          ;BY ISSUING A RESET WITH CONTENTS OF READER BUFFER LOADED IN R0.
2242  013672  104005                          PRG12:  CHALT                   ;HALT TO SET SR.
2243  013674  004767  000020                  JTA:    JSR     %7,C1112M       ;GO OUTPUT CHARACTER FROM SR LEFT AND
2244  013700  017700  165306                          MOV     @TKB,%0         ;STALL PER SR RIGHT. (TKB) TO R0.
2245  013704  000005                                  RESET                   ;"FIX" (TKB) IN DATA LIGHTS.
2246  013706  000005                                  RESET
2247  013710  000005                                  RESET
2248  013712  000005                                  RESET
2249  013714  000005                                  RESET
2250  013716  000766                                  BR      JTA             ;REPEAT.
2251                                          ;
2252  013720  052777  000004  165266          C1112M: BIS     #4,@TPS         ;SET MAINTENANCE MODE (PUNCH).
2253  013726  117767  164242  000022          C1112:  MOVB    @SRPTR,XTY      ;STALL COUNT TO XTY.
2254  013734  005767  000016                          TST     XTY             ;DISREGARD 0 DELAY.
2255  013740  001002                                  BNE     C1112A
2256  013742  005267  000010                          INC     XTY
2257  013746  117777  164223  165242          C1112A: MOVB    @SRPTR+1,@TPB   ;LOAD PUNCH BUFFER.
2258  013754  104024                                  DELAY                   ;DELAY (APPROXIMATELY) THE NUMBER OF
2259  013756  000000                          XTY:    OPEN                    ;MSECS. SPECIFIED AT SR RIGHT
2260  013760  000207                                  RTS     %7              ;EXIT
```

```
                                        .SBTTL  PRG13, PRG14
                                ;PRG13-MAINTENANCE MODE SINGLE CHARACTER DATA TEST.
                                ;WITH MAINTENANCE MODE SET, OUTPUTS ONTO PUNCH BUFFER AND BACK ONTO
                                ;READER BUFFER THE CHARACTER SET IN SR LEFT. THE CHARACTER IN THE
                                ;READER BUFFER IS COMPARED TO THE CHARACTER IN SR LEFT. IF THE 2 CHARACTERS
```

