7030 DPS

LOADER
File No. KA UL1

LOAD AND TAPE WRITE

UTILITY

KA UL1

October 13, 1961

LOADER AND TAPE WRITE

The Loader and Tape Write program is designed to load any punid deck into any 7030 DPS. It is a punful deck and is placed on the front of the punid deck to be loaded. This deck is then placed in the card reader and an IPL given to the card reader. The Loader and Tape Write program will accept all the types of cards which are accepted as input to the Strap Simulator. Some of the types of cards are treated with a different philosophy and are listed below.

1. N cards are ignored by this loader and will not be printed on the on line printer.
2. C cards are loaded exactly as they are punched on the card. This allows the programmer to skip half words if so desired. A half-word will be stored only if the period is punched in the proper column for that particular half-word. As with the Strap Simulator C card input, a one punch in the period column of a previously punched half-word will cause the loader to ignore the half-word.
3. Data from P cards will be stored from a P card until a half-word is found with a period missing, which concludes the patch.

Two switch options are available to the operator and must be set prior to giving the IPL if these options are to be exercised.

1. Switch 32 - If this switch is set to zero all of core, above the loader, and all special registers will be cleared. An indexed loop is used and the zero instruction employed for the actual clearing. If the switch is set to one, the clearing of core will be by-passed.

2. Switch 37 - When set to a one, this switch will initiate the writing of the IPL tape. If this option is selected, the operator must decide which Tape Adapter Unit and drive he will use prior to giving the IPL. Switches 12-17 are used for the channel selection and 21-23 are used for drive selection. If channel 32 (40_8) and drive 0 are to be used, these bits may all be set to zero and the Tape Write routine will make this assumption. If any other TAU or drive is to be used, the operator must:

a) Enter the channel number, in octal, in switches 12-17,

b) Enter the drive number in switches 21-23.

As soon as the loader program begins loading the subject program, the operator may change the switch settings. The loader program fetches and saves the switch setting for the tape write routine.

At the completion of writing the IPL tape, the tape write routine will unload the tape so that it cannot be destroyed by the program. As soon as the EOP is received from the unload instruction, the tape write routine will branch to the location loaded from the branch control card.

Any program employing the Loader and Tape Write program should not attempt to load any registers between 40.00_8 and 601.00_8.

Within the card loader portion of the program there are certain simulated stops which indicate an error of some type. Some of the hang-ups allow the operator to continue loading, ignoring the error. This option is exercised by changing the setting of switch 63. By corralating the number displayed in the lower bounds register with the following list, the operator can determine the type of error and if the option is provided, may continue loading the deck.

000100	An illegal type of card was found in the deck. Changing switch 63 will cause the loader to ignore this card and continue loading.
000101	An origin card has a starting address lower than (8) 602.00. This program cannot be loaded.
000102	Cards being loaded are out of sequence. Changing switch 63 will cause the loader to ignore the error. The sequence counter will be updated to the sequence of the card in error. If this is an expected error, the T card should be employed.
000103	A check sum error has been found in the card presently being loaded. Changing switch 63 will cause the loader to ignore this error and load the card as it is punched. If the check sum on the card is bad, column 4,

the check sum column should be punched with all ones. This will signal the loader to bypass checking the check sum.

000104 The card loader has found an illegal character punch in a column of a C or P card. If the option to continue is exercised, all ones will replace the illegal octal or octal-hex punch.

000105 The origin address of a C or P card is lower than (8) 602.00. By changing the setting of switch 63, this whole card will be ignored and the loader will continue loading.

PRNID, LOADER ------ 9/21/61 ---- PEREIRA

12

11

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3

```
PRNS
                                                                      @
                                                                      @
                                                                      @
          @THIS LOADER WILL LOAD ANY PUNID DECK INTO THE 7030 DPS.
     @IT WILL ACCEPT ALL THE TYPES OF CARDS WHICH THE STRAP
     @SIMULATOR WILL ACCEPT WITH SEVERAL MINOR CHANGES.
                                                                      @
                                                                      @
          @1.N CARDS ARE IGNORED, THEY ARE NOT PRINTED.
                                                                      @
                                                                      @
          @2.C CARDS ARE TREATED WITH A DIFFERENT PHILOSOPHY. ALL
            @FOUR HALF-WORDS ARE INTERROGATED. THE HALF WORD IS
            @INSERTED ONLY IF THERE IS A PERIOD IN THE PERIOD
            @COLUMN. IF LEFT BLANK, IT IS IGNORED. IF A HALF WORD
            @WHICH WAS PREVIOUSLY PUNCHED IS NOW TO BE IGNORED, A
            @ONE PUNCH WITH THE PERIOD IN THE PERIOD COLUMN WILL
            @CAUSE IT TO BE IGNORED.
                                                                      @
                                                                      @
          @3.P CARDS ARE TREATED AS STATED IN THE STRAP REFERENCE
            @MANUAL. THE LOADER WILL INSERT THE DATA FROM THE P
            @CARD UNTIL IT FINDS A PERICD MISSING. THIS IS THE END
            @OF THE PATCH.
                                                                      @
                                                                      @
                                                                      @
          @ALL OF MEMORY WILL AUTOMATICALLY BE CLEARED BY
          @TO DO SO. CLEARING OF MEMORY IS BYPASSED IF MS 32
          @IS SET PRIOR TO IPLING IN THE LOADER.
                                                                      @
                                                                      @
                                                                      @
          @IF DESIRED, AN IPL TAPE OF THE PROGRAM
          @TO BE LOADED MAY BE WRITTEN.  THIS OPTION CAN
          @BE SELECTED BY SETTING MS 37 TO EQUAL ONE.
          @THE CHANNEL AND DRIVE MAY BE SELECTED IN THE
          @FOLLOWING MANNER.
                                                                      @
                                                                      @
               @PLACE CHANNEL ADDRESS, IN OCTAL, IN MS 12-17.
                                                                      @
               @PLACE DRIVE NUMBER IN MS 21-23.
                                                                      @
                                                                      @
          @IF THE ABOVE BITS ARE ALL ZERO, CHANNEL 32
          @%40 OCTAL□ AND DRIVE 0 WILL BE USED.
                                                                      @
                                                                      @
          @AS SOON AS THE LOADER PROGRAM STARTS LOADING
          @THE SUBJECT PROGRAM, ANY MAINTENANCE SWITCHES
          @MAY BE CHANGED.
                                                                      @
                                                                      @
          @ANY PROGRAM EMPLOYING THIS LOADER SHOULD
          @NOT ATTEMPT TO LOAD BELOW LOCATION
               @%8□602.00.
```

@THERE ARE HANGUP POINTS WITHIN THE LOADER. SOME GIVE
@THE OPERATOR THE OPTION TO CONTINUE LOADING IF SO DESIRED.
@TO CONTINUE LOADING FROM THE HANGUP POINT, REVERSE THE
@SETTING OF BIT 63 OF THE MAINTENANCE SWITCHES. THE HANGUPS
@ARE AT THE FOLLOWING LOCATIONS.

