

IDENTIFICATION

Product Code: DEC-12-ZR5B-D
Product Name: DIAL-MS BUILD Program
Description
Date Created: December 1, 1970
Maintainer: Software Services

LAP6-DIAL is an editor, filing system and assembler for use with the PDP-12 computer. The editor and filing portions are derived from the basic LINC program LAP6¹ by Mary Allen Wilkes of Washington University. The assembly portion is derived from several programs used for the PDP-8 computer including PAL-D².

The Digital Equipment Corporation wishes to express to the author, Mary Allen Wilkes (Clark), and the Computer Research Laboratory of Washington University, St. Louis, Missouri, its appreciation for the development set forth in LAP6 as well as its thanks for permission to use parts of the LAP6 program.

¹M. A. Wilkes, LAP6 Handbook, Computer Research Laboratory Tech. Rep. No. 2, Washington University, St. Louis, May 1, 1967.

²PAL-D Assembler Programmer's Reference Manual DEC-D8-ASAA-D.

1.0 PROGRAM OVERVIEW

BUILD is the name of the routine which "customizes" DIAL-MS for a given configuration. BUILD determines what devices a user has and creates a set of I/O routines for DIAL-MS¹ to use. At present, BUILD resides in blocks 310, 345, 365, and 366 of the DIAL-MS system.

BUILD is composed of three separate logical components. The first is the actual code that decides which devices are present and constructs the necessary tables for the I/O controller to use. The second component is the I/O controller which dispatches the calls for operations to the correct handlers with any necessary modifications made in the data. The individual I/O handlers are the third logical part. Each I/O handler operates just one device, and each is independent of the controller and other routines. The three components of BUILD are described in the following section.

2. INITIALIZATION

The initialization phase resides at block 310 on the DIAL-MS system. Note that this is part of the Editor (locations Ø-377). The DIAL-MS Editor requires that the pointers to the read and write routines reside at locations 21 and 22, respectively. Therefore, while the initialization phase starts at location 4Ø2Ø in LINCmode it immediately jumps past the pointers at 21 and 22. It then reads in the prototype I/O controller located at block 345, plus all the handlers for all the possible devices (LINCTape and RSØ8, DF32 and RKØ8 disks) which are located at blocks 365 and 366 of the DIAL-MS tape. Initially the handlers and controllers are set up to support only LINCTape, with the LINCTape handler residing at 76ØØ of field 1. The program then checks for the various devices by device IOT's. If the device is present, the program alters the device table slightly to include these new unit codes. It will also move the new secondary device handler to location 74ØØ of field 1 if another device in addition to LINCTape is present. Locations 74ØØ-7777 of field 1 are then written onto tape Ø. Thus, the system now knows that blocks 322 and 323 of LINCTape Ø contain all the necessary information and they do not have to be rebuilt each time. Blocks 3ØØ-467 of tape Ø (with the exception of the index) are copied to blocks Ø-167 of logical unit 1ØØ, providing 1ØØ is not on

¹LAP6-DIAL-MS is commonly referred to as DIAL-MS.

LINCTape (logical unit 100 is discussed in the I/O controller section). The system then does a standard bootstrap of the DIAL-MS Editor.

3. I/O CONTROLLER

The I/O controller is essentially the dispatcher for DIAL-MS. Calls are made to read or write operations, and the controller passes this information on to the correct handler. The controller is a field independent routine (may be located in any field and called from any field). The calling sequences are discussed at length in the DIAL-MS manual. Inside the controller, there exists a table located at 7300 which contains the values of the units that are available, where the routines are to do the operations, and the amount to add (or subtract) from the block numbers when going from one device to another. This table is commonly referred to as the MTABLE. Each unit is given three words in this table. The first word is the actual unit number. The second is the calling address of the read handler for this unit. The last word is the number of blocks to add onto the user's calling argument to transform it correctly to the physical block number on the device. A minus unit number indicates the end of the table. In prototype form, the table contains eleven units. Eight of these are the LINC-tapes (units 0-7); first word contains the unit number, second word contains 7630, the read routine entry point, the third word contains 0 because there is no correction necessary. In addition, there are three more units; namely, 100, 110 and 111. 100 is used internally to describe the DIAL-MS system. Thus, if you are running a tape system, DIAL-MS resides on blocks 300-367 of unit 0. The Editor resides on block 0 of unit 100 so the entry point in the table is 100 (unit #100), 7630 (pointer to the LINCTape routine), 300 (number of blocks to add to unit 100 calls to make it come out to the correct LINCTape blocks). This is how DIAL-MS can work off any device. The system is always on device 100; the MTABLE tells it where the device and block number really are. Unit 110 is the source unit; its first block is also 0. Thus, to reference block 3 of the source, it is block 3 of unit 110. The MTABLE tells the controller how to transform these numbers into physical device calls. Unit 111 is the binary unit (the first block of it is also 0). Only these three logical units are presently implemented; more can be added without any trouble.

The disk units are 10-17, with the pointer to 7430 (this is where the disk routine will be). Note that units 20-45 do not appear in the table if the user has multiple RK08s. The controller will look for units 10-17 if any unit between 20 and 47 is given as an argument to the controller. Note that it is trivial to make the values for the disk units those for the tape units, and vice versa. All that is necessary is to change the pointers to the handler locations. At present, only two handlers are in core at any one time (LINCTape plus perhaps a disk handler). This can easily be changed to permit more handlers to be present if a user has a special device he wants to use.

An important point of interest about the I/O controller is that the controller leaves the read address of the handler just used at location 7770 and the number of blocks to add to any calling sequence in location 7771. This is necessary because some program (e.g., the Loader) may destroy the I/O controller, and then call the handlers directly, rather than going through the controller.

The only other routines not discussed are the bootstrap and the MOVE routines. The bootstrap merely reads in blocks 300-307 of the Editor off device 100 and jumps to 4021, instead of to 4020. Jumping to 4020 would cause the system to reload the I/O routines. The MOVE routine is so trivial that it will not be discussed here.

4. I/O HANDLERS

The I/O handlers are the low level routines of DIAL-MS. They control the physical devices. Though they may vary greatly in design and structure, they all have several things in common:

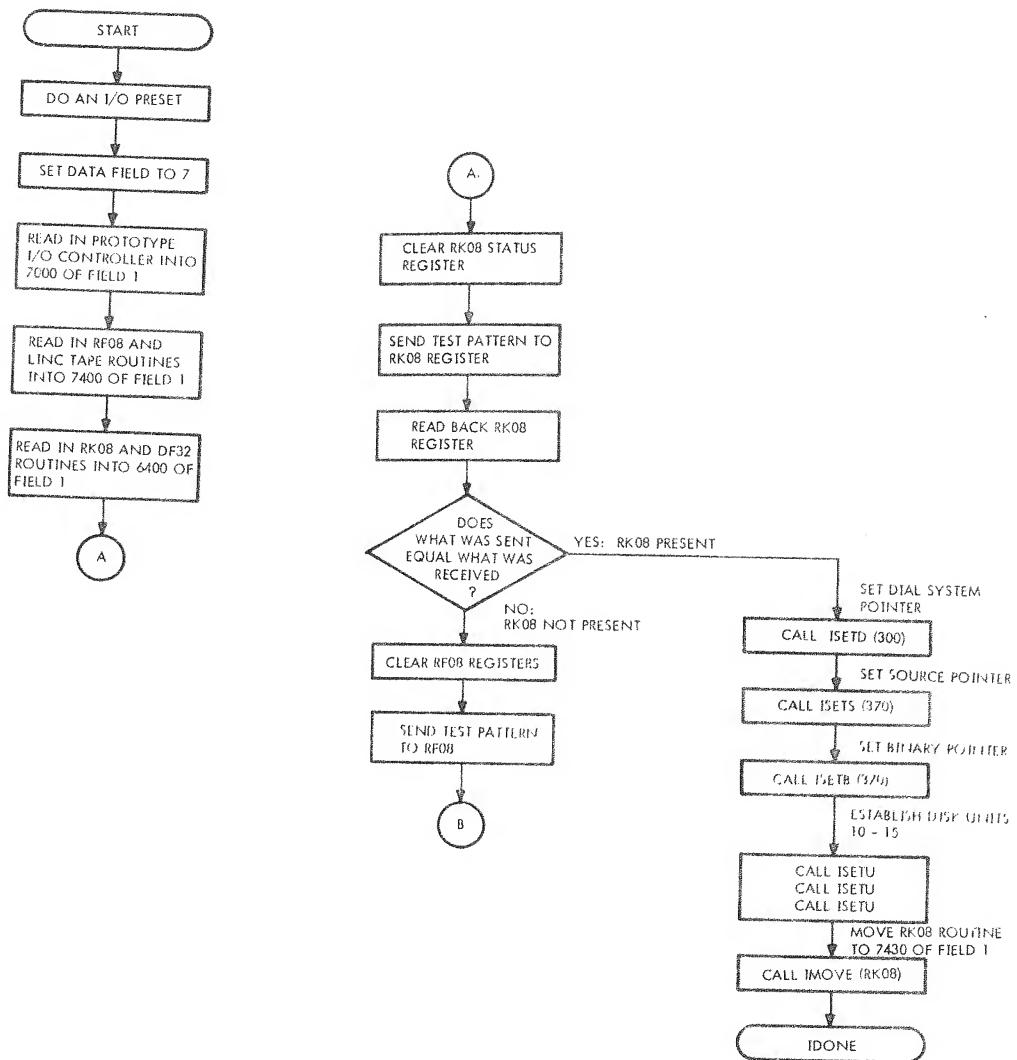
- a. They are all page independent (can be randomly located on any page in core and still function).
- b. No outside routines or constants are needed.
- c. They are field independent, but may be called only from the field in which they presently reside.
- d. Only location 30 through 167 of the page may be used by them.
- e. The read entry point is at 30 of the page and the write entry point is at 32 of the page.
- f. The calling sequence is similar to the calling sequence to the I/O controller, but the arguments are in-line, rather than pointed to by a pointer.