```
2266                                            ;DISAGREE THE PROGRAM HALTS. THE DATA LIGHTS WILL THEN CONTAIN:
2267                                            ;
2268                                            ;LEFT HALF: THE EXPECTED CHARACTER (SR LEFT).
2269                                            ;RIGHT HALF: THE CHARACTER IN THE READER BUFFER.
2270  013762  104005                    PRG13:  CHALT                   ;HALT TO SET SR.
2271  013764  052777  000004  165222    KTA:    BIS     #4,@TPS         ;SET MAINTENANCE MODE.
2272  013772  105777  165216            KTB:    TSTB    @TPS            ;WAIT FOR READY.
2273  013776  100375                            BPL     .-4
2274  014000  117767  164171  165357            MOVB    @SRPTR+1,CRBUF+1        ;S/B CHAR TO CRBUF+1.
2275  014006  116777  165353  165202            MOVB    CRBUF+1,@TPB    ;OUTPUT CHARACTER.
2276  014014  105777  165170                    TSTB    @TKS            ;WAIT FOR READER DONE FLAG.
2277  014020  100375                            BPL     .-4
2278  014022  117767  165164  165334            MOVB    @TKB,CRBUF      ;CHAR READ TO CRBUF.
2279  014030  104004                            DATCHK                  ;GO CHECK AGAINST S/B CHAR.
2280  014032  000754                            BR      KTA             ;REPEAT.
2281
2282                                            ;PRG14-MAINTENANCE MODE SPECIAL BINARY COUNT PATTERN DATA TEST.
2283                                            ;PERFORMS SAME OPERATION AS PRG13, EXCEPT THAT SPECIAL BINARY COUNT
2284                                            ;PATTERN IS USED.
2285  014034  012767  002000  165342    PRG14:  MOV     #1024.,CTRA     ;SET UP FOR 1024 CHECKS.
2286  014042  004767  167760                    JSR     %7,INBIN        ;INITIALIZE BINARY COUNT
2287  014046  012767  177600  167130            MOV     #177600,STLMSK  ;SET STALL LIMIT
2288  014054  052767  040000  165166            BIS     #BIT14,PRGID    ;ALLOW STALLS
2289  014062  052777  000004  165124    LTA:    BIS     #4,@TPS         ;SET MAINTENANCE MODE.
2290  014070  032777  000400  164076            BIT     #BIT8,@SRPTR    ;CHECK STALL SWITCH
2291  014076  001001                            BNE     LTB             ;BRANCH IF NO STALL WANTED
2292  014100  104002                            STALL                   ;STALL
2293  014102  105777  165106            LTB:    TSTB    @TPS            ;WAIT FOR READY.
2294  014106  100375                            BPL     .-4
2295  014110  004767  170016                    JSR     %7,GTBINP       ;GET BIN CHARACTER.
2296  014114  110167  165245                    MOVB    %1,CRBUF+1      ;MOVE TO S/B CHAR.
2297  014120  110177  165072                    MOVB    %1,@TPB         ;OUTPUT BIN CHARACTER.
2298  014124  105777  165060                    TSTB    @TKS            ;WAIT FOR READER DONE.
2299  014130  100375                            BPL     .-4
2300  014132  117767  165054  165224            MOVB    @TKB,CRBUF      ;CHAR IN READ BUFFER TO CRBUF.
2301  014140  104004                            DATCHK                  ;GO CHECK AGAINST S/B CHAR.
2302  014142  005737  000042                    TST     @#42            ;CHAIN OR AUTO ACCEPT?
2303  014146  001745                            BEQ     LTA             ;BR IF NOT.
2304  014150  005367  165230                    DEC     CTRA            ;DONE REQUIRED TIMES?
2305  014154  001342                            BNE     LTA             ;BR IF NOT.
2306  014156  000167  165670                    JMP     CHNC            ;YES. GO EXIT.
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 2307  014162      047      137      127  A33WP6: .BYTE   047,137,127,057,127,137
 2308  014165      057      127      137
 2309  014170      047      133      077  A35WP6: .BYTE   047,133,077,103,077,133
 2310  014173      103      077      133
 2311  014176      101      102      103  A:      .BYTE   101,102,103
 2312  014201      104      105      106  D:      .BYTE   104,105,106
 2313  014204      107      110      111  G:      .BYTE   107,110,111
 2314  014207      112      113      114  J:      .BYTE   112,113,114
 2315  014212      115      116      117  M:      .BYTE   115,116,117
 2316  014215      120      121      122  P:      .BYTE   120,121,122
 2317  014220      123      124      125  S:      .BYTE   123,124,125
 2318  014223      126      127      130  V:      .BYTE   126,127,130
 2319  014226      131      132      060  Y:      .BYTE   131,132,060
 2320  014231      061      062      063  ONE:    .BYTE   061,062,063
 2321  014234      064      065      066  FOUR:   .BYTE   064,065,066
 2322  014237      067      070      071  SEVEN:  .BYTE   067,070,071
 2323  014242      041      042      043  C41:    .BYTE   041,042,043
 2324  014245      044      045      046  C44:    .BYTE   044,045,046
 2325  014250      047      050      051  C47:    .BYTE   047,050,051
 2326  014253      052      053      054  C52:    .BYTE   052,053,054
 2327  014256      055      056      057  C55:    .BYTE   055,056,057
 2328  014261      072      073      074  C72:    .BYTE   072,073,074
 2329  014264      075      076      077  C75:    .BYTE   075,076,077
 2330  014267      100      133      134  C100:   .BYTE   100,133,134
 2331  014272      135      136      137  C135:   .BYTE   135,136,137
 2332  014275      377      000      377  C377:   .BYTE   377,000,377
 2333  014300  021445   040524   020102  TBTST:  .ASCII  '%#TAB TEST%#'
 2334  014306  042524   052123   021445
 2335  014314  020040   020040   020040  TBMRK:  .ASCII  '       /@'
 2336  014322  020040   040057
 2337  014326  020040   020040   020040  TBMRK1: .ASCII  '       /@'
 2338  014334  027440      100
 2339  014337     045      100           CRLF:   .ASCII  '%@'
 2340  014341     055   026455   044455  RM33A:  .ASCII  '----I@'
 2341  014346     100
 2342  014347     055   026511      100  RM33B:  .ASCII  '-I-@'
 2343  014353     055   026455   044455  RM37A:  .ASCII  '----I-I@'
 2344  014360  044455      100
 2345  014363     134   040040           SPTSTC: .ASCII  '\ @'
 2346  014366  021445   040503   051122  CRTST:  .ASCII  '%#CARRIAGE RETURN TEST%#@'
 2347  014374  040511   042507   051040
 2348  014402  052105   051125   020116
 2349  014410  042524   052123   021445
 2350  014416     100
 2351  014417     045   051043   043511  RMTST:  .ASCII  '%#RIGHT MARGIN TEST%#@'
 2352  014424  052110   046440   051101
 2353  014432  044507   020116   042524
 2354  014440  052123   021445      100
 2355  014445     045   051443   040520  SPTST:  .ASCII  '%#SPACE TEST%#@'
 2356  014452  042503   052040   051505
 2357  014460  022524   040043
 2358  014464  021445   044514   042516  LFTST:  .ASCII  '%#LINE FEED TEST%#@'
 2359  014472  043040   042505   020104
 2360  014500  042524   052123   021445
 2361  014506     100
 2362  014507     045   041443   040510  CHRTST: .ASCII  '%#CHARACTER TESTS%#@'
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2363  014514  040522  052103  051105
2364  014522  052040  051505  051524
2365  014530  021445     100
2366  014533     045  053443  051117  WCPTST: .ASCII  '%*WORST CASE PATTERN TEST%*@'
2367  014540  052123  041440  051501
2370  014546  020105  040520  052124
2371  014554  051105  020116  042524
2372  014562  052123  021445     100
2373  014567     045  045443  041131  KMSG1:  .ASCII  '%*KYBD TEST%*@'
2374  014574  020104  042524  052123
2375  014602  021445     100
2376  014605     045  051120  051505  KMSG2:  .ASCII  '%PRESS A KEY WITHIN 10 SECONDS.@'
2377  014612  020123  020101  042513
2400  014620  020131  044527  044124
2401  014626  047111  030440  020060
2402  014634  042523  047503  042116
2403  014642  027123     100
2404  014645     045  042443  044103  KMSG3:  .ASCII  '%*ECHO TEST'
2405  014652  020117  042524  052123
2406  014660  041445  040510  040522  KMSG3A: .ASCII  '%CHARACTER KEYED WILL BE TYPED.'
2407  014666  052103  051105  045440
2410  014674  054505  042105  053440
2411  014702  046111  020114  042502
2412  014710  052040  050131  042105
2413  014716     056
2414  014717     045  052522  047502          .ASCII  '%RUBOUT ENDS ROUTINE.%*@'
2415  014724  052125  042440  042116
2416  014732  020123  047522  052125
2417  014740  047111  027105  021445
2420  014746     100
2421  014747     045  047443  052103  KMSG4:  .ASCII  '%*OCTAL EQUIVALENT TEST@'
2422  014754  046101  042440  052521
2423  014762  053111  046101  047105
2424  014770  020124  042524  052123
2425  014776     100
2426  014777     045     040          KMSG5:  .ASCII  '% '
2427  015001     040  020040  022440  OCTEQV: .ASCII  '    %@'
2430  015006     100
2431  015007     045  047516  045440  KMSG6:  .ASCII  '%NO KEYBOARD REQUEST.@'
2432  015014  054505  047502  051101
2433  015022  020104  042522  052521
2434  015030  051505  027124     100
2435  015035     045  040506  051514  KMSG7:  .ASCII  '%FALSE KYBD INTERRUPT@'
2436  015042  020105  054513  042102
2437  015050  044440  052116  051105
2440  015056  052522  052120     100
2441  015063     045  050043  044522  P7MG1:  .ASCII  '%*PRINTER EXERCISER%*@'
2442  015070  052116  051105  042440
2443  015076  042530  041522  051511
2444  015104  051105  021445     100
2445  015111     045  052043  050131  P7MG2:  .ASCII  '%*TYPE IN DATA :@'
2446  015116  020105  047111  042040
2447  015124  052101  020101  040072
2450  015132  020125     100          BKSU:   .ASCII  'U @'
2451  015135     040  020040  020040  DECVAL: .ASCII  '    '
2452  015142  000001                  DEND:   .END
```

DZKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