@

@

@000100 AN ILLEGAL TYPE CARD HAS BEEN FOUND. CHANGING
@BIT 63 WILL CAUSE THIS CARD TO BE IGNORED AND
@THE NEXT CARD TO BE READ IN.

@

@

@000101 AN ORIGIN CARD HAS A STARTING ADDRESS LESS
@THAN %8□602.00. THIS IS CONSIDERED ILLEGAL AND
@THE OPERATOR CANNOT EXERCISE ANY OPTION.

@

@

@000102 A SEQUENCE ERROR HAS BEEN DISCOVERED. CHANGING
@BIT 63 WILL IGNORE THIS SEQUENCE ERROR AND THE
@CARD WILL BE TREATED AS DEFINED. THE SEQUENCE
@COUNTER HAS BEEN UPDATED. IF THIS ERROR IS
@EXPECTED, USE OF THE T CARD SHOULD BE
@EMPLOYED.

@

@

@000103 A CHECK SUM ERROR HAS BEEN DISCOVERED.
@CHANGING BIT 63 WILL IGNORE THIS ERROR AND THE
@CARD WILL BE STORED IN MEMORY AS READ. IF THE
@CHECK SUM ON THE CARD IS KNOWN TO BE BAD,
@COLUMN 4, THE CHECK SUM COLUMN SHOULD BE
@PUNCHED WITH ALL ONES. THIS WILL CAUSE THE
@CHECKING OF THE CHECK SUM TO BE BY-PASSED.

@

@

@000104 AN ILLEGAL CHARACTER PUNCH HAS BEEN FOUND ON
@A C OR P CARD. IF THE OPTION OF BIT 63 IS
@TAKEN, ALL ONES WILL BE PLACED IN PLACE OF
@THE BAD CHARACTER.