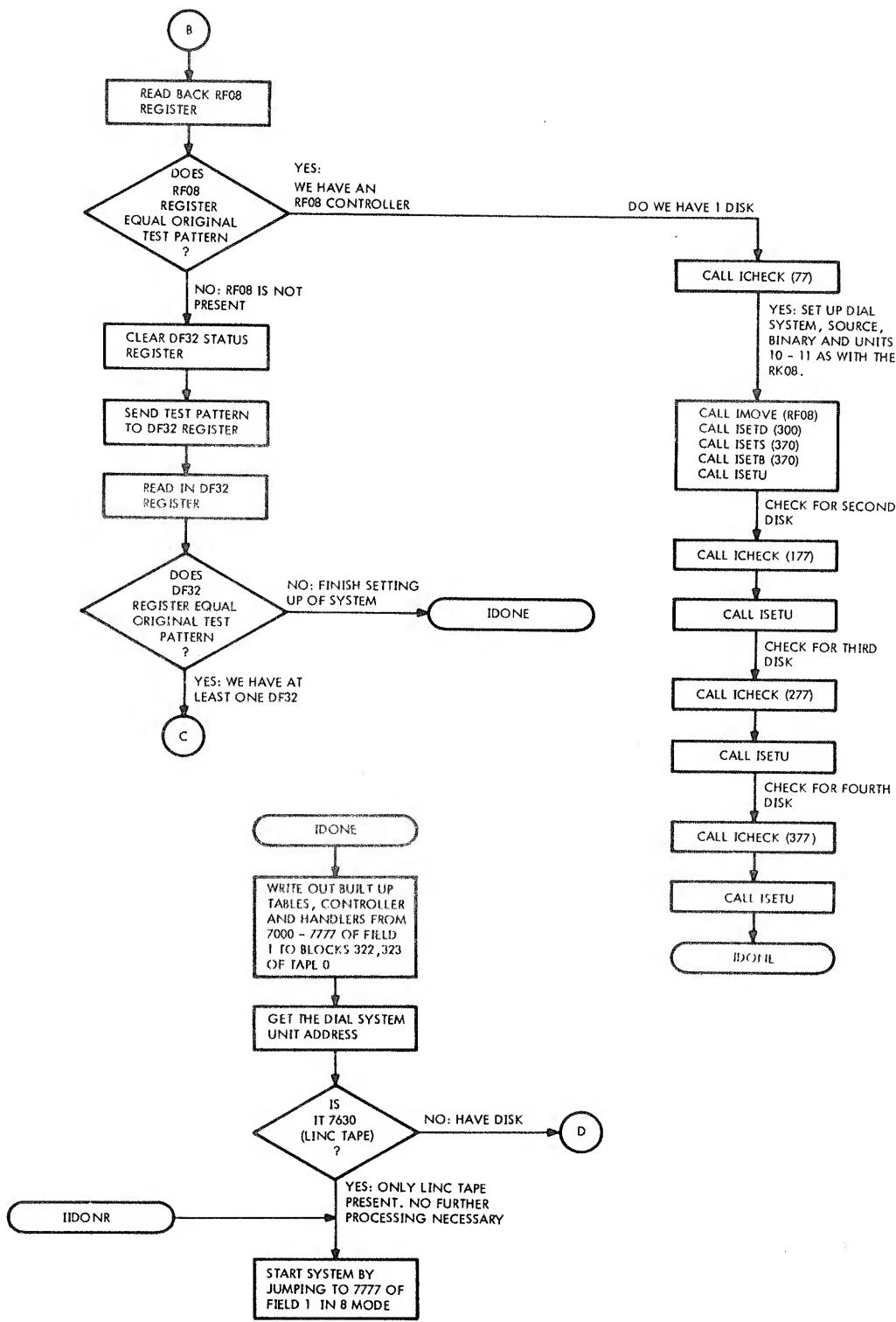
g. There is no code at 150 or 151 of the page so that if they are ever located in 7600, no code will be over the disk data break locations.

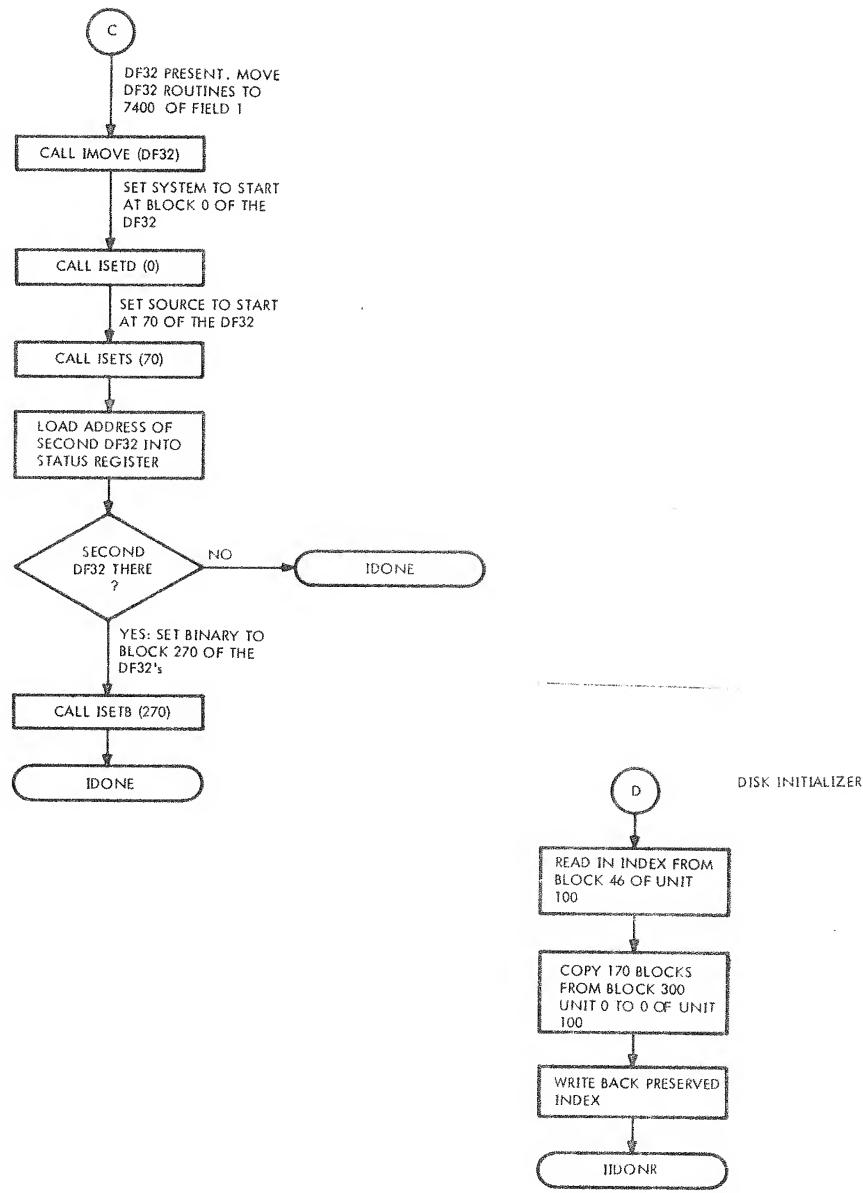
The I/O handlers also share one other feature. They only look at the rightmost digit of the calling unit, thus insuring the device independence of the system. While the physical nature of each handler is important, only the flow charts are necessary to understand each one. They are basically straightforward code. At present, there are four handlers implemented: LINCtape and RF08, DF32, and RK08, and disks. Any other device may be supported by merely writing a handler for it which conforms to the above standards.

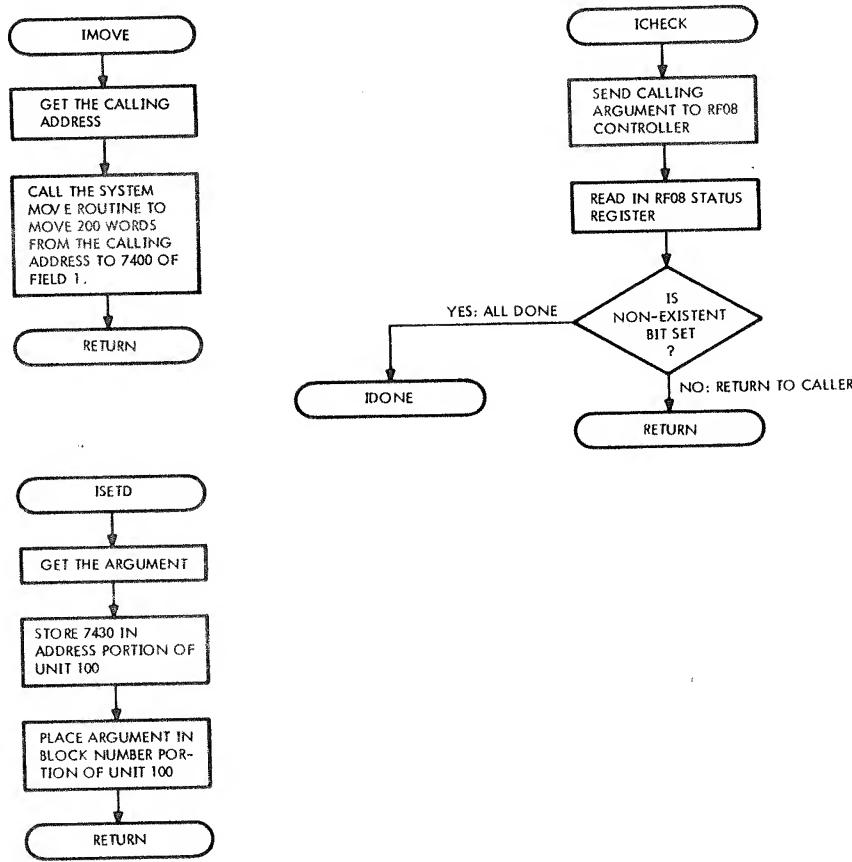
5.0 FLOW DIAGRAM (Attached)