```
A       014176            762     766    1634    2311#
ACNV    004264            638     646     656#
ACNVB   004220            637*    641#
ACNVC   004246            645*    649#
ACNVM   004300            659#    667
ACNVX   004262            655#    658*    659     663*    664*    665*
ACNV4   004226            644#   2008
ACNV6   004200            636#
ADTEMP  004526            695     714#
ARDB    002412            352     355#
AREAD   002364            348#    354     920     934     949     980     997    1017    1036    1059    1078
AT20E   006052           1022#
A1ST    004254            640     648     652#    656
A33WP6  014162            776    2307#
A35WP6  014170            790    2309#
BCHECK  003576            561#   1442    1455    1470    2177
BDCNV   004420            693#
BDCNVA  004440            697#    700
BELL   =000007             88#
BIT0   =000001             75#
BIT1   =000002             74#
BIT10  =002000             65#    284
BIT11  =004000             64#    268     965     982
BIT12  =010000             63#
BIT13  =020000             62#
BIT14  =040000             61#    208     263     473     502     735    1431    1565    1802    1804    1818    1820    1836
                          1838   1848    2020    2170    2186    2199    2288
BIT15  =100000             56      60#     215
BIT2   =000004             73#   1136    1137    1141    1142    1153    1155    1346    1389
BIT3   =000010             72#    315
BIT4   =000020             71#
BIT5   =000040             70#
BIT6   =000100             69#    540     872     873     877     878     890     892    1020    1039    1063    1082    1105
                          1106   1110    1111    1123    1125    1224    1240    1259    1276    1301    1327    1366    1391
                          1958   2032    2069    2071
BIT7   =000200             68#   1421    1478    1944    1990    2013    2046    2064    2196
BIT8   =000400             67#   2051    2072    2173    2290
BIT9   =001000             66#    250     274
BKSU    015132            2416#
BLKBB  =015265             92#
BLKCC  =015377             96#
BLK2   =015267             94#
BLOCKA=015142              89#     90      91      92      93      94      95      96     721     738*    739*   2090    2142
BLOCKB=015254              91#    740*    741*   2130    2148
BLOCKC=015366              95#    742*    743*
BLOCK1=015144              90#    749     752     753     756     763     767     770     777     780     781     784     791
                           794    795     798    2085*   2087    2088    2144    2188    2203    2204    2208    2209
BLOCK2=015256              93#    757     771     785     799    2125*   2127    2128    2150
BMOVA   004350            674#    676
BMOVE   004340            605     639     647     670#    747     751     755     761     765     769     775     779     783
                           789     793     797    2086    2126    2202    2207
BRCTR   001414            187#    348*    529     538*    541*    542*    543*    544*    545*
BREAD   002572            396#    403     416     573     575     577    1441    1454    1469    1924    1933    2176
BREADA  002620            404#    410
BREADB  002632            397     407#
BREADC  002652            409     412#
```

DZKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

```
BREADD  002662            413     415#
BSYNC   003636            569     572#    580    1440    1452    1466    2171
CC    = 177776             51#
CHAINN  001754            161     262#
CHALT = 104005            157#    242    2018    2231    2242    2270
CHKASR= 104022            170#    903     918     932     947     962     978     995    1013    1032    1055    1076
CHK33   002210            162     308#
CHK33A  002220            310#    313
CHK33B  002224            164     309     311#
CHK35   002226            163     312#
CHLT    001422            156     191#
CHNA    002074            264     266     268#
CHNAA   002026            269     271     273#
CHNB    002032            274#
CHNC    002052            278#   2306
CHRTST  0:4507           1632    2362#
CHR1    001366            176#    574*    590
CHR1A   001374            179#    585*    590
CHR2    001370            177#    576*    592
CHR2A   001376            180#    587*    592
CHR3    001372            178#    578*    594
CHR3A   001400            181#    589*    594
CKASR   002240            169     315#
CK33  = 104013            163#   1812
CK35  = 104014            164#   1585    1830
CK37  = 104015            165#   1490    1518    1567    2200
CLEAN   001654            244#    277
CNVCTR  004520            696*    699*    711#
CPRDY   004362            680#    684     686
CPRDYA  004372            681     683#
CRBUF   001364            175#    201     203     405*    562*    563     574     576     578     806*    807     808     998*
                          999*   1000    1002    1925    1935*   1986*   1987    1990*   1991    2004*   2007*   2009    2013*
                         2014    2059*   2105    2116*   2136*   2196*   2197    2274*   2275    2278*   2296*   2300*
CRLF    014337           1609    2339#
CRTA    001612            231     234#
CRTB    001634            236     239#
CRTST   014366           1488    2346#
CTRA    001404            183#    1494*   1495*   1498    1516*   1520*   1524*   1536*   1539*   1541*   1553*   1566*   1569*
                         1574*   1591*   1595*   1598*   1603*   1817*   1822*   1835*   1840*   1917*   1920*   1923*   1927*
                         1932*   1937*   1953*   1974*   2078*   2091*   2096*   2146*   2192*   2194*   2285*   2304*
CTRB    001406            184#    1498*   1501*   1542*   1543    1556*   1610*   1623*   2030*   2080*   2100*
CTRC    001410            185#    1543*   1549*   1611*   1615*   2118*   2131*   2138*   2152*
CTRD    001412            186#    2111*   2120*
CTOA    010124           1495#   1508
CTOB    010134           1496    1498#
CTOC    010142           1499#   1502
CT1A    010252           1519    1522#   1525
CT2A    010310           1537#   1540
CT2B    010330           1542#
CT2C    010336           1543#   1557
CT2D    010360           1547#   1550
CT2E    010416           1554    1556#
CT3A    010464           1568    1570#   1578
CT3B    010514           1575    1577#
CT33A   011344           1818#   1823
CT34A   011426           1836#   1841
```

DZKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

```
CT4A    010550           1591#
CT4B    010562           1593#   1596
CURTST  001236            131#    252     257     295*
C100    014267           1786    2330#
C1112   013726           2232    2253#
C1112A  013746           2255    2257#
C1112M  013720           2243    2252#
C135    014272           1794    2331#
C377    014275           2332#
C41     014242           1730    2323#
C44     014245           1738    2324#
C47     014250           1746    2325#
C52     014253           1754    2326#
C55     014256           1762    2327#
C72     014261           1770    2328#
C75     014264           1778    2329#
D       014201           1642    2312#
DATCHK= 104004            156#   1936    2117    2137    2279    2301
DATHLT= 104017            167#    566
DECVAL  015135            693    2417#
DELAY = 104024            172#    399     424     480    1960    2258
DELAYX= 104400             87#    246     350     526     906    1207    1348    2033
DEND    015142             89    2418#
DIGIT   004522            702*    705*    708*    709     712#
DLCNT = 003050            454#    457*    467*
DLY     003046            171     455#
DLYA    003070            460#    468
DLYB    003076            461#    466
DLYR    003304            490*    491*    492*    493*    494*    495*    500#
DLYRO = 003350            513#    520*
DLYRI = 003362            514#    518*
DLYT    003144            460*    461*    462*    463*    464*    465*    470#
DLYX    003344             43     517     515#
DLYXA   003356            514     517#    521
DLYXB   003364            518#    519
DTCHK   001446            155     201#
DTCHKA  001464            202     206#
DTFL    013330           2143    2159    2154#
DTFLA   013342           2157#   2163
DTFLB   013354           2158    2160#
DTHLT   001456            166     203#
DVDND   001416            188#    529*    530*
DVQUOT  001420            189#    528*    532*    534
EHALT = 104010            160#    232     260     353     402     600     683    1929    1964    1970    2039    2058
EHLT    001434            159     196#    547
EMTINT  002170             41     301#
EMTTAB  001304            150#    305
EMTX  = 000027             86#    152#    153#    154#    155#    156#    157#    158#    159#    160#    161#    162#    163#
                          164#    165#    166#    167#    168#    169#    170#    171#    172#    173#    174#
ERCTR   001402            182#    567*    581*
ERR     001466            154     208#
ERRA    001506            209     213#
ERROR = 104003            155#    826     838     850     862     875     880     894     909     923     938     953     969
                           986   1022    1043    1065    1085    1093    1108    1113    1127    1139    1144    1157    1168
                          1181   1196    1210    1226    1244    1261    1278    1286    1304    1335    1351    1375    1399
                          1411   1423
```

DZKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