@

@

@000105 THE ADDRESS OF A C OR P CARD IS LOWER THAN
@%8□602.00. THIS CARD WILL NOT BE LOADED. BY
@CHANGING BIT 63, THE NEXT CARD WILL BE READ
@IN.

```
             PUNFUL
             SFM,6
             SLC,%8¤77.0                                                                        000077.00
             XW,LDR,FND-LDR,0,2                                        100.00 20 011740.00 00   000077.00
LDR          BD,$&.32                                                  100.44 00                000100.00
                                                                 @
             BB,$MB&.32,LDR1A          @CLEAR MEM IF BIT 32 NOT SET.     4.40 80 000110.74 02   000100.40
             Z,$X15                                                     37.22 00                000101.40
             LCI,$X15,31                                                37.37 02                000102.00
             Z,0%$X15¤                 @CLEAR FIRST 31 REGS.             0.22 0F                000102.40
             CB&,$X15,$-.32                                            102.77 48                000103.00
             LVI,$X15,%8¤777777.40                                  777777.77 01                000103.40
             SV,$X15,1.0                                                 1.37 30                000104.00
             Z,$X15                                                     37.22 00                000104.40
             BADZ,$&.32                                                105.50 46                000105.00
             Z,FND&1.0%$X15¤           @CLEAR ALL OF MEMORY.           577.22 0F                000105.40
             Z,FND&2.0%$X15¤                                           600.22 0F                000106.00
             Z,FND&3.0%$X15¤                                           601.22 0F                000106.40
             Z,FND&4.0%$X15¤                                           602.22 0F                000107.00
             V&I,$X15,4.0                                                4.37 05                000107.40
             BZADZ,$-2.32                                              105.50 44                000110.00
                                                                 @
LDR1A        L%BU¤,$MB                 @SAVE THE MAIN. REG.              4.00 80 000000.20 50   000110.40
             ST%BU¤,MNREG                                              153.00 80 000000.20 D0   000111.40
                                                                 @
             Z,SEQCNT                  @ZERO SEQUENCE COUNT REG.       157.22 00                000112.40
LDR1         RD%SEOP¤,$RDR,LDRCW       @READ A CARD.                    22.00 80 000145.11 00   000113.00
LDR2         CCW,$RDR,LDRCCW           @WAIT FOR SEOP TO GO DOWN.       22.00 80 000164.21 00   000114.00
             BB,LDRCCW&.24,LDR2                                        164.30 80 000114.34 02   000115.00
                                                                 @
             L%BU,12,8¤,CARD                                           173.00 80 014000.20 50   000116.00
             K%BU,12,8¤,CDTST                                          155.00 80 014000.21 10   000117.00
             BAF,OR1                   @ORIGIN CARD.                   221.76 C2                000120.00
                                                                 @
             K%BU,12,8¤,CDTST&.12                                      155.14 80 014000.21 10   000120.40
             BAF,FL1                   @FLOW CARD.                     272.36 C2                000121.40
                                                                 @
             K%BU,12,8¤,CDTST&.24                                      155.30 80 014000.21 10   000122.00
             BAF,B1                    @BRANCH CARD.                   317.36 C2                000123.00
                                                                 @
             K%BU,12,8¤,CDTST&.36                                      155.44 80 014000.21 10   000123.40
             BAF,C1                    @C CARD.                        425.36 C2                000124.40
                                                                 @
             K%BU,12,8¤,CDTST&.48                                      155.60 80 014000.21 10   000125.00
             BAF,P1                    @P CARD.                        466.36 C2                000126.00
                                                                 @
             K%BU,12,8¤,CDTST&.60                                      155.74 80 014000.21 10   000126.40
             BAF,T1                    @T CARD.                        542.76 C2                000127.40
                                                                 @
             K%BU,12,8¤,CDTST&.72                                      156.10 80 014000.21 10   000130.00
             BAF,LDR1                  @IGNORE IF AN N CARD.           113.36 C2                000131.00
                                                                 @
             LVI,$X1,%8¤100.0          @HANGUP WITH THIS NUMBER DISPLAYED  100.03 01            000131.40
             SVA,$X1,$LB               @IN THE LOWER BOUNDS REG - AN     3.43 D0                000132.00
             SIC,HGUPEX                @ILLEGAL CARD.                  144.00 80                000132.40
             B,HGUP                                                    134.10 00                000133.00
             B,LDR1                                                    113.10 00                000133.40
```

```
HGUP    BB,$MB&.63,HGUP2        @HANGUP ROUTINE - ON BIT 63.        4.77 80 000140.74 02    000134.00
HGUP1   NOP                                                         0.30 00                 000135.00
        NOP                                                         0.30 00                 000135.40
        NOP                                                         0.30 00                 000136.00
        NOP                                                         0.30 00                 000136.40
        BZB,$MB&.63,HGUP1                                           4.77 80 000135.34 00    000137.00
        B,HGUP3                                                   143.50 00                 000140.00
                                                                    @
HGUP2   NOP                                                         0.30 00                 000140.40
        NOP                                                         0.30 00                 000141.00
        NOP                                                         0.30 00                 000141.40
        NOP                                                         0.30 00                 000142.00
        BB,$MB&.63,HGUP2                                            4.77 80 000140.74 02    000142.40
HGUP3   7,3,0                                                       3.22 00                 000143.40
HGUPEX  $B,0                                                        0.10 00                 000144.00
                                                                    @
        @CONSTANTS AND TABLES
                                                                    @
LDRCW   CW,CARD,15,LDRCW                                          173.00 00 000360.00 65    000145.00
                                                                    @
ORIX2   XW,CARD&.48,68,ORIX2                                      173.60 00 002100.00 66    000146.00
                                                                    @
CIX3    XW,CARD&.12,70,CIX3                                       173.14 00 002140.00 67    000147.00
CIX4    XW,TBL,19,CIX4                                            212.00 00 000460.00 68    000150.00
CIX5    XW,CWD,70,CIX5                                            165.00 00 002140.00 69    000151.00
CIX6    XW,0,4,CIX6                                                 0.00 00 000100.00 6A    000152.00
MNREG   DR%BU□,%1□                                                  1.00                    000153.00
                                                                    @
P1HW    $B,0                                                        0.10 00                 000154.00
                                                                    @
        CNOP                                                        0.30 00                 000154.40
CDTST   %8□DD%BU,12,8□,7                                                        0007        000155.00
        %8□DD%BU,12,8□,5                                                        0005        000155.14
        %8□DD%BU,12,8□,15                                                       0015        000155.30
        %8□DD%BU,12,8□,4100                                                     4100        000155.44
        %8□DD%BU,12,8□,2004                                                     2004        000155.60
        %8□DD%BU,12,8□,1100                                                     1100        000155.74
        %8□DD%BU,12,8□,2020                                                     2020        000156.10
                                                                    @
        CNOP                                                        0.30 00                 000156.40
SEQCNT  DR%BU,12,8□,%1□                                             0.14                    000157.00
SEQOK   DR%BU,1,1□,%1□                                              0.01                    000157.14
        CNOP                                                        0.30 00                 000157.40
ZECNT   DR%BU,24,8□,%1□                                             0.30                    000160.00
                                                                    @
        CNOP                                                        0.30 00                 000160.40
IC      DR%BU,24,8□,%1□                                             0.30                    000161.00
        CNOP                                                        0.30 00                 000161.40
MIC     DR%BU,24,8□,%1□                                             0.30                    000162.00
        CNOP                                                        0.30 00                 000162.40
LIC     DD%BU,24,8□,%8□77777777                                                 77777777    000163.00
                                                                    @
        CNOP                                                        0.30 00                 000163.40
LDRCCW  DR%BU□,%1□                                                  1.00                    000164.00
        CNOP
CWD     DR%BU,4,4□,%70□                                             4.30                    000165.00
        CNOP                                                        0.30 00                 000171.40
PFLWD   DR%BU,1,1□,%1□                                              0.01                    000172.00
                                                                    @
        CNOP                                                        0.30 00                 000172.40
```