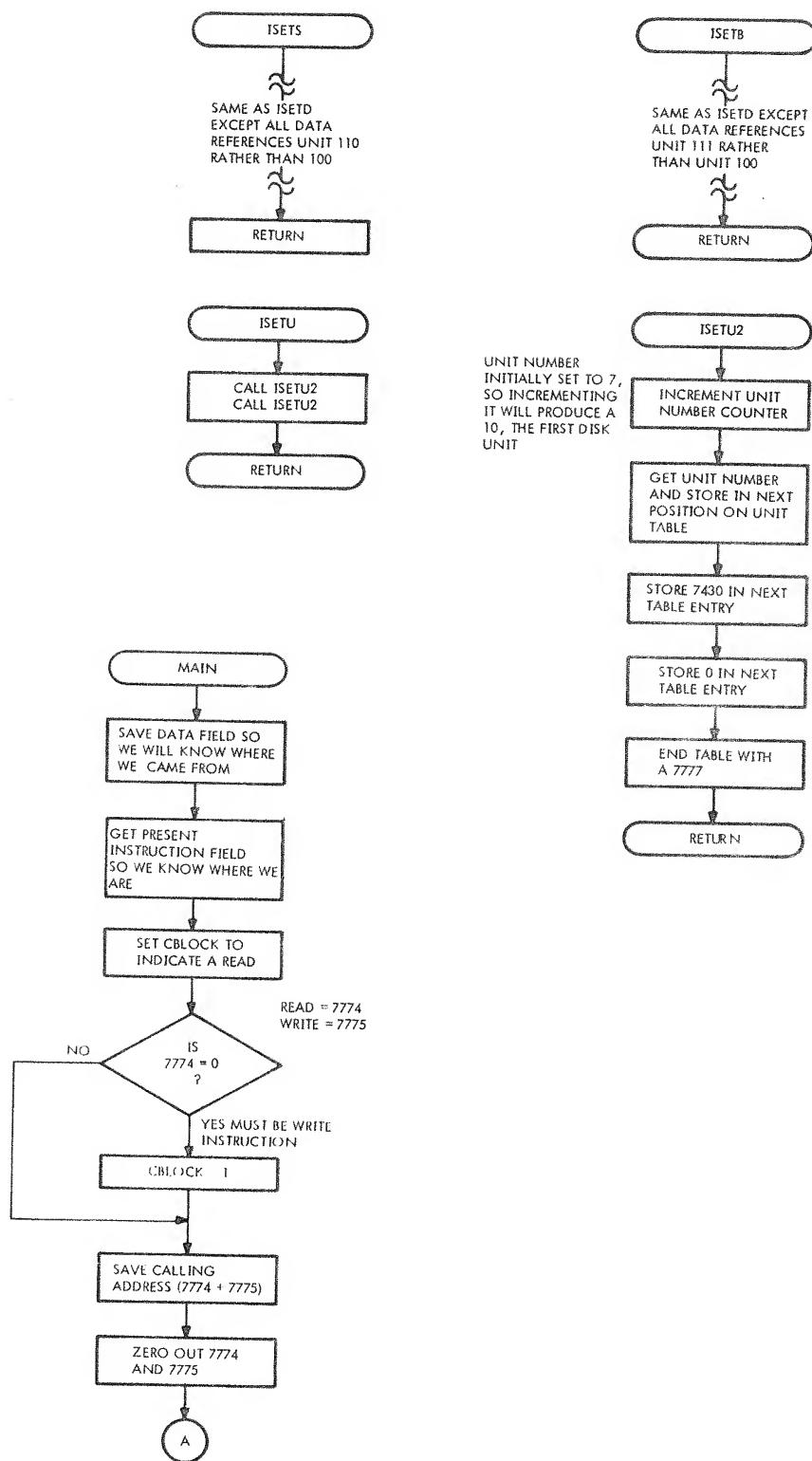
6.0 PROGRAM LISTING (Attached)

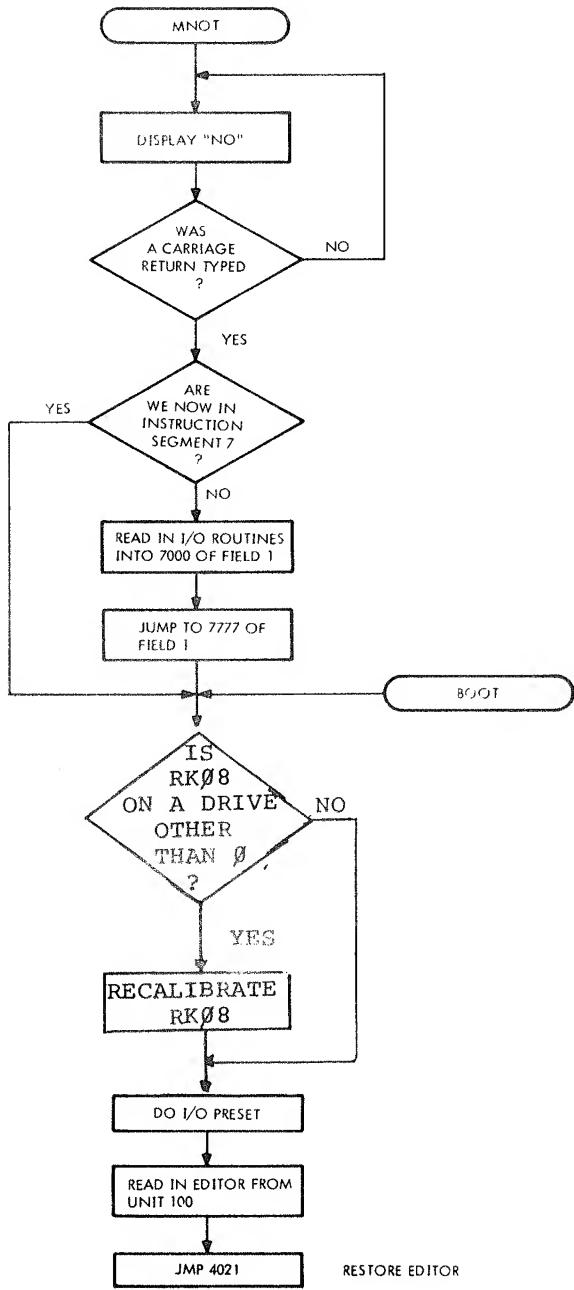
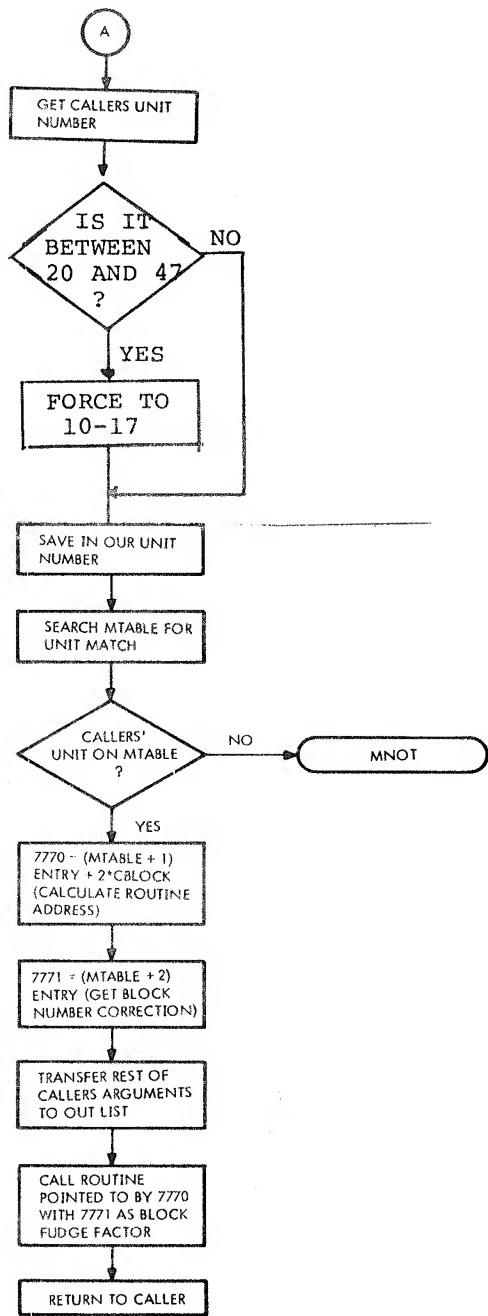