```
ETOA    012146          1954#   1975
ETOB    012204          1955    1966#
ETOC    012220          1967    1971#
ETOCA   012226          1965    1971    1973#
ET1A    012250          1984#   1992
ET2A    012340          2005#   2015
FBALL   004746           761#   1801
FBF3    004702           733     746#
FBF3A   004712           746#    748#
FBF3B   004720           751#
FORWD   002112           249     288#
FORWDA  002144           295#    299
FORWDB  002152           292     297#
FOUR    014234          1714    2321#
FW336   005006           775#   1816
FW356   005046           789#   1834
G       014204          1650    2313#
GETRDY  001646           243#    261     275     285     287
GKBCR   005106           803#   2193
GRCNT   003552           553#    555    1467    1900    2172
GTA     013416          2172#   2180
GTB     013434          2174    2176#   2179
GTBIN   004064           561     584     586     588     617#   1861    1879    1902    1934    2223
GTBINP  004132           626#   2295
GTRDYA  001676           249#    259
GTRDYB  001702           250#
GTRDYC  001716           251     253#
GTRDYD  001740           256     258#
HERE    002076           279     284#
HTA     013464          2186#   2213
HTB     013522          2193#   2195
HTC     013600          2198    2201    2207#
HTD     013612          2206    2211#   2214
ICTR    001244           134#    270#    293#    298#    319#
INBIN   004026           572     604#   1860    1878    1899    1931    2222    2286
INCPRG  001606           232#
INCRTN  001750           260#
INITO   013260          2029    2083    2099    2142#
INIT1   013304          2110    2123    2148#
ITA     013664          2232#   2233
J       014207          1658    2314#
JTA     013674          2243#   2250
KMSG1   014567          1946    2371#
KMSG2   014605          1957    2374#
KMSG3   014645          1983    2380#
KMSG3A  014660          2002    2382#
KMSG4   014747          2001    2393#
KMSG5   014777          2012    2398#
KMSG6   015007          1963    2401#
KMSG7   015035          1969    2405#
KSTART  001234           130#    243     814#    1428#   1477#   1847#   1943#
KTA     013764          2271#   2280
KTB     013772          2272#
LFTST   014464          1564    2358#
LOGIC   002062            48     281#
LSPCH   004376           686#    724     809     1493    1500    1504    1505    1507    1545    1546    1548    1552    1571
```

DCKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

```
                        1573    1614    1618    1619    1620    1622    1862    1880    1903    1915    1919    2219    2224
LTA     014062          2289#   2303    2305
LTB     014102          2291    2293#
M       014212          1666    2315#
MACHER  000004            31#   222*    244*    923*    835*    847*    859*
MANUAL= 100000            56#
MSEC  = 003072           459#    490     534*
NOP   = 000240            54#    282
NXTST   001242           133#    243*    258     276     288     290*
OCTEQV  015001          2010    2399#
ONE     014231          1706    2320#
OPEN  = 000000            55#    128     129     130     131     132     133     134     135     136     174     175     176
                         177     178     179     180     181     182     183     184     185     186     187     188     189
                         332     333     345     346     360     367     442     451     470     481     483     500     510
                         558     559     602     610     611     612     613     614     615     641     649     652     653
                         654     655     711     712     713     728     734     748    1329    1527    1606    1607    2035
                        2036    2145    2151    2259
P       014215          1674    2316#
PC    =%000007            59#    226*    237*    281*    505*    524*    525*    535*    551*   1017*
PC4CNT  012512          2022*   2036#   2040*   2042    2048    2060*   2062    2067
PCHDAT  012734          2027    2077#   2102
PCHDTA  012766          2081    2085#
PCHECK  012014          1866    1885    1910    1923#   1930
PCHKA   012022          1924#   1928
PCHKB   012050          1926    1931#
PCHKC   012062          1933#   1938
PCHKD   012100          1937#
PCHZER  013024          2093    2095#
PCONT   012532          2042#   2079    2084    2094    2097    2103
PCONTA  012564          2045    2048#
PCONTB  012600          2049    2051#
PCONTC  012612          2043    2052    2054#
PFRNT   011750          1859    1877    1898    1913#
PIND    004056           613#    628*
PLTLR   011766          1865    1884    1909    1913    1917#
PLTRA   011774          1918#   1921
POPSP =  005726            76#
POPSP2=  022626            77#    318     404     415
PRGID   001250           136#    234*    291     473     502     735*   1431*   1478*   1565*   1802*   1804*   1818*   1820*
                        1836*   1838*   1848*   1944*   2020*   2170*   2186*   2199*   2288*
PRGNUM  001232           129#    235*    238
PRGTAB  001252           137#    241
PRG0    005144           137     814#
PRG1    007652           138    1428#
PRG10   013626           145    2217#
PRG10A  013634          2219#   2221
PRG10B  013650          2223#   2225
PRG11   013662           146    2231#
PRG12   013672           147    2242#
PRG13   013762           148    2270#
PRG14   014034           149     227     283    2285#
PRG2    010026           139    1477#
PRG3    011462           140    1847#
PRG4    012110           141    1943#
PRG5    012410           142    2018#
PRG6    013370           143    2168#
```