	CARD	DR%BU□,%I5□	17.00	000173.00
		CNOP		
	TRL	%8□DD%BU,12,8□,0	0000	000212.00
		%8□DD%BU,12,8□,1000	1000	000212.14
		%8□DD%BU,12,8□,400	0400	000212.30
		%8□DD%BU,12,8□,200	0200	000212.44
		%8□DD%BU,12,8□,100	0100	000212.60
		%8□DD%BU,12,8□,40	0040	000212.74
		%8□DD%BU,12,8□,20	0020	000213.10
		%8□DD%BU,12,8□,10	0010	000213.24
		%8□DD%BU,12,8□,4	0004	000213.40
		%8□DD%BU,12,8□,2	0002	000213.54
		%8□DD%BU,12,8□,1	0001	000213.70
		%8□DD%BU,12,8□,4400	4400	000214.04
		%8□DD%BU,12,8□,4200	4200	000214.20
		%8□DD%BU,12,8□,4100	4100	000214.34
		%8□DD%BU,12,8□,4040	4040	000214.50
		%8□DD%BU,12,8□,4020	4020	000214.64
		%8□DD%BU,12,8□,4010	4010	000215.00
		%8□DD%BU,12,8□,4102	4102	000215.14
		%8□DD%BU,12,8□,4502	4502	000215.30
	TRL1	%8□DD%BU,12,8□,0	0000	000215.44
		%8□DD%BU,12,8□,0	0000	000215.60
		%8□DD%BU,12,8□,1	0001	000215.74
		%8□DD%BU,12,8□,2	0002	000216.10
		%8□DD%BU,12,8□,3	0003	000216.24
		%8□DD%BU,12,8□,4	0004	000216.40
		%8□DD%BU,12,8□,5	0005	000216.54
		%8□DD%BU,12,8□,6	0006	000216.70
		%8□DD%BU,12,8□,7	0007	000217.04
		%8□DD%BU,12,8□,10	0010	000217.20
		%8□DD%BU,12,8□,11	0011	000217.34
		%8□DD%BU,12,8□,12	0012	000217.50
		%8□DD%BU,12,8□,13	0013	000217.64
		%8□DD%BU,12,8□,14	0014	000220.00
		%8□DD%BU,12,8□,15	0015	000220.14
		%8□DD%BU,12,8□,16	0016	000220.30
		%8□DD%BU,12,8□,17	0017	000220.44
12		%8□DD%BU,12,8□,17	0017	000220.60
		%8□DD%BU,12,8□,1	0001	000220.74
11				
10				
9				
8				
7				
6				
5				
4				
3				
2				

```
        @@@ORIGIN CARD
                                                          @
OR1     M&1%BU,12,8□,SEQCNT      @UPDATE SEQUENCE CNTR.         157.00 80 014000.22 B0    000221.40
        L%BU,12,8□,CARD&.24      @CHECK SEQUENCE.               173.30 80 014000.20 50    000222.40
        K%BU,12,8□,SEQCNT                                       157.00 80 014000.21 10    000223.40
        SIC,SERREX                                              415.00 80                 000224.40
        BZAE,SEQERR                                             411.36 C0                 000225.00
                                                          @
        L%BU,12,8□,CARD&.36      @SEE IF CHECK SUM ALL ONES.    173.44 80 014000.20 50    000225.40
        KI%BU,12,8□,%8□7777                                  777700.00 80 414000.21 10    000226.40
        BAE,OR5                                                 242.36 C2                 000227.40
                                                          @
        LX,$X2,ORIX2             @CHECK CHECK SUM.              146.04 10                 000230.00
        L%BU,12,8□,CARD          @CHECK CHECK SUM.              173.00 80 014000.20 50    000230.40
        &%BU,12,8□,CARD&.12                                     173.14 80 014000.20 10    000231.40
        &%BU,12,8□,CARD&.24                                     173.30 80 014000.20 10    000232.40
        B,OR3                                                   235.10 00                 000233.40
OR2     &%V&IC□%BU,12,8□,.12%$X2□                                 0.14 82 214000.20 10    000234.00
                                                          @
OR3     BZBZ,$R&.51,OR4          @CHECK FOR CARRY.               11.63 80 000237.74 04    000235.00
        M&1%BU,12,8□,$R&.52                                      11.64 80 014000.22 B0    000236.00
        B,OR3                                                   235.10 00                 000237.00
                                                          @
OR4     BZXCZ,OR2                                               234.30 40                 000237.40
        K%BU,12,8□,CARD&.36                                     173.44 80 014000.21 10    000240.00
        SIC,CKSMEX                                              417.40 80                 000241.00
        BZAE,CKSMER                                             415.76 C0                 000241.40
                                                          @
OR5     L%BU,24,8□,CARD&.60      @STORE NEW ORIGIN ADDRESS.     173.74 80 030000.20 50    000242.00
        ST%BU,24,8□,IC                                          161.00 80 030000.20 D0    000243.00
        KI%BU□,END&2.0                                          600.00 80 430000.21 10    000244.00
        BAH,OR6                                                 247.37 42                 000245.00
        LVI,$X1,%8□101.0         @AN ORG CARD HAS TOO           101.03 01                 000245.40
        SVA,$X0,$LB              @LOW AN ADDRESS AND WILL         3.41 D0                 000246.00
        B,$                      @DESTROY THE LOADER.           246.50 00                 000246.40
                                                          @
OR6     L%BU,24,8□,CARD&1.20     @IF ALL ZERO, NO SKIP OR ZERO. 174.24 80 030000.20 50    000247.00
        BZBZ,ZBAHT                                              252.34 C0                 000250.00
                                                          @
        SIC,DATAEX               @OR ZEROED.                    365.40 80                 000250.40
        BRZZ,DATA                                               343.74 C6                 000251.00
        B,UPDMIC                                                420.10 00                 000251.40
                                                          @
ZBAHT   BB,CARD&.48,ZBA                                         173.60 80 000254.74 02    000252.00
        BB,CARD&.49,SA1          @SKIP AFTER LOADING CARD.      173.61 80 000261.74 02    000253.00
        B,SB1                    @SKIP BEFORE LOADING CARD.     256.10 00                 000254.00
ZBA     BB,CARD&.49,ZA1          @ZERO AFTER LOADING CARD.      173.61 80 000267.74 02    000254.40
        B,ZB1                    @ZERO BEFORE LOADING CARD.     265.10 00                 000255.40
                                                          @
SB1     L%BU,24,8□,CARD&1.20                                    174.24 80 030000.20 50    000256.00
        M&%BU,24,8□,IC                                          161.00 80 030000.20 90    000257.00
        SIC,DATAEX                                              365.40 80                 000260.00
        B,DATA                                                  343.50 00                 000260.40
        B,UPDMIC                                                420.10 00                 000261.00
                                                          @
SA1     SIC,DATAEX                                              365.40 80                 000261.40
        B,DATA                                                  343.50 00                 000262.00
        L%BU,24,8□,CARD&1.20                                    174.24 80 030000.20 50    000262.40
        M&%BU,24,8□,IC                                          161.00 80 030000.20 90    000263.40
        B,UPDMIC                                                420.10 00                 000264.40
```

```
ZB1     SIC,ZEFX                                          407.00 80                 000265.00
        B,ZF                                              366.10 00                 000265.40
        SIC,DATAFX                                        365.40 80                 000266.00
        B,DATA                                            343.50 00                 000266.40
        B,UPDMIC                                          420.10 00                 000267.00
                                                @
ZA1     SIC,DATAFX                                        365.40 80                 000267.40
        B,DATA                                            343.50 00                 000270.00
        SIC,ZEFX                                          407.00 80                 000270.40
        B,ZF                                              366.10 00                 000271.00
        B,UPDMIC                                          420.10 00                 000271.40
                                                @
        @@@FLOW CARD
                                                @
FL1     M&1%BU,12,8□,SEQCNT     @UPDATE SEQUENCE CNTR.    157.00 80 014000.22 B0    000272.00
        L%BU,12,8□,CARD&.24     @CHECK SEQUENCE           173.30 80 014000.20 50    000273.00
        K%BU,12,8□,SEQCNT                                 157.00 80 014000.21 10    000274.00
        SIC,SERRFX                                        415.00 80                 000275.00
        BZAF,SEQERR                                       411.36 C0                 000275.40
                                                @
        L%BU,12,8□,CARD&.36     @SEE IF CHECK SUM ALL ONES.  173.44 80 014000.20 50 000276.00
        KI%BU,12,8□,%8□7777                            777700.00 80 414000.21 10    000277.00
        BAF,FL5                                           312.76 C2                 000300.00
                                                @
        LX,$X2,ORIX2                                      146.04 10                 000300.40
        L%BU,12,8□,CARD         @CHECK CHECK SUM.         173.00 80 014000.20 50    000301.00
        &%BU,12,8□,CARD&.12                               173.14 80 014000.20 10    000302.00
        &%BU,12,8□,CARD&.24                               173.30 80 014000.20 10    000303.00
        B,FL3                                             305.50 00                 000304.00
FL2     &%V&IC□%BU,12,8□,.12%$X2□                           0.14 82 214000.20 10    000304.40
                                                @
FL3     BZBZ,$R&.51,FL4         @CHECK FOR CARRY.          11.63 80 000310.34 04    000305.40