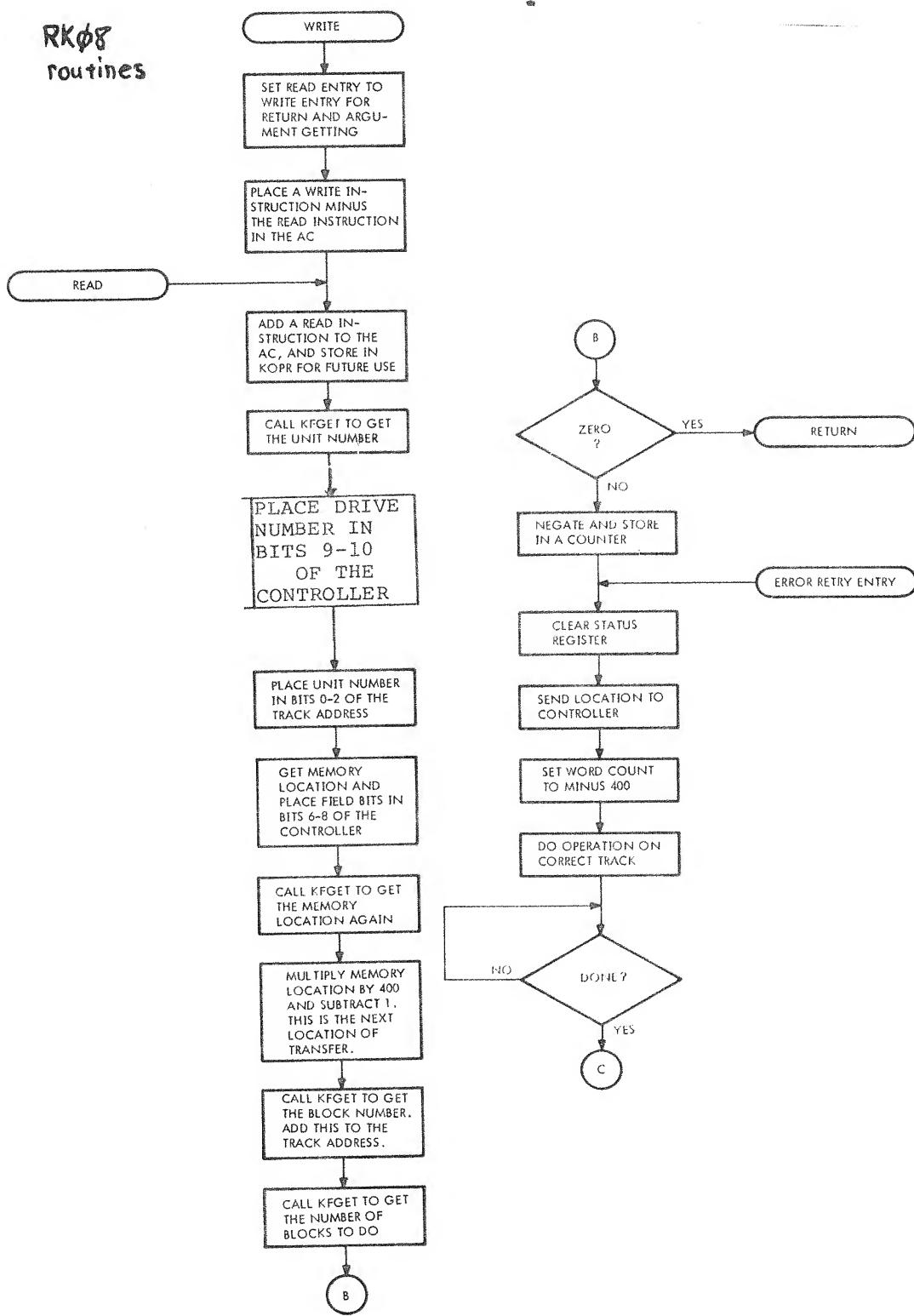


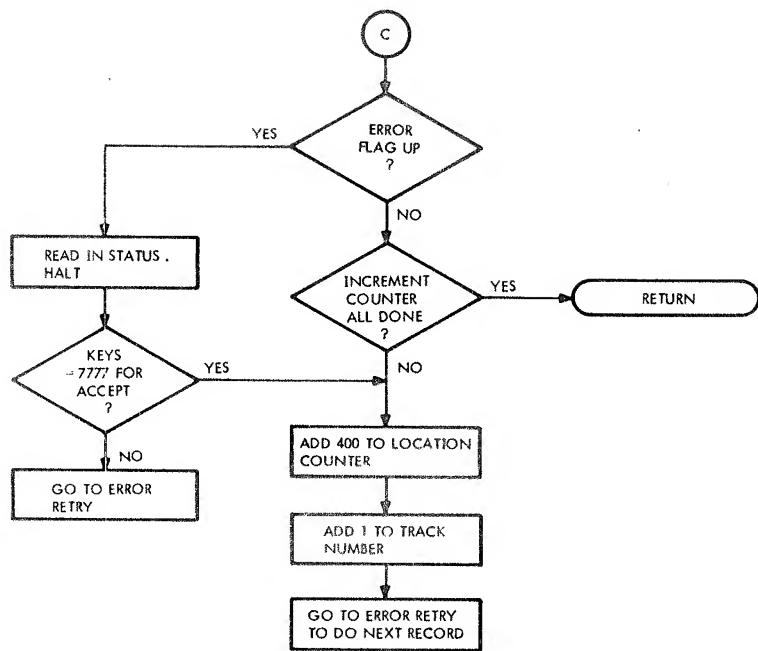




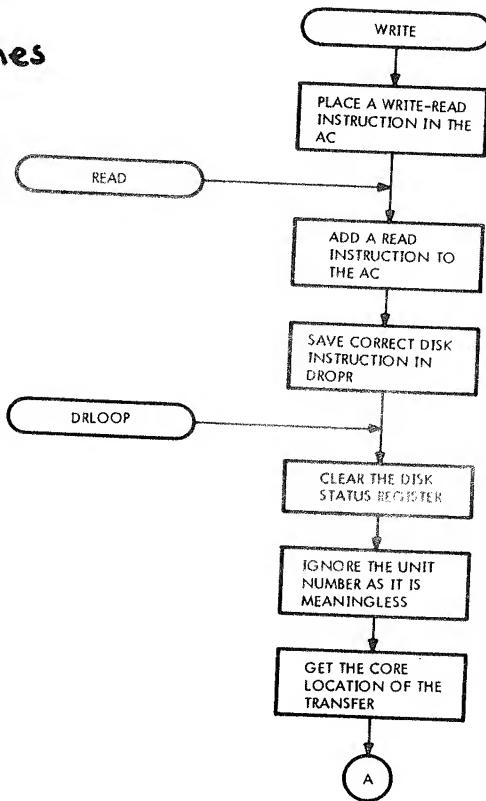


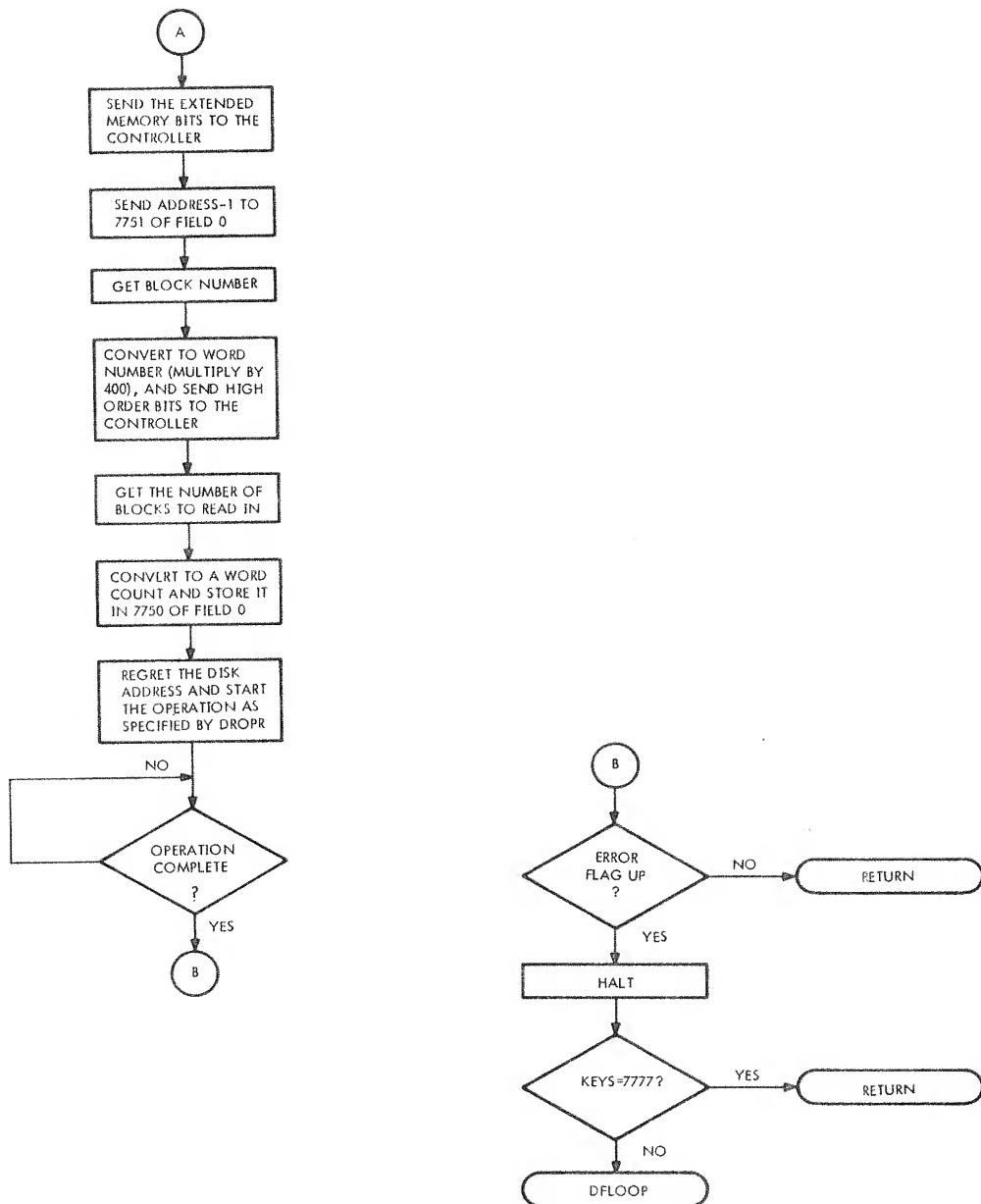
RK08
routines



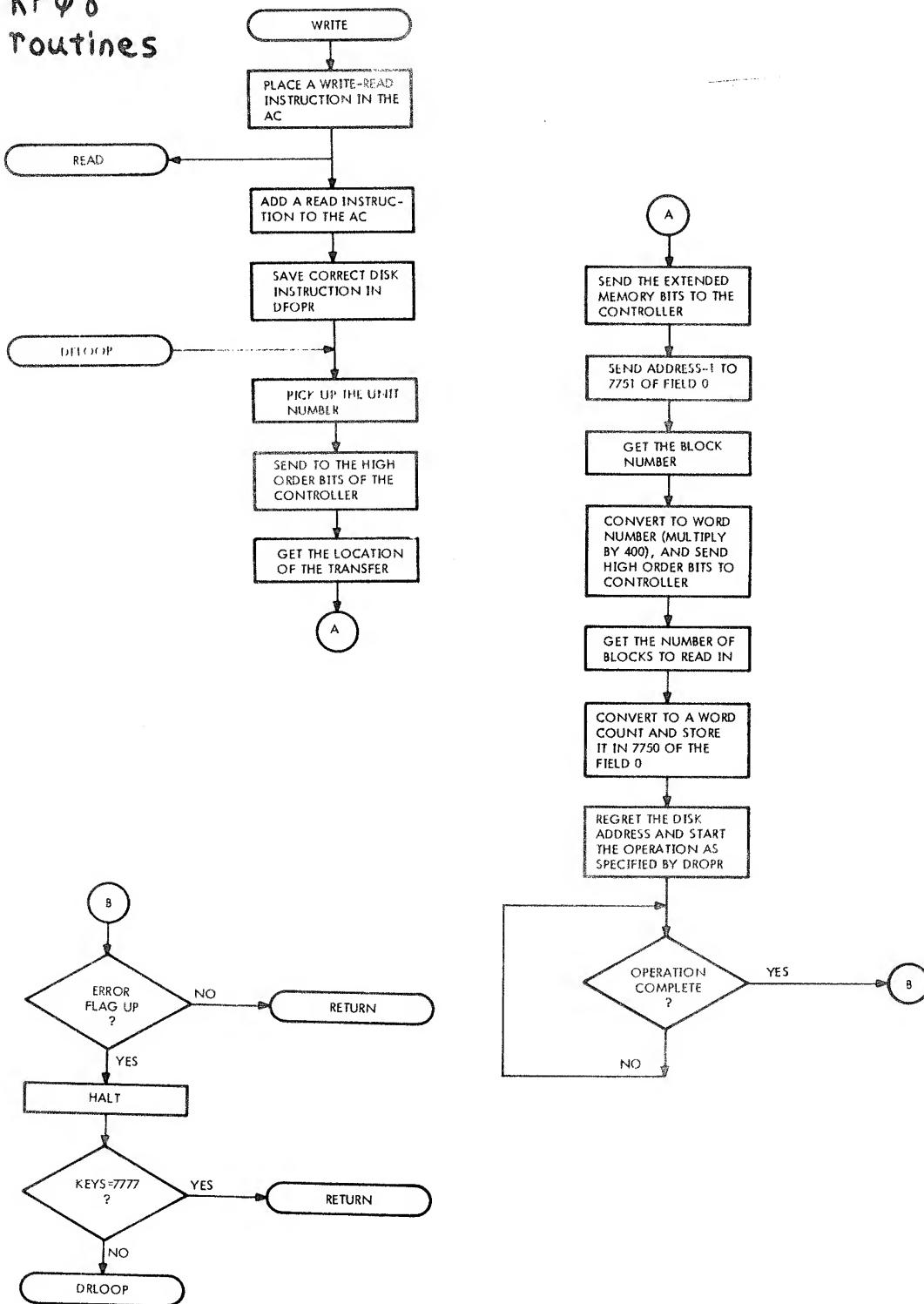


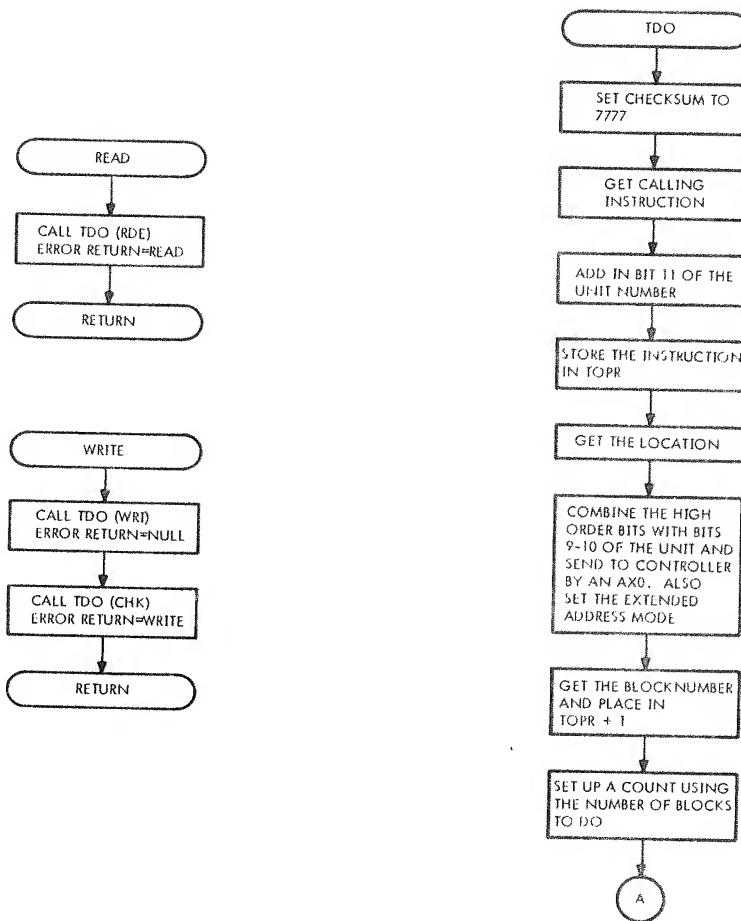
DF32 routines

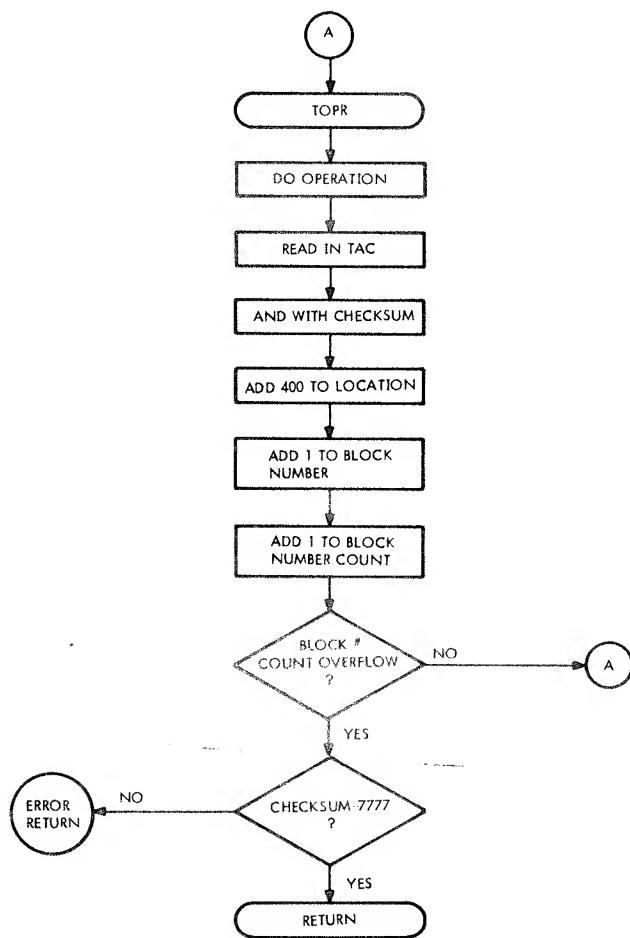




RF08 Routines







*2@
0000 //DISK-DIAL DISK ROUTINES
0001 //
0002 //COPYRIGHT 1970,
0003 // DIGITAL EQUIPMENT CORPORATION
0004 // MAYNARD, MASS., 01754
0005 //
0006 // THIS IS THE SYSTEM BUILD AND I-O ROUTINES ALL IN ONE.
0007 //
0008 //
0009 // UPDATED FOR MULTIPLE RK0BS 8/11/70
0010 //
0011 //
0012 //
0013 //
0014 // WRITTEN BY JACK BURNESS
0015 //
0016 //
0017 //
0018 //
0019 //
0020 //
0021 //
0022 //
0023 //
0024 //
EJECT

Lxx
ccc
x
a


```

CIF          6212      JMS I      BWRITE    10
4252        6212      JMS I      BWRITE    10
4253        4772      ILOUTP   TAD       1B2
4254        4350      ILOUTP   TAD       LTEN
4255        1352      ILOUTP   TAD       IB2
4255        1352      ILOUTP   DCA       IB2
4256        1347      ILOUTP   DCA       BM20
4256        1347      ILOUTP   ISZ       IL0OP
4257        3352      ILOUTP   DCA       /NOPE. DO MORE
4257        3352      ILOUTP   ISZ       /ALL DONE???
4258        2373      ILOUTP   DCA       /UPDATE 1B2
4260        2373      ILOUTP   ISZ       /CALL THE SYSTEM BOOTSTRAP NOW
4261        5244      ILOUTP   JMP       /
4262        /         ILOUTP   /         /
4263        4772      IIDONE, CIF      BWRITE  10
4264        4354      IIDONE, DSAVI   BWRITE  10
4265        6212      IIDONE, CIF      BSAV   10
4266        5774      IIDONE, JMP     BSYSBOT
4266        /         ILOUTP   /         /
4267        /         ILOUTP   /         /
4268        /         ILOUTP   /         /
4269        /         ILOUTP   /         /
4270        /         ILOUTP   /         /
4271        /         ILOUTP   /         /
4272        /         ILOUTP   /         /
4273        6211      ILOUTP   TAD       ISETD
4273        6211      ILOUTP   ISZ       ISETD
4274        3763      ILOUTP   CDF     10
4274        3763      ILOUTP   DCA       MSYSP2
4275        1375      ILOUTP   CDF     10
4275        1375      ILOUTP   DCA       B7430
4276        3762      ILOUTP   CDF     10
4276        3762      ILOUTP   DCA       MSYSP1
4277        5667      ILOUTP   CDF     10
4277        5667      ILOUTP   DCA       ISETD
4278        /         ILOUTP   /         /
4279        /         ILOUTP   /         /
4280        /         ILOUTP   /         /
4281        /         ILOUTP   /         /
4282        /         ILOUTP   /         /
4283        /         ILOUTP   /         /