```
PRG7     013454              144    2183#
PRTY0  = 000000               85#
PRTY1  = 000040               84#
PRTY2  = 000100               83#
PRTY3  = 000140               82#
PRTY4  = 000200               81#    125     127
PRTY5  = 000240               80#
PRTY6  = 000300               79#
PRTY7  = 000340               42      44      78#    871     889    1104    1122    1299    1303    1365    1388
PSW    = 177776               52#    221*    248*    458*    489*    516*    871*    889*   1019*   1038*   1061*   1062*   1083*
                             1104*   1122*   1223*   1238*   1257*   1258*   1275*   1299*   1302*   1303*   1328*   1365*   1372*
                             1388*   1396*   1959*
PTO      004052              611#    617     623*
PTOP     004060              614#    626     632*
PTI      004054              612#    617*    618*    621*    622*    623     624
PTIP     004062              615#    626*    627*    630*    631*    632     633
POAA     005174              820     824#
POAAA    006776             1232    1238#
POAAB    007020             1242#   1245
POAAC    007026             1237    1244#
POAE     005202              823     826#
POBA     005224              832     836#
POBAA    007046             1250    1256#
POBAC    007100             1255    1262#
POBE     005232              835     838#
POCA     005254              844     848#
POCAA    007116             1268    1272#
POCAC    007152             1273    1281#
POCAD    007166             1282    1284#
POCAE    007172             1281    1286#
POCAF    007174             1285    1287#
POCE     005262              847     850#
PODA     005304              856     860#
PODAA    007216             1293    1299#
PODAC    007252             1298    1306#
PODE     005312              859     862#
POEA     005334              868     872#
POEAA    007276             1312    1325#
POEAB    007322             1325*   1329#   1335*
POEAC    007332             1324    1335#
POEB     005356              874     877#
POEC     005376              879     881#
POFA     005416              886     890#
POFAA    007354             1341    1346#
POGA     005454              900     904#
POGAA    007416             1359    1364#
POGAB    007466             1363    1375#
POHA     005516              915     921#
POHAA    007506             1382    1387#
POHAB    007564             1386    1399#
POIA     005544              929     934#
POJA     005600              944     949#
POJAA    007600             1405    1408#
POKA     005634              959     963#
POKAA    007630             1417    1420#
POKB     005642              965#    968
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```
FOKC    005662            966     970#
POLA    005676            975     979#
POMA    005760            992     999#
POMB    006004           1001    1004#
PONA    006032           1009    1018#
PONC    006054           1015    1023#
POOA    006102           1028    1037#
POOE    006132           1034    1043#
POPA    006162           1051    1060#
POPB    006214           1057    1067#
POQA    006242           1073    1079#
POQC    006276           1080    1088#
POQD    006312           1089    1091#
POQE    006316           1088    1093#
PORA    006344           1101    1105#
POSA    006426           1119    1123#
POTA    006462           1133    1136#
POTLST= 177777             97#   1415
POT0    005156            814     817#
POT1    005206            818     829#
POT10   005530            913     926#
POT11   005564            927     941#
POT12   005622            942     956#
POT13   005664            957     972#
POT14   005732            973     989#
POT15   006006            990    1006#
POT16   006056           1007    1025#
POT17   006136           1026    1048#
POT2    005236            830     841#
POT20   006222           1049    1070#
POT21   006326           1071    1098#
POT22   006410           1099    1116#
POT23   006452           1117    1130#
POT24   006526           1131    1147#
POT25   006562           1148    1160#
POT26   006604           1161    1171#
POT27   006634           1172    1184#
POT3    005266            842     853#
POT30   006670           1185    1199#
POT31   006722           1200    1213#
POT32   006762           1214    1229#
POT33   007032           1230    1247#
POT34   007106           1248    1265#
POT35   007202           1266    1290#
POT36   007260           1291    1309#
POT37   007342           1310    1338#
POT4    005316            854     865#
POT40   007402           1339    1356#
POT41   007472           1357    1379#
POT42   007570           1380    1402#
POT43   007620           1403    1414#
POT5    005400            866     883#
POT6    005442            884     897#
POT7    005476            898     912#
POUA    006536           1150    1153#
POVA    006572           1163    1166#
```

EOS

DZKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

POWA	006614	1174	1177#
POXA	006644	1187	1190#
POYA	006700	1202	1205#
POZA	006736	1216	1222#
POZB	006760	1221	1227#
P1AA	007722	1437	1441#
P1BA	007750	1448	1453#
P1CA	010000	1461	1467#
P1CC	010006	1469#	1472
P1TLST=	177777	98#	1459
P1T0	007706	1428	1434#
P1T1	007734	1435	1445#
P1T2	007764	1446	1458#
P2TLST=	177777	99#	1827
P2T0	010060	1477	1483#
P2T1	010206	1484	1510#
P2T10	010774	1646	1653#
P2T11	011006	1654	1661#
P2T12	011020	1662	1669#
P2T13	011032	1670	1677#
P2T14	011044	1678	1685#
P2T15	011056	1686	1693#
P2T16	011070	1694	1701#
P2T17	011102	1702	1709#
P2T2	010272	1511	1530#
P2T20	011114	1710	1717#
P2T21	011126	1718	1725#
P2T22	011140	1726	1733#
P2T23	011152	1734	1741#
P2T24	011164	1742	1749#
P2T25	011176	1750	1757#
P2T26	011210	1758	1765#
P2T27	011222	1766	1773#
P2T3	010426	1531	1559#
P2T30	011234	1774	1781#
P2T31	011246	1782	1789#
P2T32	011260	1790	1797#
P2T33	011316	1798	1808#
P2T34	011400	1809	1826#
P2T4	010520	1560	1580#
P2T5	010732	1581	1627#
P2T6	010750	1628	1637#
P2T7	010762	1638	1645#
P3AA	011520	1855	1858#
P3AB	011536	1861#	1864
P3BA	011576	1872	1876#
P3BB	011614	1879#	1883
P3CA	011664	1891	1897#
P3CB	011702	1900#	1908
P3CC	011710	1902#	1907
P3CD	011736	1905	1909#
P3TLST=	177777	100#	1889
P3T0	011510	1847	1852#
P3T1	011566	1853	1869#
P3T2	011646	1870	1888#
P4TLST=	177777	101#	1996

DZKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

```
P4TO    012134            1943    1949#
P4T1    012240            1950    1978#
P4T2    012320            1979    1995#
P7MG1   015063            2185    2409#
P7MG2   015111            2190    2413#
RBUSY   012510            2023*   2035#   2044    2046*   2064*
RCMSK   003572             554     558#   1429*   1896*   2169*
RCNT    001362             174#   1489*   1491*   1494    1858*   1863*   1876*   1882*   1897*   1904*   2156*   2162*
RCONT   012644            2062#   2106    2119    2124    2134    2141
RCONTA  012666            2063    2067#
RCONTB  012714            2070    2072#
RCONTC  012726            2068    2073    2075#
RDAT    013132            2113    2115#
RDATA   013136            2108    2116#
RDATB   013172            2121    2125#
RDATC   013226            2134#   2139
RDELAY= 104025             173#    509
RDLCNT= 003210             485#    488*    497*
RDLY    003206             172     486#
RDLYA   003230             490#    498
RDLYB   003236             491#    496
RESET2= 104023             171#    904     919     933     948     963     979     996     1016    1035    1058    1077    1177
                          1190    1205    1322    1345    1364    1387
RIND    004050             604*    606     607     610#    619*
RMB     010256            1517*   1521*   1527#
RMTST   014417            1515    2351#
RM33A   014341            1523    2340#
RM33B   014347            1517    2342#
RM37A   014353            1521    2343#
RNCNT   003574             556*    559#   1471*   1906*   2178*
RNGEN   002520             381#    476     505     553
RP1     002566             381     385*    392     394#
RP2     002570             384     388     391*    395#
RSETT2  002512             170     377#
RSTAL   003306             173     502#
RSTALL= 104026             174#   2074
RSTLA   003320             503     505#
RSTLAA  003340             508*    510#
RSTLB   003342             507     511#
RSTPC   002360             335*    343     345#
RSTPSW  002362             336*    342     346#
RSTREG= 104021             169#    677
RSTRG   002324             168     335#
RTNNO   001240             132#    217     223*    255     289*
RZERA   013104            2107    2109#   2140
RZERO   013064            2025    2104#
R0    =%000000              57#    278*    301     302*    303*    304*    305*    306*
R20ZER  013230            2133    2135#
R6    =%000006              58#    262*
S       014220            1682    2317#
SAVREG= 104020             168#    670
SAVRG   002264             167     322#
SCOPE = 104012             162#    320     825     827     837     839     849     851     861     863     876     881     895
                           910     924     939     954     970     987    1004    1023    1042    1046    1068    1087    1096
                          1109    1114    1128    1140    1145    1158    1169    1182    1197    1211    1227    1243    1263
                          1280    1288    1307    1334    1354    1374    1376    1398    1400    1412    1424    1443    1456
```