        M&1%BU,12,8□,$R&.52                                11.64 80 014000.22 B0    000306.40
        B,FL3                                             305.50 00                 000307.40
                                                @
FL4     BZXCZ,FL2                                         304.70 40                 000310.00
        K%BU,12,8□,CARD&.36                               173.44 80 014000.21 10    000310.40
        SIC,CKSMFX                                        417.40 80                 000311.40
        BZAF,CKSMER                                       415.76 C0                 000312.00
                                                @
FL5     LV,$X6,IC               @LOAD $X6 WITH STORE ADDRESS.  161.14 30            000312.40
                                                @
        LI%BU,18,8□,800,18                               1440.00 80 422011.20 50    000313.00
        &I%BU,24,8□,CARD&.52,40                           173.64 80 430024.20 10    000314.00
        LX,$X7,$R                                          11.16 10                 000315.00
                                                @
        SIC,DATAFX                                        365.40 80                 000315.40
        B,DATA1                                           350.50 00                 000316.00
        B,UPDMIC                                          420.10 00                 000316.40
```

```
          @@@BRANCH CARD
                                                                   @
B1        M&1%BU,12,8□,SEQCNT       @UPDATE SEQUENCE CNTR.            157.00 80 014000.22 B0      000317.00
          L%BU,12,8□,CARD&.24       @CHECK SEQUENCE.                  173.30 80 014000.20 50      000320.00
          K%BU,12,8□,SEQCNT                                           157.00 80 014000.21 10      000321.00
          SIC,SERREX                                                  415.00 80                   000322.00
          BZAE,SEQERR                                                 411.36 C0                   000322.40
                                                                   @
          L%BU,12,8□,CARD&.36       @SEE IF CHECK SUM ALL ONES.       173.44 80 014000.20 50      000323.00
          KI%BU,12,8□,%8□7777                                      777700.00 80 414000.21 10      000324.00
          BAF,B4                                                      340.76 C2                   000325.00
                                                                   @
          L%BU,12,8□,CARD           @CHECK CHECK SUM.                 173.00 80 014000.20 50      000325.40
          &%BU,12,8□,CARD&.12                                         173.14 80 014000.20 10      000326.40
          &%BU,12,8□,CARD&.24                                         173.30 80 014000.20 10      000327.40
          BZBZ,$R&.51,$&2.0         @CHECK FOR CARRY.                  11.63 80 000332.74 04      000330.40
          M&1%BU,12,8□,$R&.52                                          11.64 80 014000.22 B0      000331.40
          &%BU,12,8□,CARD&.60                                         173.74 80 014000.20 10      000332.40
          &%BU,12,8□,CARD&1.08                                        174.10 80 014000.20 10      000333.40
                                                                   @
B2        BZBZ,$R&.51,B3            @CHECK FOR CARRY.                  11.63 80 000336.74 04      000334.40
          M&1%BU,12,8□,$R&.52                                          11.64 80 014000.22 B0      000335.40
                                                                   @
B3        K%BU,12,8□,CARD&.36                                         173.44 80 014000.21 10      000336.40
          SIC,CKSMEX                                                  417.40 80                   000337.40
          BZAE,CKSMER                                                 415.76 C0                   000340.00
                                                                   @
B4        L%BU,19,8□,CARD&.60       @EFFECT THE BRANCH.               173.74 80 023000.20 50      000340.40
          ST%BU,19,8□,B5                                              343.00 80 023000.20 D0      000341.40
          B,TA1                                                       544.10 00                   000342.40
B5        $BD,0                                                         0.04 00                   000343.00
                                                                   @
DATA      L%BU,24,8□,IC,40                                            161.00 80 030024.20 50      000343.40
          LX,$X6,$R                 @LOAD $X6 WITH STORE ADDRESS.      11.14 10                   000344.40
                                                                   @
          L%BU,10,8□,CARD&.50,18                                      173.62 80 012011.20 50      000345.00
          &I%BU,24,8□,CARD&1.52,40                                    174.64 80 430024.20 10      000346.00
          LX,$X7,$R                 @LOAD $X7 WITH FETCH ADR. AND      11.16 10                   000347.00
          KCI,$X7,64                @BIT COUNT.                       100.17 0A                   000347.40
          BXL,DATALT                                                  355.72 42                   000350.00
                                                                   @
DATA1     L%BU,64,8□,0%$X7□                                             0.00 87 000000.20 50      000350.40
          ST%BU,64,8□,0%$X6□                                            0.00 86 000000.20 D0      000351.40
                                                                   @
          V&I,$X6,1.0                                                   1.15 05                   000352.40
          C-I,$X7,64                                                  100.17 08                   000353.00
          V&I,$X7,1.0                                                   1.17 05                   000353.40
          BXCZ,DATAF                                                  362.70 42                   000354.00
                                                                   @
          KCI,$X7,64                                                  100.17 0A                   000354.40
          BZXL,DATA1                                                  350.72 40                   000355.00
                                                                   @
DATALT    L%BU,6,6□,$X7&.40         @STORE ANY PARTS OF WORDS.         27.50 80 006600.20 50      000355.40
          ST%BU,6,6□,DATA2&.35                                        361.03 80 006600.20 D0      000356.40
          ST%BU,6,6□,DATA3&.35                                        362.03 80 006600.20 D0      000357.40
                                                                   @
DATA2     L%BU□,0%$X7□                                                  0.00 87 000000.20 50      000360.40
DATA3     ST%BU□,0%$X6□                                                 0.00 86 000000.20 D0      000361.40
                                                                   @
DATAF     L%BU,6,6□,$X7&.40         @UPDATE IC REGISTER□.              27.50 80 006600.20 50      000362.40
          &%BU,24,8□,$X6                                               26.00 80 030000.20 10      000363.40
```

```
           ST%BU,24,8¤,IC                                               161.00 80 030000.20 D0     000364.40
DATAEX     $B,0                                                           0.10 00                  000365.40

ZE         LV,$X6,IC                 @LOAD $X6 WITH STORE ADDRESS.      161.14 30                  000366.00
                                                                  @
           L%BU,24,8¤,CARD&1.20      @FETCH BIT CNT FOR ZEROING.        174.24 80 030000.20 50     000366.40
ZEA1       BZB,MNREG&.32,ZEDONE      @MEM CLRED BEFORE LOADING.         153.40 80 000407.74 00     000367.40
           ST%BU,24,8¤,ZECNT                                            160.00 80 030000.20 D0     000370.40
           KI%BU,24,8¤,64                                                 1.00 80 430000.21 10     000371.40
           BAL,ZELST                                                    400.76 42                  000372.40
                                                                  @
ZE1        CM0000%BU¤,0%$X6¤         @ZERO THE AREA.                      0.00 86 000000.00 F0     000373.00
           V&I,$X6,1.0                                                    1.15 05                  000374.00
                                                                  @
           M-1%BU,18,8¤,ZECNT                                           160.00 80 022000.32 B0     000374.40
           L%BU,24,8¤,ZECNT                                             160.00 80 030000.20 50     000375.40
           BBZ,ZEE                                                      404.34 C2                  000376.40
                                                                  @
           KI%BU,24,8¤,64                                                 1.00 80 430000.21 10     000377.00
           BZAL,ZE1                                                     373.36 40                  000400.00
                                                                  @
ZELST      L%BU,6,6¤,ZECNT&.18       @ZERO ANY PARTIAL WORD.            160.22 80 006600.20 50     000400.40
           ST%BU,6,6¤,ZE2&.35                                           403.43 80 006600.20 D0     000401.40
                                                                  @