4284        /         ILOUTP   /         /
4285        /         ILOUTP   /         /
4286        /         ILOUTP   /         /
4287        /         ILOUTP   /         /
4288        /         ILOUTP   /         /
4289        /         ILOUTP   /         /
4290        /         ILOUTP   /         /
4291        /         ILOUTP   /         /
4292        /         ILOUTP   /         /
4293        /         ILOUTP   /         /
4294        /         ILOUTP   /         /
4295        /         ILOUTP   /         /
4296        /         ILOUTP   /         /
4297        /         ILOUTP   /         /
4298        /         ILOUTP   /         /
4299        /         ILOUTP   /         /
4300        0000      ISETS,  CDF     0
4301        6201      ISETS,  TAD       ISETS
4302        1700      ISETS,  ISZ       ISETS
4303        2300      ISETS,  CDF     10
4304        6211      ISETS,  DCA       MSYSP5
4305        3765      ISETS,  CDF     10
4305        3765      ISETS,  DCA       B7430
4306        1375      ISETS,  TAD       MSYSP4
4306        1375      ISETS,  DCA       ISETD
4307        3764      ISETS,  CDF     10
4307        3764      ISETS,  DCA       MSYSP7
4310        5700      ISETS,  CDF     10
4310        5700      ISETS,  DCA       ISETD
4311        /         ISETS,  /         /
4312        6201      ISETS,  CDF     0
4313        1711      ISETS,  TAD       ISETB
4314        2311      ISETS,  ISZ       ISETB
4315        6211      ISETS,  CDF     10
4316        3767      ISETS,  DCA       MSYS10
4317        1375      ISETS,  TAD       B7430
4318        3766      ISETS,  DCA       MSYSP7
4320        4320      ISETS,  CDF     10
4321        5711      ISETS,  DCA       ISETB
4322        /         ISETS,  /         /
4323        6211      ISETU2, CDF     0
4323        6211      ISETU2, ISZ     10
4324        2376      ISETU2, TAD     87
4325        1376      ISETU2, TAD     87

```


1132
1736
1737
1740
1741
1742
1743
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1745
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1760
1761
1762
1763
1764
1765
1766

*60000

/LOCATIONS FOR THE "NON MESSAGE

60000 00000 0
60001 00000 DX,
60002 00000 DCHAR,

/FOR JMPS IN LMODE
/CONTAINS THE X VALUE FOR THE NO.
/CONTAINS THE DISPLAY TABLE POINTERS FOR THE NO.

EJECT

0767
0770
0771
0772
0773
0774
0775
0776
0777
10001
10002
10003
10004
10005
10006
10007
10101
10111
10113
10114
10115
10116
10117
10120
10221
10222
10223
10224
10225
10226
10227
10330
10331
10332
10333
10334
10335
10336
10337
10440
12441
10442
10443
10444
10445
10446
1047
10550
10551
10552
10553
10554
10555
10556
10557
10660
10661
10662
10663
10664

*6438

RK08E, /THE RK08 ROUTINES GO HERE.