```
                        1473    1497    1528    1555    1576    1586    1597    1635    1643    1651    1659    1667    1675
                        1683    1691    1699    1707    1715    1723    1731    1739    1747    1755    1763    1771    1779
                        1787    1795    1806    1813    1824    1831    1842    1867    1886    1911    1976    1993    2016
SCOPTR  001246           135#    265     267     272     294*    297*
SEEDO   013272          2028*   2082*   2098*   2145#
SEED1   013316          2109*   2122*   2151#
SEVEN   014237          1722    2322#
SHALT   001510           215#    273
SHLTA   001526           216     219#
SOFTSR  000176           104#    113
SP     =%000006          107*    108*
SPEOT  = 001200           53#    106     220     245     262
SPCNT   010630          1592*   1594*   1607#   1611
SPTST   014445          1535    2355#
SPTSTC  014363          1538    2345#
SRESET= 104011           161#    247     377     378     527     891     935    1124    1154    1973
SRPTR   000174           103#    110     113*    208     215     228     250     253     263     268     274     284     205:
                        2072    2173    2212    2253    2257    2274    2290
SRSET   001644           242#    815    1432    1481    1850    1947
SRSETT  002474           160     371#    373*
STAL    003146           153     473#
STALA   003200           479*    481#
STALAA  003160           474     476#
STALB   003202           478     482#
STALL  = 104002           154#    722    1453    1468    1577    1881    1901    2053    2175    2292
START   001530           118     220#    233
STBF    004634           738#   1480    2019    2183
STBFA   004650           740#
STLMSK  003204           477     483#    506    1430*   1479*   1849*   2021*   2168*   2187*   2287*
STLSPV  002444           158     364#
STLSRV  002414           157     357#
STPCHV= 104007           159#    536    1220    1236    1254    1272    1297    1323    1362    2026    2092    2101
STPPA   002462           364*    367#
STPRA   002432           357*    360#
STRDRV= 104006           158#    396    1014    1033    1056    1079    1385    1954    2024    2112    2132
SUBTEN  004460           698     702#
SUBTNA  004464           703#    706
SUBTNB  004500           704     707#
SVRPC   002320           322*    330     332#
SVRPSW  002322           323*    329     333#
SYCTRA  004024           583*    598*    602#
SYNCA   003716           579     583#
SYNCB   003724           584#    599
SYNCC   004012           591     593     595     598#
TABP    010632          1593    1608#
TABPA   010644          1611#   1624
TABPB   010654          1613#   1616
TABPC   010672          1612    1617#
TBCNT   010626          1584*   1606#   1610
TBMRK   014314          1590    2335#
TBMRK1  014326          1602    2337#
TBTST   014300          1600    2333#
TCTR    004572           720*    725*    728#
TEMPWR  004524           697*    703     707     713#
TIMCAL  003402           226     237     524#
TIMCLA  003430           530#    533
```

DZKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

```
TIMCLB  003446            531    534#
TKB     001212            121#   405    803    806    836    950    998    999   1395   1386   2007   2059   2191
                         2244   2278   2300
TKLVL   001222            125#   361   1028   1061
TKS     001210            120#   349*   351    398*   401*   407*   408    804    824    872*   873    877*   878
                          890*   892    905*   907    921    936    951    964*   965    967    981*   982    984
                         1018*  1020*  1037*  1039*  1041*  1060*  1063*  1067*  1081*  1082*  1086*  1095*  1349
                         1391*  1392   1394*  1408*  1409   1958*  1966   1984   2005   2047*  2056   2065*  2075*
                         2276   2298
TKVTR   001220            124#   359   1088*
TPB     001216            123#   433*   539*   687*   860   1178*  1191   1206*  1326*  1347*  1367*  1371*  1390*
                         1987*  2031*  2054*  2257*  2275*  2297*
TPBM    010602           1587   1598#
TPBMA   010612           1601#  1604
TPLVL   001226            127#   368   1238   1257
TPL3A   004616            730*   731*   734#
TPS     001214            122#   434    540*   680    688    848   1105*  1106   1110*  1111   1123*  1125   1136*
                         1137   1141*  1142   1153*  1155   1166   1179   1194   1208   1222*  1224*  1239*  1240*
                         1242*  1256*  1259*  1262*  1274*  1276*  1279*  1287*  1300*  1301*  1306*  1327*  1333*
                         1346*  1366*  1368   1370*  1389*  1420*  1421   1988   2032*  2037   2050*  2069   2071*
                         2252*  2271*  2272   2289*  2293
TPVTR   001224            126#   536   1281*
TSPCH   003456            524    525    536#
TSPCHA  003542            537    549#
TSPCHB  003550            549    551#
TSPCHC  003500            541#   546
TSTPCH  012514           2037#  2077   2095
TSTROR  012620           2056#  2104   2115   2135
TTYTYP  001230            128#   308    312    315
TYP     002666            151    418#
TYPA    002676            421#   432    441
TYPC    002720            423    427#
TYPD    002746            431    433#   438    440
TYPDAT  003012            421*   422    427    429    433    437*   439*   442#
TYPE  = 104000            152#   450   1487   1514   1522   1526   1534   1537   1563   1589   1599   1601   1608
                         1631   1814   1832   1945   1956   1962   1968   1982   2011   2184   2189
TYPES = 104001            153#  2000
TYPF    002764            428    437#
TYPG    002776            430    439#
TYPLA   004546            721#
TYPLB   004552            722#   726
TYPLN   004540            720#   736   1803   1805   1819   1821   1837   1839   2211
TYPLN3= 104016            166#  1633   1641   1649   1657   1665   1673   1681   1689   1697   1705   1713   1721
                         1729   1737   1745   1753   1761   1769   1777   1785   1793
TYPL3   004574            165    730#
TYPS    003014            152    444#   452
TYPSA   003040            448    450#
TYPSB   003042            446*   447    451#
V       014223           1690   2318#
WCPTST  014533           1815   1833   2366#
X     = 000002            813#   816    821#   828    833#   840    845#   852    857#   864    869#   882    887#
                          896    901#   911    916#   925    930#   940    945#   955    960#   971    976#   988
                          993#  1005   1010#  1024   1029#  1047   1052#  1069   1074#  1097   1102#  1115   1120#
                         1129   1134#  1146   1151#  1159   1164#  1170   1175#  1183   1188#  1198   1203#  1212
                         1217#  1228   1233#  1246   1251#  1264   1269#  1289   1294#  1308   1313#  1337   1342#
                         1355   1360#  1378   1383#  1401   1406#  1413   1418#  1427#  1433   1438#  144:   1449#
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DZKLAE CROSS REFERENCE TABLE -- USER SYMBOLS