           Z,$B                                                          11.22 00                  000402.40
ZE2        ST%BU¤,0%$X6¤                                                  0.00 86 000000.20 D0     000403.00
                                                                  @
ZEE        L%BU,6,6¤,ZECNT&.18                                          160.22 80 006600.20 50     000404.00
           &%BU,24,8¤,$X6                                                26.00 80 030000.20 10     000405.00
           ST%BU,24,8¤,IC            @UPDATE IC REG.                    161.00 80 030000.20 D0     000406.00
ZEEX       $B,0                                                           0.10 00                  000407.00
                                                                  @
ZEDONE     M&%BU,24,8¤,IC                                               161.00 80 030000.20 90     000407.40
           B,ZEEX                                                       407.10 00                  000410.40
                                                                  @
SEQERR     BBZ,SEQOK,MODSEQ          @EXPECTED SEQ ERR, MODIFY SEQCNT.  157.14 80 000414.34 06     000411.00
           LVI,$X1,%8¤102.0                                             102.03 01                  000412.00
           SVA,$X1,$LB               @NUMBER DISPLAYED IN LOWER           3.43 D0                  000412.40
           SIC,HGUPEX                @BOUNDS REG. IF BIT 63 CHANGES,    144.00 80                  000413.00
           B,HGUP                    @THIS CARD WILL BE LOADED AS DEFINED. 134.10 00               000413.40
                                                                  @
MODSEQ     ST%BU,12,8¤,SEQCNT                                           157.00 80 014000.20 D0     000414.00
SERREX     $B,0                                                           0.10 00                  000415.00
                                                                  @
CKSMER     LVI,$X1,%8¤103.0          @CHECK SUM ERROR.  IF THIS IS      103.03 01                  000415.40
           SVA,$X1,$LB               @EXPECTED OR IT IS DESIRED TO        3.43 D0                  000416.00
           SIC,HGUPEX                @CONTINUE LOADING, CHANGE THE      144.00 80                  000416.40
           B,HGUP                    @SETTING OF SWITCH 63.             134.10 00                  000417.00
CKSMEX     $B,0                                                           0.10 00                  000417.40
                                                                  @
UPDMIC     LV,$X14,IC                                                   161.34 30                  000420.00
           LV,$X15,MIC                                                  162.36 30                  000420.40
           KV,$X14,$X15                                                  37.34 90                  000421.00
           BXL,$&1.0                                                    422.72 42                  000421.40
           SV,$X14,MIC                                                  162.35 30                  000422.00
           LV,$X15,LIC                                                  163.36 30                  000422.40
           KV,$X14,$X15                                                  37.34 90                  000423.00
           BXH,$&1.0                                                    424.73 42                  000423.40
           SV,$X14,LIC                                                  163.35 30                  000424.00
           B,LDR1                                                       113.10 00                  000424.40
```

```
        @@@CORRECTION CARD
                                                                          @
C1      SIC,C1B1                                                450.40 80                    000425.00
        B,C1S                                                   426.50 00                    000425.40
                                                                          @
        B,C1C                                                   451.10 00                    000426.00
                                                                          @
C1S     LX,$X3,CIX3                                             147.06 10                    000426.40
        LX,$X5,CIX5                                             151.12 10                    000427.00
        LX,$X6,CIX6                                             152.14 10                    000427.40
                                                                          @
C1A     LX,$X4,CIX4                                             150.10 10                    000430.00
        L%V&IC□%BU,12,8□,.12%$X3□                                 0.14 83 214000.20 50       000430.40
C1A1    K%V&IC□%BU,12,8□,.12%$X4□     @DETERMINE CHARACTER IN THIS COL   0.14 84 214000.21 10       000431.40
        BAF,C1B                                                 435.76 C2                    000432.40
        BZXCZ,C1A1                                              431.70 40                    000433.00
                                                                          @
        LVI,$X1,%8□104.0           @AN ILLEGAL CHARACTER HAS BEEN   104.03 01                    000433.40
        SVA,$X1,$LB                @PUNCHED IN A C OR P CARD.         3.43 D0                    000434.00
        SIC,HGUPEX                                              144.00 80                    000434.40
        B,HGUP                                                  134.10 00                    000435.00
                                                                          @
C1B     L%BU,12,8□,3.24%$X4□       @FETCH AND STORE A 4 BIT CHARACTER.   3.30 84 014000.20 50       000435.40
        ST%V&IC□%BU,4,4□,.04%$X5□                                 0.04 85 204400.20 D0       000436.40
        BZXCZ,C1A                                               430.30 40                    000437.40
                                                                          @
        Z,$L                                                     10.22 00                    000440.00
        Z,$R                                                     11.22 00                    000440.40
        C0011%BU,24,4□,CWD                                      165.00 80 030400.06 70       000441.00
        CM0101%BU,18,3□,$L                                       10.00 80 022300.12 F0       000442.00
        &%BU,1,1□,CWD&.29,109                                   165.35 80 001166.60 10       000443.00
        KEI%BU□,END&2.0,104                                     600.00 80 430064.23 10       000444.00
        BAH,C1B1A                  @A C OR P CARD HAS TOO       450.37 42                    000445.00
                                                                          @
        LVI,$X1,%8□105.0           @LOW AN ADDRESS AND WOULD    105.03 01                    000445.40
        SVA,$X0,$LB                @HAVE BEEN STORED IN THE LOADER.   3.41 D0                    000446.00
        SIC,HGUPEX                                              144.00 80                    000446.40
        B,HGUP                                                  134.10 00                    000447.00
        B,LDR1                                                  113.10 00                    000447.40
                                                                          @
C1B1A   LX,$X10,$L                 @PLACE CORRECTION ADDRESS IN $X10.   10.24 10                    000450.00
C1B1    $B,0                                                      0.10 00                    000450.40
                                                                          @
C1C     L%BU,4,4□,CWD&1.0%$X6□     @CHECK FOR PERIOD.           166.00 86 004400.20 50       000451.00
        KI%BU,4,4□,%8□17           @SKIP IF ANYTHING         740000.00 80 404400.21 10       000452.00
        BZAF,CSKP                  @BUT A PERIOD.               464.76 C0                    000453.00
                                                                          @
        C0011%BU,24,4□,CWD&.40%$X6□                             165.50 86 030400.06 70       000453.40
        CM0101%BU,18,3□,$L&.32                                   10.40 80 022300.12 F0       000454.40
        &%BU,3,3□,CWD&1.05%$X6□,75                              166.05 86 003345.60 10       000455.40
        &%BU,3,3□,CWD&1.09%$X6□,72                              166.11 86 003344.20 10       000456.40
        &%BU,8,8□,CWD&1.16%$X6□,64                              166.20 86 010040.20 10       000457.40
        ST%BU,32,8□,0%$X10□,64     @STORE THE HALF WORD CORRECTION.   0.00 8A 040040.20 D0       000460.40
        KV,$X10,MIC                                             162.24 90                    000461.40
        BXL,$&1.0                                               463.32 42                    000462.00
        SV,$X10,MIC                                             162.25 30                    000462.40
        KV,$X10,LIC                                             163.24 90                    000463.00
        BXH,$&1.0                                               464.73 42                    000463.40
        SV,$X10,LIC                                             163.25 30                    000464.00
                                                                          @
CSKP    V&I,$X10,.32                                              0.65 05                    000464.40
```