ALL ROUTINES ARE OPTIMIZED AT 70 OF THE PAGE

DCL A = 6751
DLD C = 6732
DLD R = 6733
DLD W = 6735
DCH P = 6737
DR DA = 6734
DR DC = 6736
DR DS = 6741
DCLS = 6742
DM NT = 6743
DS KG = 6745
DS KT = 6746
DS KE = 6747
DW WC = 6752
DW LC = 6753
DW CA = 6755
DR CA = 6757
DR BC = 6759

```

        /
        /
        /READ ENTRY POINT
        /GO TO THE COMMON ENTRY PLACE
        /WRITE ENTRY POINT
        /SET UP A PHOONEY CALL
        /SAVE AWAY
        /*+2 TO MAKE READ INSTRUCTION A WRITE INSTRUCTION.

1070      6430    0000    KREAD,   0     JMP    KCMM
1071      6431    5236    KWRITE,  0     TAD    KWRITE
1072      6432    0000    TAD    KREAD
1073      6433    1232    DCA    CLA    IAC RAL
1074      6434    3230    CLA    CLL    IAC RAL
1075      6435    7305    /
1076      1100    1365    KCMM,
1077      6436    1365    TAD    KOLDR
1078      6437    3316    DCA    KOPR
1079      6440    1630    TAD I   KREAD
1080      6440    1630    AND   KL70
1081      6441    0361    SNA
1082      6442    7450    TAD    KLPH10
1083      6443    1252    TAD    KL70
1084      6444    1361    TAD    KL70
1085      6444    0360    AND   KL30
1086      6445    7112    CLL    RTR
1087      6445    0360    DCA    KLOC
1088      6446    7112    JMS   KFGET
1089      6447    3352    CLL    RTR
1090      6448    4353    DCA    KLOC
1091      6449    7112    TAD I   KREAD
1092      6449    7012    RTR
1093      6450    0363    AND   KL7400
1094      6453    0363    DCA    KTRACK
1095      6454    3351    TAD I   KREAD
1096      6455    1630    RAR
1097      6456    7010    AND   KL70
1098      6457    0361    TAD    KL70
1099      6458    1352    DLDG
1100      6460    1352    DLDG
1101      6461    6732    JMS   KFGET
1102      6462    4353    RTR
1103      6463    7012    RTR
1104      6464    7012    RAR
1105      6465    7010    AND   KL7400
1106      6466    0363    TAD    KL7777
1107      6467    1364    DCA    KLOC
1108      6468    3352    JMS   KFGET
1109      6469    1353    TAD    KTRACK
1110      6470    1351    DCA    KTRACK
1111      6471    4353    JMS   KFGET
1112      6472    1351    TAD    KTRACK
1113      6473    3351    DCA    KTRACK
1114      6474    4353    JMS   KFGET
1115      6475    7450    SNA
1116      6476    5630    JMP I   KREAD
1117      6477    7041    CIA
1118      6500    3350    DC A
1119      6501    5306    JNP   KCOUNT
1120      6502    1352    KNEXT,  TAD    KERR
1121      6503    1362    TAD    KLOC
1122      6504    3352    DCA    KLOC
1123      6505    2351    ISZ   KTRACK
1124      1151    1152    KERR,  CLA CMA
1125      1152    1153    OCLS
1126      1153    1154    CLA
1127      1154    1155    TAD
1128      1155    1156    DLCA
1129      1156    1157    TAD
1130      1157    1158    KL7400
1131      1158    1159    DLWC
1132      1159    1160    TAD
1133      1160    1161    KTRACK
1134      1161    1162    KTRACK
1135      1162    1163    KTRACK
1136      1163    1164    KTRACK
1137      1164    1165    KTRACK
1138      1165    1166    KTRACK
1139      1166    1167    KTRACK
1140      1167    1168    KTRACK
1141      1168    1169    KTRACK
1142      1169    1170    KTRACK
1143      1170    1171    KTRACK
1144      1171    1172    KTRACK
1145      1172    1173    KTRACK
1146      1173    1174    KTRACK
1147      1174    1175    KTRACK
1148      1175    1176    KTRACK
1149      1176    1177    KTRACK
1150      1177    1178    KTRACK
1151      1178    1179    KTRACK
1152      1179    1180    KTRACK
1153      1180    1181    KTRACK
1154      1181    1182    KTRACK
1155      1182    1183    KTRACK
1156      1183    1184    KTRACK
1157      1184    1185    KTRACK
1158      1185    1186    KTRACK
1159      1186    1187    KTRACK
1160      1187    1188    KTRACK
1161      1188    1189    KTRACK
1162      1189    1190    KTRACK
1163      1190    1191    KTRACK
1164      1191    1192    KTRACK
1165      1192    1193    KTRACK
1166      1193    1194    KTRACK
1167      1194    1195    KTRACK
1168      1195    1196    KTRACK
1169      1196    1197    KTRACK
1170      1197    1198    KTRACK
1171      1198    1199    KTRACK
1172      1199    1200    KTRACK
1173      1200    1201    KTRACK
1174      1201    1202    KTRACK
1175      1202    1203    KTRACK
1176      1203    1204    KTRACK
1177      1204    1205    KTRACK
1178      1205    1206    KTRACK
1179      1206    1207    KTRACK
1180      1207    1208    KTRACK
1181      1208    1209    KTRACK
1182      1209    1210    KTRACK
1183      1210    1211    KTRACK
1184      1211    1212    KTRACK
1185      1212    1213    KTRACK
1186      1213    1214    KTRACK
1187      1214    1215    KTRACK
1188      1215    1216    KTRACK
1189      1216    1217    KTRACK
1190      1217    1218    KTRACK
1191      1218    1219    KTRACK
1192      1219    1220    KTRACK
1193      1220    1221    KTRACK
1194      1221    1222    KTRACK
1195      1222    1223    KTRACK
1196      1223    1224    KTRACK
1197      1224    1225    KTRACK
1198      1225    1226    KTRACK
1199      1226    1227    KTRACK
1200      1227    1228    KTRACK
1201      1228    1229    KTRACK
1202      1229    1230    KTRACK
1203      1230    1231    KTRACK
1204      1231    1232    KTRACK
1205      1232    1233    KTRACK
1206      1233    1234    KTRACK
1207      1234    1235    KTRACK
1208      1235    1236    KTRACK
1209      1236    1237    KTRACK
1210      1237    1238    KTRACK
1211      1238    1239    KTRACK
1212      1239    1240    KTRACK
1213      1240    1241    KTRACK
1214      1241    1242    KTRACK
1215      1242    1243    KTRACK
1216      1243    1244    KTRACK
1217      1244    1245    KTRACK
1218      1245    1246    KTRACK
1219      1246    1247    KTRACK
1220      1247    1248    KTRACK
1221      1248    1249    KTRACK
1222      1249    1250    KTRACK
1223      1250    1251    KTRACK
1224      1251    1252    KTRACK
1225      1252    1253    KTRACK
1226      1253    1254    KTRACK
1227      1254    1255    KTRACK
1228      1255    1256    KTRACK
1229      1256    1257    KTRACK
1230      1257    1258    KTRACK
1231      1258    1259    KTRACK
1232      1259    1260    KTRACK
1233      1260    1261    KTRACK
1234      1261    1262    KTRACK
1235      1262    1263    KTRACK
1236      1263    1264    KTRACK
1237      1264    1265    KTRACK
1238      1265    1266    KTRACK
1239      1266    1267    KTRACK
1240      1267    1268    KTRACK
1241      1268    1269    KTRACK
1242      1269    1270    KTRACK
1243      1270    1271    KTRACK
1244      1271    1272    KTRACK
1245      1272    1273    KTRACK
1246      1273    1274    KTRACK
1247      1274    1275    KTRACK
1248      1275    1276    KTRACK
1249      1276    1277    KTRACK
1250      1277    1278    KTRACK
1251      1278    1279    KTRACK
1252      1279    1280    KTRACK
1253      1280    1281    KTRACK
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1515      1512    1513    KTRACK
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1264 6564 7777 KL7777, 7777
1265 /
1266 6565 6733 KLDLR, DLDR
1267 /
1270 //
1271 //
1272 //
1273 //
1274 //
1275 //
1276 //
1277 //
1300 //
1301 //
1302 //
1303 //
1304 //
1305 //
1306 //
1307 //
1310 //
1311 //
1312 //
1313 =

EJECT

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*6630
DF32=,
*6630

DRREAD, 0 DRWRT, 0 DR1
5236 0000 0000
6631 5236 0000
6632 0000 0000
6633 1232 TAD DRWRT
6634 3235 DCA DRREAD
6635 7326 CLA CLL CML RTL
6636 1327 DR1, TAD DRMAR
6637 3303 DCA DROPR
6640 6601 DRLOOP, DCMA DRREAD
6641 2230 ISZ TAD DR READ
6642 1630 RAR AND DRL70
6643 7010 AND DRWRT
6644 0330 DCA DRWRT
6645 3232 DCA DRWRT
6646 6224 RIF DRCDF
6647 1253 TAD DRXCOF
6650 3333 DCA DRREAD
6651 1630 TAD JMS DRRTA
6652 4335 JMS CDF G
6653 6201 DR CDF, G

/ DF32 READ-WRITE ROUTINES,
/ INTO MAIN PROCESSOR
/ WRITE ENTRY POINT
/ SET UP ARG GETTER
/+2
/ ADD IN READ INSTRUCTION,
/ SAVE THE CORRECT INSTRUCTION,
/ CLEAR THE STATUS REGISTER
/UNT MEANINGLESS FOR DF32S
/GET THE CORE LOCATION
/SHIFT OVER 1 PLACE
/ZAP OUT CRAP
/AND SAVE AWAY FOR NOW,
/GET THIS FIELD
/ADD IN A CDF G
/NOW STORE FIELD RESTORE INSTRUCTION,
/RESET THE CORE LOCATION
/RORS AND WITH 7400,
/SET TO SFTUP DATA BREAK INITIATION

1512 6744 7750 DRMNC, 7750
1513 6745 7751 DRMAD, 7751
1514 6746 3700 DRL3700, 3700
1515 /
1516 //
1517 //
1520 //
1521 //
1522 //
1523 //
1524 // * , 87600+152 /ORIGIN PASS DATA BREAK LOCATIONS,
1525 //
1526 //
1527 //
1530 6752 6601 DR CLR F , DCMA
1531 6753 6601 DCMA
1532 6754 5630 JMP I DR READ
1533 //
1534 //
1535 //
1536 //
1537 //
1540 //
1541 //
1542 //
1543 //
1544 //
1545 //
1546 //
1547 //
1550 //
1551 //
1552 //
1553 //
1554 //
1555 //
1556 //
1557 //
/CLEAR DF32 FLAGS IN CASE HE'S USING INTERRUPTS,
/YOU REALLY NEED TWO OF THEM,
/AND RETURN.
EJECT

1560 1561 1562 1563 1564
/ / / /