DZKLAE CROSS REFERENCE TABLE -- MACRO NAMES

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COMMEN      1#
ENTDEF      5#    151    152    153    154    155    156    157    158    159    160    161    162    163    164
          165     166    167    168    169    170    171    172    173
ENDCOM      1#
ESCAPE      1#
GETPRI      1#
GETSWR      1#
MULT        1#
NEWTST      1#
POP         1#
PUSH        1#
REPORT      1#
SETPRI      1#
SETUP       1#
SKIP        1#
SLASH       1#
STARS       1#
SWRSU       1#
TSTA        5#    816    828    840    852    864    882    896    911    925    940    955    971    988   1005
         1024   1047   1069   1097   1115   1129   1146   1159   1170   1183   1198   1212   1228   1246   1264
         1289   1308   1337   1355   1378   1401   1433   1444   1851   1868
TSTAA       5#    816    828    840    852    864    882    896    911    925    940    955    971    988   1005
         1024   1047   1069   1097   1115   1129   1146   1159   1170   1183   1198   1212   1228   1246   1264
         1289   1308   1337   1355   1378   1401   1413   1433   1444   1457   1851   1868   1887
TSTAE       5#   1413   1457   1887
TSTBB       5#   1482   1509   1529   1558   1579   1626   1636   1644   1652   1660   1668   1676   1684   1692
         1700   1708   1716   1724   1732   1740   1748   1756   1764   1772   1780   1788   1796   1807   1825
         1948   1977   1994
TSTBE       5#   1825   1994
TSTC        5#   1482   1509   1529   1558   1579   1626   1636   1644   1652   1660   1668   1676   1684   1692
         1700   1708   1716   1724   1732   1740   1748   1756   1764   1772   1780   1788   1796   1807   1948
         1977
TYPBIN      1#
TYPDEC      1#
TYPNAM      1#
TYPNUM      1#
TYPOCS      1#
TYPOCT      1#
TYPTXT      1#
$$ESCA      1#
$$NEWT      1#
$$SKIP      1#
.EQUAT      1#
.HEADE      1#
.KT11       1#
.SETUP      1#
.SWRHI      1#
.$ACTI      1#
.$APTB      1#
.$APTH      1#
.$APTY      1#
.$ASTA      1#
.$CATC      1#
.$CMTA      1#
.$DB2D      1#
.$DB20      1#
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DZKLAE CROSS REFERENCE TABLE -- MACRO NAMES