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              CB&,$X6,C1C             @DO FOUR HALF WORDS.                    451.15 48                    000465.00
              B,LDR1                                                          113.10 00                    000465.40


              @@@PATCH CARD
                                                                      @
      P1      SIC,C1B1                                                        450.40 80                    000466.00
              B,C1S                                                           426.50 00                    000466.40
                                                                      @
              L%BU□,0%$X10□                                                     0.00 8A 000000.20 50       000467.00
              KFI%BU,4,4□,8,36                                            400000.00 80 404422.23 10       000470.00
              BAF,P1B                 @FULL WORD                              504.36 C2                    000471.00
                                                                      @
              L%BU,32,8□,0%$X10□,32   @LOAD HALF-WD IN LEFT HALF OF $R.         0.00 8A 040020.20 50       000471.40
              &%BU,18,8□,MIC,14       @LOAD PRESENT SETTING OF MIC.           162.00 80 022007.20 10       000472.40
              &I%BU,18,1□,1,14        @ADD 1 TO IC.                             1.00 80 422107.20 10       000473.40
              ST%BU,24,8□,MIC,8       @UPDATE MIC.                            162.00 80 030004.20 D0       000474.40
              LV,$X11,$R&.32                                                   11.66 30                    000475.40
              &I%BU,1,1□,1,11         @MAKE IT A BRANCH INSTRUCTION.      400000.00 80 401105.60 10       000476.00
              ST%BU,32,8□,0%$X10□     @INSERT BRANCH.                           0.00 8A 040000.20 D0       000477.00
                                                                      @
              ST%BU,32,8□,0%$X11□,32  @INSERT REMOVED INSTR.                    0.00 8B 040020.20 D0       000500.00
              V&I,$X11,.32                                                      0.67 05                    000501.00
              M&1%BU,19,8□,MIC                                                162.00 80 023000.22 B0       000501.40
              BBZ,PFLWD,$&1.0                                                 172.00 80 000503.74 06       000502.40
              B,P1C                                                           517.10 00                    000503.40
      P1B     L%BU□,0%$X10□,64        @LOAD FULL WD IN $L.                      0.00 8A 000040.20 50       000504.00
              &%BU,18,8□,MIC,14       @LOAD PRESENT SETTING OF MIC.           162.00 80 022007.20 10       000505.00
              &I%BU,18,1□,1,14        @ADD 1.                                   1.00 80 422107.20 10       000506.00
              ST%BU,24,8□,MIC,8       @UPDATE MIC.                            162.00 80 030004.20 D0       000507.00
                                                                      @
              LV,$X11,$R&.32                                                   11.66 30                    000510.00
              &I%BU,1,1□,1,11         @MAKE IT A BRANCH INSTRUCTION.      400000.00 80 401105.60 10       000510.40
              &I%BU,3,3□,6,42         @MAKE A NOP.                        600000.00 80 403325.20 10       000511.40
              ST%BU□,0%$X10□          @INSERT NOP & BRANCH.                     0.00 8A 000000.20 D0       000512.40
              ST%BU□,0%$X11□,64       @INSERT REMOVED INSTR.                    0.00 8B 000040.20 D0       000513.40
              V&I,$X11,1.0                                                      1.27 05                    000514.40
              M&1%BU,18,8□,MIC                                                162.00 80 022000.22 B0       000515.00
              BB1,PFLWD,$&1.0                                                 172.00 80 000517.34 0E       000516.00
                                                                      @
      P1C     L%BU,4,4□,CWD&1.0%$X6□  @CHECK FOR PERIOD.                      166.00 86 004400.20 50       000517.00
              KI%BU,4,4□,%8□17        @FINISHED IF ANYTHING               740000.00 80 404400.21 10       000520.00
              BZAF,PEND               @BUT A PERIOD.                          531.76 C0                    000521.00
                                                                      @
              C0011%BU,24,4□,CWD&.40%$X6□                                     165.50 86 030400.06 70       000521.40
              CM0101%BU,18,3□,$L&.32                                           10.40 80 022300.12 F0       000522.40
              &%BU,3,3□,CWD&1.05%$X6□,75                                      166.05 86 003345.60 10       000523.40
              &%BU,3,3□,CWD&1.09%$X6□,72                                      166.11 86 003344.20 10       000524.40
              &%BU,8,8□,CWD&1.16%$X6□,64                                      166.20 86 010040.20 10       000525.40
              ST%BU,32,8□,0%$X11□,64  @STORE HALF A WORD OF A P CARD.           0.00 8B 040040.20 D0       000526.40
                                                                      @
              M&1%BU,19,8□,MIC                                                162.00 80 023000.22 B0       000527.40
              V&I,$X11,.32                                                      0.67 05                    000530.40
              CB&,$X6,P1C                                                     517.15 48                    000531.00
                                                                      @
      PEND    BB,PFLWD,PEND1                                                  172.00 80 000536.34 02       000531.40
              CBH,$X10,$&.32          @MAKE THE BRANCH BACK.                  533.24 C8                    000532.40
              SVA,$X10,P1HW                                                   154.25 D0                    000533.00
              L%BU,32,8□,P1HW                                                 154.00 80 040000.20 50       000533.40
              ST%BU,32,8□,0%$X11□                                               0.00 8B 040000.20 D0       000534.40
              B,PENDA                                                         541.10 00                    000535.40
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PEND1   CB&,$X10,$&,32          @MAKE THE BRANCH BACK.          536.65 48                    000536.00
        SVA,$X10,P1HW                                           154.25 D0                    000536.40
        L%BU,32,8¤,P1HW                                         154.00 80 040000.20 50       000537.00
        ST%BU,32,8¤,0%$X11¤                                       0.00 8B 040000.20 D0       000540.00
                                                                @
PENDA   M&1%BU,19,8¤,MIC        @SAFELY UPDATE MIC.             162.00 80 023000.22 B0       000541.00
        B,IDR1                                                  113.10 00                    000542.00
                                                                @
        @@@T CARD                                               @
T1      BB1,SEQOK,$&1.0                                         157.14 80 000543.74 0F       000542.40
        B,IDR1                                                  113.10 00                    000543.40
```