```

4023
2026      6201    LCDF,          CDF
2027      7136    MREAD,        7774
2030      7137    MWRITE,       7775
2031      7140    PTABLE,        MTABLE
2032      7141    7300
2033      7142    00000,        TEMP,        0
2034      7143    00000,        MRETL,       0
2035      7144    00000,        MCALL,       0
2036      7145    00000,        L6,          6
2037      7146    00007,        L7,          7
2038      7147    00020,        L20,         20
2039      7148    00030,        L30,         30
2040      7149    7770,        L7770,       7770
2041      7150    7771,        L7771,       7771
2042      7151    7772,        L7772,       7772
2043      7152    7773,        L7773,       7773
2044      7153    7760,        M20,         -20
2045      7154    7750,        M30,         -30
2046      7155    7740,        M40,         -40
2047      //      //
2048      //      //
2049      //      //
2050      //      //
2051      //      //
2052      //      //
2053      //      //
2054      //      //
2055      //      //
2056      //      //
2057      LMODE
2058      //      /
2059      2057    /TEL ASSY WE ARE IN LINC MODE WHEN WE GET HERE
2060      //      /
2061      //      /
2062      //      /
2063      //      /
2064      1156    0002    BOOTER,        PDP
2065      //      PMODE
2066      7157    0345    AND           L6
2067      7160    7650    SNA CLA
2068      7161    5365    JMP  RK080K
2069      7162    6751    DCLA
2070      7163    6745    DSKC
2071      7164    5363    JMP  1
2072      7165    3740    RK080K,       DCA 1
2073      7166    4737    JMS 1
2074      7167    7174    MREAD
2075      7168    4737    DPBOOT
2076      7169    7174    LINC
2077      7170    6141    LMODE
2078      //      LDF   3
2079      //      LIF   2
2080      //      JMP  4021
2081      //      /
2082      //      /
2083      //      /
2084      //      /
2085      //      /
2086      //      /
2087      //      /
2088      //      /
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2090      //      /
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2096      //      /
2097      //      /
2098      //      /
2099      //      /
2100      //      /
2101      1171    0643    PMODE
2102      1172    0602    PMODE
2103      1173    6021    PMODE
2104      //      /
2105      //      /
2106      //      /
2107      //      /
2108      //      /
2109      //      /
2110      //      /
2111      //      /
2112      //      /
2113      7174    0100    DPBOOT,       DIALUNIT
2114      7175    0010    DIALCORE
2115      7176    0010    DIALBLOCK
2116      7177    0010    DIALNUMBER
2117      //      /
2118      //      /
2119      //      /
2120      //      /
2121      //      /
2122      //      /
2123      //      /

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2132
2133
2134
2135
2136
2137
2140
2141
2142
2143
2144

EJECT

```

2145   /
2146   /
2147   /
2150   /
2151   /
2152   /
2153   /
2154   /
2155   /
2156   /
2157   / MOVE,
2160   7200  0000
2161   7201  7200
2162   7202  4236
2163   7203  3222
2164   7204  4236
2165   7205  3244
2166   7206  4236
2167   7207  3224
2170   7210  4236
2171   7211  3245
2172   7212  6214
2173   7213  1246
2174   7214  3234
2175   7215  4236
2176   7216  7450
2177   7217  5234
2200   7220  7041
2201   7221  3236
2202   7222  0000
2203   7223  1644
2204   7224  0000
2205   7225  3645
2206   7226  2245
2207   7227  7000
2210   7230  2244
2211   7231  7000
2212   7232  2236
2213   7233  5222
2214   7234  0000
2215   7235  5600
2220   7236  0000
2221   7237  1600
2222   7240  2200
2223   7241  5636
2224   /
2225   /
2226   /
2227   /
2230   7242  0000
2231   7243  0000
2232   7244  0000
2233   7245  0000
2234   7246  6203
2235   /
2236   /
2237   /
2240   /
2241   /
2242   7247  3077

```

/THE SPACE BETWEEN THE N AND THE O
0000
7251 0000 0000
7252 4177 4177
7253 7741 7741
/
//

/END OF THE "NOM" MESSAGE

2244 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2300 2301 2302 2303 2304 2305 2306 2307 2310 2311 2312 2313 2314 2315 2316 2317 2320 2321 2322 2323 2324 2325 2326 2327 2330 2331 2332 2333 2334 2335 2336 2341
0000
7251 0000 0000
7252 4177 4177
7253 7741 7741
/
//
LMODE
/
1254 1020 CHECKF, LDA I
1255 0020 20
1256 0004 ESF
1257 0011 CLR
1260 0647 LDF
1261 0500 IOB
2301 7262 6224 PMODE
2302 1263 1420 RIF
2303 1264 1616 LMODE
2304 1265 7272 SHD I
2305 1266 0700 CHBOOT
2306 1267 6322 JMP
2307 1268 0700 6\SETUP1
2310 1270 0700 RDC
2311 1271 7323 7\SETUP2
2312 /
2313 1272 0607 CHBOOT, LIF
2314 1273 1000 7
2315 1274 0001 LDA
2316 1275 7156 DX\\$1777
2317 1276 0001 JMP
2318 1277 7156 BOOTER
2319 1278 0001 //
2320 1279 0001 //
2321 1280 0001 //
2322 1281 0001 //
2323 1282 0001 //
2324 1283 0001 //
2325 1284 0001 //
2326 1285 0001 //
2327 1286 0001 //
2330 1287 0001 //
2331 1288 0001 //
2332 1289 0001 //
2333 1290 0001 //
2334 1291 0001 //
2335 1292 0001 //
2336 1293 0001 //
2341 1294 0001 //

/GET THE I-O PRESET CODE INTO THE AC
/DEVICES SHOULD BE CLEAR NOW BECAUSE OF THE I-O PRESET,
/GET RID OF THE CODE NOW,
/AND SET DATA FIELD TO BE SURE,
/NOW READ IN THE INSTRUCTION FIELD
/
/BACK INTO LMODE NOW,
/IS IT OK(I,F.=7)
/YEP, NORMAL REBOOTS TRAP
/THE I/O ROUTINES NOW,
/
PMODE
/
1616
JMP
RDC
6\SETUP1
RDC
7\SETUP2
/
/SET THE I.F. TO 7 FOR REBOOTS TRAP.
/NOW GET THE OLD RK08 STATUS INTO THE AC,
/BEFORE WE GO UP TO THE ROUTINES,
/DO THE BOOT NOW.

*7300

/THIS IS WHERE THE UNIT TABLE RESIDES.

	MTABLE,	0	7630
2344	00000	0	7630
2345	73000	0	7630
2346	73010	0	7630
2347	73020	0	7630
2350	73030	0	7630
2351	73040	1	7630
2352	73050	0	7630
2353	73060	2	7630
2354	73070	0	7630
2355	73080	0	7630
2356	73090	0	7630
2357	73100	0	7630
2360	73110	0	7630
2361	73120	3	7630
2362	73130	0	7630
2363	73140	4	7630
2364	73150	0	7630
2365	73160	0	7630
2366	73170	5	7630
2367	73180	0	7630
2368	73190	0	7630
2369	73200	0	7630
2370	73210	0	7630
2371	73220	0	7630
2372	73230	0	7630
2373	73240	0	7630
2374	73250	0	7630
2375	73260	0	7630
2376	73270	0	7630
2377	73280	0	7630
2400	73290	6	7630
2401	73300	0	7630
2402	73310	0	7630
2403	73320	0	7630
2404	73330	7	7630
2405	73340	0	7630
2406	73350	0	7630
2407	73360	0	7630
2410	73370	0	7630
2411	73380	0	7630
2412	73390	0	7630
2413	73400	0	7630
2414	73410	0	7630
2415	73420	0	7630
2416	73430	0	7630
2417	73440	0	7630
2420	77777	77777	77777
2421	/	/	/
2422	/	/	/
2423	/	/	/
2424	/	/	/
2425	/	/	/
2426	/	/	/
2427	/	/	/
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2762	/	/	/</

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2463

EJECT

2464 //
2465 //
2466 //
2467 //
2470 //
2471 //
2472 //
2473 //
2474 //
2475 //
2476 //
2477 //
2478 //
2500 //
2501 *7400
2502 //
2503 //
2504 //
2505 //
2506 //
2507 //
2510 //
2511 //
2512 //
2513 //
2514 //
2515 //
2516 //
2517 //
2520 //
2521 //
2522 //
2523 //
2524 //
2525 1400 MNL,
2526 1401 0360 SET I DX&1777
2527 1402 0062 SET I DCHAR&1777
2528 1403 1246 DTABLE&1777
2531 1404 0011 CLR
2532 1405 1762 DSC I DCHAR&1777
2533 1406 1762 DSC I DCHAR&1777
2534 1407 1762 DSC I DCHAR&1777
2535 1410 1762 DSC I DCHAR&1777
2536 1411 1762 DSC I DCHAR&1777
2537 //
2540 1412 0415 KST
2541 1413 7400 JMP MNL
2542 1414 0500 IOB
2543 //
2544 7415 6036 PMODE
2545 //
2546 1416 1460 LMODE
2547 1417 0215 SAE I
2550 1420 7400 215
2551 1421 0456 JMP SKP
2552 //
2553 //
2554 //
2555 7422 6141 BOOTCK, LINC
2556 //
2557 //
2560 1423 0011 CLR
2561 1424 0500 IOB

LMODE
/THE NO IS DONE NOW,
/NOW SEE IF A CHARACTER HAS BEEN TYPED,
/NOPE, LOOP!
/READ IN THE CHARACTER NOW,
/IS A C.R.
/NOPE, LOOP,
/SKIP PAST BOOT ENTRY,
/GET OVER INTO SUPER MODE<?>
/CLEAR THE AC TO BE SURE,

DX1777
/AND SAVE FOR A SECOND,
/AND NOW GO DO THE REBOOTSTRAP.

DX&1777
CHECKF

STC
JMP

4001
1426 1427 7254

2563
2564
2565
2566
2567
2570
2571
2572
2573
2574
2575
2576
2577
2578
2600
2601
2602
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2626

PMODE

EJECT

2627

2633

2634

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2636

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2640

2641

2642

2643

2644

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2647

2650

2651

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2724

DISK DEFINITIONS (DF32-RF08)

DCMA=6601
DMAR=6603
DMAW=6605
DCEA=6611
DSAC=6612
DEAL=6615
DEAC=6616
DFSE=6621
DISK=6623
DIML=6615
DFSC=6622
DIMA=6616
DMAC=6626
DMMT=6646
DCXA=6641
DXAL=6643
DXAC=6645

*7430

RF08 = .