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.$DIV       1#
.$EOP       1#
.$ERRO      1#
.$ERRT      1#
.$MULT      1#
.$POWE      1#
.$RAND      1#
.$RDDE      1#
.$RDOC      1#
.$READ      1#
.$R2AZ      1#
.$SAVE      1#
.$SB2D      1#
.$SB2O      1#
.$SCOP      1#
.$SIZE      1#
.$SUPR      1#
.$TRAP      1#
.$TYPB      1#
.$TYPD      1#
.$TYPE      1#
.$TYPO      1#
.$40CA      1#
.1170       1#
```

L05

DZKLAE CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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ADD     310  358  365  384  388  419  445  456  487  596  661  707  708  732 1556
       1569
ASL     304
BCS     704
BEQ     202  216  225  236  264  266  271  279  428  430  478  507  555  879  893
        983 1001 1112 1126 1143 1156 1410 1422 1612 1905 1926 2081 2106 2121 2303
BHI    2068
BIC     229  254  477  506  554  622  631  660  735  877 1110 1141 1802 1818 1836
       1990 2013 2064 2196 2199
BIS     398  540  872  890 1020 1039 1063 1082 1105 1123 1136 1153 1224 1240 1259
       1276 1301 1327 1346 1366 1389 1391 1431 1478 1565 1804 1820 1838 1848 1944
       1958 2020 2032 2046 2047 2071 2170 2186 2252 2271 2288 2289
BIT     208  215  250  263  268  274  284  308  312  315  473  502  873  878  892
        965  982 1106 1111 1125 1137 1142 1155 2051 2069 2072 2173 2290
BLO     531 2043
BLOS    231 2049
BMI     292  352  908  922 1167 1195 1209 1350 1967 2038 2045 2057 2213
BNE     209  251  256  259  269  275  277  285  309  313  316  423  448  466  468
        474  496  498  503  519  521  546  564  568  591  593  595  599  620  629
        667  676  700  726  874  966 1107 1138 1472 1496 1502 1525 1540 1550 1554
       1575 1596 1604 1616 1624 1823 1841 1864 1883 1907 1921 1928 1938 1975 1992
       2015 2052 2063 2070 2073 2079 2097 2119 2139 2158 2163 2174 2179 2195 2198
       2221 2255 2291 2305
BPL     409  435  681  689  805  937  952  968  985 1180 1369 1393 1985 1989 2006
       2273 2277 2294 2299
BR      112  233  261  287  299  354  403  416  432  441  452  533  548  580  684
        706 1092 1245 1285 1508 1519 1557 1568 1578 1908 1930 1965 2034 2084 2094
       2103 2108 2124 2134 2180 2201 2206 2214 2225 2233 2250 2280
CLC     239
CLR     221  223  234  248  401  407  458  489  516  528  538  539  690  702 1018
       1019 1037 1041 1060 1067 1081 1083 1086 1095 1178 1206 1222 1223 1239 1242
       1256 1262 1274 1275 1279 1287 1300 1302 1306 1326 1328 1333 1347 1367 1370
       1371 1372 1390 1394 1396 1592 1959 2004 2022 2023 2050 2065 2218
CLRB   1193 2085 2125
CMP     115  230  258  265  276  447  590  592  594 1421 2014 2042 2048 2067 2157
CMPB    201  255  422  427  429  563 1000 1925 1991 2197
COM     372  618  619  627  628
DEC     270  465  467  495  497  518  520  567  598  666  675  699  725 1471 1495
       1501 1524 1539 1549 1553 1574 1595 1603 1615 1623 1822 1840 1863 1882 1904
       1906 1920 1927 1937 1974 2060 2078 2080 2096 2118 2120 2138 2162 2178 2194
       2220 2304
EMT     152  153  154  155  156  157  158  159  160  161  162  163  164  165  166
        167  168  169  170  171  172  173  174
HALT     30   32   34   36   38   40   46  193  198  204  212  218  286  412 1003
INC     349  532  545  621  630  705  905  964  981 1192 1594 2040 2075 2082 2122
       2161 2256
JMP     118  227  241  252  257  267  272  283  815 1432 1481 1850 1947 2141 2306
JSR     226  237  249  273  281  431  438  440  476  505  524  525  553  561  569
        572  573  575  577  579  584  586  588  605  638  639  646  647  686  698
        724  733  736  747  751  755  761  765  769  775  779  783  789  793  797
        809  920  934  949  980  997 1017 1036 1059 1078 1440 1441 1442 1452 1454
       1455 1466 1467 1469 1470 1480 1493 1500 1504 1505 1507 1545 1546 1548 1552
       1571 1573 1587 1593 1614 1618 1619 1620 1622 1801 1803 1805 1816 1819 1821
       1834 1837 1839 1859 1860 1861 1862 1865 1866 1877 1878 1879 1880 1884 1885
       1898 1899 1900 1902 1903 1909 1910 1913 1915 1919 1924 1931 1933 1934 2008
       2019 2029 2077 2083 2086 2095 2099 2104 2107 2110 2115 2123 2126 2135 2140
```

```
        2143  2149  2171  2172  2176  2177  2183  2193  2202  2207  2211  2219  2222  2223  2224
        2232  2243  2286  2295
MOV      106   107   108   109   113   116   117   191   196   203   210   220   222   228   235
         238   243   244   245   253   262   278   288   289   290   293   294   295   297   298
         301   302   303   305   319   322   323   324   325   326   327   328   329   330   335
         336   337   338   339   340   341   342   343   348   357   359   360   361   364   366
         367   368   371   373   381   385   391   392   410   413   418   420   444   446   455
         457   460   461   462   463   464   479   486   488   490   491   492   493   494   508
         515   517   529   534   541   542   543   544   549   556   581   583   585   587   589
         604   617   623   624   626   632   633   636   637   644   645   656   657   658   659
         671   672   673   687   693   694   695   696   697   720   721   730   731   746   814
         823   835   847   859   871   889  1002  1038  1061  1088  1089  1104  1122  1191  1238
        1257  1281  1282  1299  1303  1325  1335  1365  1388  1408  1420  1428  1429  1430  1477
        1479  1489  1494  1498  1516  1517  1520  1521  1536  1541  1542  1543  1566  1584  1591
        1598  1610  1611  1817  1836  1847  1849  1858  1876  1896  1897  1914  1917  1918  1923
        1932  1943  1953  1971  2021  2028  2030  2090  2091  2098  2100  2109  2111  2130  2131
        2142  2146  2148  2152  2154  2155  2156  2159  2168  2169  2187  2188  2192  2217  2244
        2285  2287
MOVB     217   405   421   433   437   439   562   574   576   578   662   674   709   723   738
         739   740   741   742   743   806   807   808   998   999  1492  1499  1503  1506  1544
        1547  1551  1570  1572  1613  1617  1621  1935  1986  1987  2007  2031  2054  2059  2116
        2136  2160  2253  2257  2274  2275  2278  2296  2297  2300
NOP     1021  1040  1064  1084  1091  1225  1241  1260  1277  1284  1373  1397
RESET    280   374  2245  2246  2247  2248  2249
ROL      240   382   383   386   387   389   390
ROR      663   664   665
RTI      194   199   206   213   311   314   317   331   344   362   369   375   379   411   414
         426   449   469   475   482   499   504   511   522   550   737  1090  1283  1336  1972
        2055  2066  2076
RTS      219   296   306   355   393   406   436   535   551   557   565   570   582   597   601
         609   625   634   643   651   668   678   682   691   701   710   727   744   759   773
         787   801   810  1605  1625  1916  1922  1939  2041  2061  2114  2147  2153  2164  2260
SUB      192   197   211   530   703  1062  1258  1491
TRAP      87
TST      110   224   803   824   836   848   860  1395  1409  2062  2191  2212  2254  2302
TSTB     291   351   408   434   680   688   804   907   321   936   950   951   967   984  1166
        1179  1194  1208  1349  1368  1392  1966  1984  1988  2005  2037  2044  2056  2105  2272
        2276  2293  2298
WAIT    1325
.ABS       2
.ASCII  2333  2335  2337  2339  2340  2342  2343  2345  2346  2351  2355  2358  2362  2366  2371
        2374  2380  2382  2388  2393  2398  2399  2401  2405  2409  2413  2416  2417
.BYTE   2307  2309  2311  2312  2313  2314  2315  2316  2317  2318  2319  2320  2321  2322  2323
        2324  2325  2326  2327  2328  2329  2330  2331  2332
.ENABL     1
.END    2418
.LIST      1     3    46   152   153   154   155   156   157   158   159   160   161   162   163
         164   165   166   167   168   169   170   171   172   173   174   821   833   845   857
         869   887   901   916   930   945   960   976   993  1010  1029  1052  1074  1102  1120
        1134  1151  1164  1175  1188  1203  1217  1233  1251  1269  1294  1313  1342  1360  1383
        1406  1418  1438  1449  1462  1485  1512  1532  1561  1582  1629  1639  1647  1655  1663
        1671  1679  1687  1695  1703  1711  1719  1727  1735  1743  1751  1759  1767  1775  1783
        1791  1799  1810  1828  1856  1873  1892  1951  1980  1997
.MACRO     1     5
.NLIST     1     4    46   152   153   154   155   156   157   158   159   160   161   162   163
         164   165   166   167   168   169   170   171   172   173   174   821   833   845   857
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NO5

DZKLAE CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

```
          869     887     901     916     930     945     960     976     993    1010    1029    1052    1074    1102    1120
         1134    1151    1164    1175    1188    1203    1217    1233    1251    1269    1294    1313    1342    1360    1383
         1406    1418    1438    1449    1462    1485    1512    1532    1561    1582    1629    1639    1647    1655    1663
         1671    1679    1687    1695    1703    1711    1719    1727    1735    1743    1751    1759    1767    1775    1783
         1791    1799    1810    1828    1856    1873    1892    1951    1980    1997
.PAGE     220     811    1425    1474    1843    1940    2017    2165    2215    2261    2307
.REPT       1      46
.SBTTL    811    1425    1474    1843    1940    2017    2165    2215    2261
.WORD     282


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 *,DZKLAE.SEQ/SOL/CRF/PAGNUM/NL:TOC=SYSMAC.CO,DZKLAE
 RUN-TIME: 32 42 5 SECONDS
 RUN-TIME RATIO: 122/80=1.5
 CORE USED:  43K  (85 PAGES)
```

Spooler runtime 11 Seconds, [illegible] VMS, [illegible] disk reads, [illegible] disk writes, [illegible] pages