```
        @@@TAPE WRITE
                                                                @
TA1     BZB,MNREG&.37,B5          @BRANCH IF NO WRITE TAPE.        153.45 80 000343.34 00     000544.00
                                                                @
        L%BU,6,6□,MNREG&.12,45    @CH ADR IF NOT 0.                153.14 80 006626.60 50     000545.00
        &%BU,3,3□,MNREG&.21,14    @DRIVE                           153.25 80 003307.20 10     000546.00
                                                                @
        BB1,$R&.13,$&1.0                                            11.15 80 000550.34 0E     000547.00
TA2     LV,$X1,$R                                                   11.02 30                  000550.00
                                                                @
        LV,$X2,$R&.32                                               11.44 30                  000550.40
        L%BU,18□,LIC,46           @CALCULATE CONTROL WORD.         163.00 80 022027.20 50     000551.00
        -I%BU,18□,2,46                                               2.00 80 422027.30 10     000552.00
        &%BU,18□,MIC,18                                            162.00 80 022011.20 10     000553.00
        -%BU,18□,LIC,18                                            163.00 80 022011.30 10     000554.00
        &I%BU,18□,10,18                                             12.00 80 422011.20 10     000555.00
        ST%BU□,END                @TAPE WRITE CW.                  576.00 80 000000.20 D0     000556.00
                                                                @
        &I%BU,18□,1,46                                               1.00 80 422027.20 10     000557.00
        BB1,$R&.26,$&1.0                                            11.32 80 000561.34 0E     000560.00
        LV,$X3,END                                                 576.06 30                  000561.00
        ST%BU□,0%$X3□             @IPL CW.                           0.00 83 000000.20 D0     000561.40
        L%BU,32□,B5,32                                             343.00 80 040020.20 50     000562.40
        ST%BU□,1.0%$X3□           @IPL BD.                           1.00 83 000000.20 D0     000563.40
                                                                @
        LOC%SEOP□,0%$X1□,0%$X2□   @LOC TAPE.                         0.00 81 000000.17 02     000564.40
        CCW,0%$X1□,LDRCCW                                            0.00 81 000164.21 00     000565.40
        BB,LDRCCW&.24,$-1.0                                        164.30 80 000565.74 02     000566.40
                                                                @
        W%SEOP□,0%$X1□,END        @WRITE IPL TAPE.                   0.00 81 000576.13 00     000567.40
        CCW,0%$X1□,LDRCCW                                            0.00 81 000164.21 00     000570.40
        BB,LDRCCW&.24,$-1.0                                        164.30 80 000570.74 02     000571.40
                                                                @
        UNLOAD%SEOP□,0%$X1□       @UNLOAD TAPE.                      0.00 81 000137.15 00     000572.40
        CCW,0%$X1□,LDRCCW                                            0.00 81 000164.21 00     000573.40
        BB,LDRCCW&.24,$-1.0                                        164.30 80 000573.74 02     000574.40
                                                                @
        B,B5                      @START PROGRAM.                  343.10 00                  000575.40
                                                                @
END     XW,0,0,0                                                     0.00 00 000000.00 00     000576.00
```

END,%8□77.0	77.00	000577.00