/DEFINE THE RF08 LOCATIONS,

*7430

/MAIN DISK THINGS,

2722

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2770

2771

2772

2773

2774

2775

2776

2777

3000

3001

3002

3003

3004

3005

3006

3007

3010

3011

3012

3013

3014

3015

3016

3017

3020

21

22

3023

```

/MAIN DISK THINGS,
*7430

/MAIN DISK READ ENTRY
/GO TO THE MAIN READ ENTRY
/MAIN RF08 WRITE ENTRY
/GET THE WRITE ENTRY
/AND SAVE IN THE READ ENTRY FOR EASY ARG PICKING UP,
/+2 IN THE AC.
/GET THE READ INSTRUCTION (DMAR)
/GET THE READ INSTRUCTION (DMAR)
/AND SAVE IT FOR LATER
/ERROR REENTRY POINT. CLEAR DISK STATUS,
/GET THE FIRST ARGUMENT (THE UNIT NUMBER)

/ROTATE INTO BITS 6-8
/AND OUT UNIT BITS NOW
/FINISH ROTATING NOW,
/AND SEND TO CONTROLLER,
/GET THE CORE LOCATION,
/Rotate RIGHT ONE PLACE,
/JUST MAKE IT BITS 6-8 FOR MEMORY FIELD REF,
/AND SEND IT OUT.
/READ IN THE PRESENT FIELD NOW FOR REFERENCE,
/ADD IN A CDF 0
/SAVE FOR RESTORING THIS DATA FIELD.
/GET THE CORE LOC AGAIN AND BOP ARG GETTER
/ROTATE DISK BITS AROUND.

/SUBTRACT ONE FOR 3 CYCLE DATA BREAK
/SET DATA FIELD TO 0 FOR SETTING UP 3 CYCLE BREAK
/SAVE IN MEMORY ADDRESS,
/RESET TO THIS FIELD
/READ IN THE DISK REGISTER
/SAVE IN A TEMP FOR A SECOND
/GET THE BLOCK NUMBER NOW
/ROTATE 5 RIGHT AND OUT.

/JUST NECESSARY BITS,
/RECALL THE OLD DISK BLOCK NUMBER
/NOW TELL DISK FULL EXTENDED REGISTER,
/NOW GET THE BLOCK NUMBER AND BOP
/ROTATE 5 RIGHT AND ANDJ,
/AND SAVE AWAY TILL DFOPR
/FINALLY GET THE NUMBER OF RECORDS
/ROTATE 5 RIGHT AND OUT.

/SET TO STORE IN WORD COUNT
/SAVE AWAY NOW
/RESTORE THIS DATA FIELD
/RECALL THE LOWER BITS OF BLOCK NUMBER
/START THE DISK MOVING, BABY!!!
/WAIT FOR EVENT TO HAPPEN
/ALL DONE. . . .
/SHOW ABOUT AN ERROR,
/NO ERROR, RETURN
/READ IN THE PROCESSOR STATUS REGISTER,
/UST LEAVE IN VARIOUS ERROR BITS,
/ROTATE NXD STATUS INTO LINK
/NXD SHOULD BE ONLY BITS ON,

```

TOP S DEC 4ECL
TOP S DEC 4ECC
TOP S DEC 4ECD
TOP S DEC 4ECE

```

6201      0      DFMWC          /PREPARE TO REGET THE WORD COUNT.
6202      TAD   I      DFMWC          /WEVE GOT IT!
6203      1767             DFXXX         /RESERVE THIS DATA FIELD.
6204      4361             DFXXX         /TEST STATUS
6205      7524      7650      DFREAD        /ITS CLEAR, ALL IS WELL. RETURN TO CALLER.
6206      5630      6616      DFREAD        /REREAD IN STATUS
6207      7526      7402      HLT           /HALT WITH THE ERROR IN THE AC.
6208      7527      7402      LAS           /READ THE SWITCHES,
6209      7530      7604      CMA           /NEGATE
6210      7531      7040      SNA           /ACCEPT OR RETRY [7777=ACCPET, ANYTHING ELSE=RETRY].
6211      7532      7650      CLA           /ITS ACCEPTED. RETURN.
6212      7533      b630      DFREAD        /+4 IN THE AC
6213      7534      7307      CLA           /AC RTL
6214      7535      7041      CIA           /MAKE IT A =4
6215      7536      1230      TAD           /BACK UP PAST THE ARGS,
6216      7537      3230      DCA           /SO THAT RETRY WILL WORK.
6217      7540      5240      JMP           /TRY AGAIN.

6218      /      /      /
6219      3046      /      /
6220      3047      /      /
6221      3050      /      /
6222      3051      /      /
6223      3052      /      /
6224      3053      /      /
6225      3054      /      /
6226      3055      /      /
6227      3056      7541      6603      DFMAR,    OMAR
6228      3057      7542      0000      DFGET,    0
6229      3060      7543      1630      TAD   I      DFREAD
6230      3061      7544      2230      DFREAD
6231      3062      7545      5742      DFGET
6232      3063      7546      7751      DFMA0,   7751      /RETURN TO CALLER
6233      3064      /      /
6234      3065      /      /
6235      3066      /      /
6236      3067      /      /
6237      3070      /      /
6238      3071      /      /
6239      3072      /      /
6240      3073      /      /
6241      3074      /      /
6242      3075      7552      0000      DFRTTR,  0
6243      3076      7553      7012      RTR
6244      3077      7554      7012      RTR
6245      3100      7555      7010      RAR
6246      3101      7556      0364      AND
6247      3102      7557      5752      JMP   I      OFL7400
6248      3103      7560      0070      DFL70,   70
6249      3104      7561      0000      DFXX,   0
6250      3105      7562      0000      DFXCDF,  0
6251      3106      7563      5761      JMP   I      DFXXX
6252      3107      7564      7402      DFL7400, 7400
6253      3110      7565      0377      DFL377,  377
6254      3111      7566      1003      DFL1003, 1003
6255      3112      7567      7750      DFMWC,   7750
6256      3113      /      /
6257      3114      /      /
6258      3115      /      /
6259      3116      /      /
6260      3117      /      /
6261      3121      /      /
6262      3122      /      /
6263      3123      /      /

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/SYSCOM AREA FOR THESE ROUTINES,

*7570

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7570 0000 0
7571 0000 0
7572 7000 MAIN
7573 7422 BOOTCK
7574 0000 0
7575 0000 0
7576 5772 JMP I,-4
7577 5773 JMP I,-4

EJECT

EJECT

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777 TAD I TCALLY
    AND TL160
    CLL RTL      /GET THE CORE LOCATION NOW,
    /JUST GET THE FIELD BITS NOW,
    /AND ROTATE TO BITS 0-2

002 7674 1750      /ADD IN THE TAPE REGISTER WORD,
    03 7675 0360      /ALSO ADD IN THE EXTENDED ADDRESS BIT,
    04 7676 7106      /AND SAVE IT AWAY,
    05 7677 7006      /GET THE CORE LOCATION AGAIN,
    06 7700 7004      /ROTATE TO BITS 0-3,
    07 7701 1327      RAL
    08 7702 1357      TAXO
    09 7703 3327      TL20
    0A 7704 1750      TAXO
    0B 7705 7012      TAD I
    0C 7706 7012      RTR
    0D 7707 7010      RTR
    0E 7710 0361      AND TL7400
    0F 7711 3232      DCA TWRITE
    10 7712 2350      ISZ TCALLY
    11 7713 1750      TAD I TCALLY
    12 7714 3332      TBLOCK
    13 7715 2350      DCA TCALLY
    14 7716 1750      TAD I TCALLY
    15 7717 7041      CIA
    16 7718 7450      SNA
    17 7719 5352      JMP
    18 7720 7450      TOUT
    19 7721 5352      TCOUNT
    20 7722 3351      DCA
    21 7723 1232      /
    22 7724 6141      TL0OP, TAD
    23 7725 0023      LINC
    24 7726 1020      LMODE
    25 7727 0000      TMA 1
    26 7728 0001      LDA 0
    27 7729 7040      AXO
    28 7730 0000      /
    29 7731 0000      TOPR, 0
    30 7732 0000      TBLOCK, 0
    31 7733 0002      PDP
    32 7734 0362      PMODE
    33 7735 3362      AND
    34 7736 1237      OCA
    35 7737 1232      TAD
    36 7738 0444      TRET
    37 7739 0444      TRET
    38 7740 3232      TL400
    39 7741 2332      TWRITE
    40 7742 2351      DCACHE
    41 7743 5323      TBLOCK
    42 7744 5352      TCOUNT
    43 7745 0000      ISZ
    44 7746 0000      JMP
    45 7747 0000      TL0OP
    46 7748 0000      TOUT
    47 7749 0000      /
    48 7750 0000      *7750
    49 7751 0000      TCALLY, 0
    50 7752 2362      TCOUNT, 0
    51 7753 5653      TOUT, 0
    52 7754 0000      ISZ
    53 7755 0000      JMP
    54 7756 0000      TDO
    55 7757 0000      TDD
    56 7758 0000      TDC
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SYMBOL VALUE DEF REFERENCES

ADDF32	4173	03330	0165	0257	0262	0265
AICHEC	4165	03322	0244	0201	0204	0267
AIDONE	4166	0323	0164	0201	0204	0267
AIRK08	4164	0321	0142			
AISET B	4171	0326	0202	0253		
AISETD	4167	0324	0167	0247		
AISETS	4170	0325	0171	0251		
AISETU	4172	0327	0255	0260	0263	0266
AMOVE	4174	0331	0223			
AM100	4162	0315	0162			
AM1000	4163	0316	0177			
AM77	4161	0314	0140	0151		
ARFD8	4175	0332	0245			
A100	4154	0307	0156			
A1000	4160	0313	0173			
A177	4155	0310	0256			
A277	4156	0311	0261			
A377	4157	0312	0264			
A77	4153	0306	0134	0145	0243	
BDSYS	4377	0700	0544	0545	0547	0550
BIMOVE	4361	0661	0371			
BW20	4373	0674	0454			
BW7630	4370	0671	0431			
BOOTCK	7422	2555	3135	3535		
BOOTER	7156	2064	2317			
BREAD	4371	0672	0436	0441		
BRK08	4360	0660	0370			
BSYSBO	4374	0675	0464			
BWRITE	4372	0673	0447	0461		
B7	4376	0677	0542	0543		
B7430	4375	0676	0501	0515	0531	0546
CBLOCK	7121	1771	1601	1605	1735	1761
CCORE	7120	1770	1753			
CHBOOT	7272	2314	2305			
CHECKF	7254	2272	2564			
CNUM	7122	1772	1764			
CUNIT	7117	1767	1633	1644	1750	
DCEA	6611	2645				
DCHAR	6002	0754				
DCHP	6737	1036				
DCL A	6751	1032	1202	2071		
DCLS	6742	1042	0132	1153	1200	
DCNA	6601	2642	0143	0144	0154	0155
DCXA	6641	2660				
DEAC	6616	2650	0161	0176	1454	
DEAL	6615	2647	0157	0174	1423	
DFBAD1	7526	3032	3924			
DFCDF	7462	2766	2760			
DGET	7542	3057	2745	2762	3001	3062
DFL00P	7440	2744	3044			
DFL100	7566	3111	3021			
DFL377	7565	3110	2776			
DFL70	7560	3103	2750	2755		
DFL740	7564	3107	3101			
DFNAD	7546	3063	2767			
F R	7541	3056	2742			
C	7567	3112	3010	3026		
C	7513	2743	2743	2743	2743	2743
Dr JPR	7507					

SYMBOL VALUE DEF REFERENCES

DFSC	6622	2654	1445	
DFSE	6621	2651	1443	1447 3016
DFWRIT	7432	2736	2737	2772 2777 3003 3012
DFXCDF	7562	3105	2761	
DFXX	7561	3104	2770	3011 3027 3106
DF32	6630	1343	0330	
DIALBL	0000	0054	2115	
DIALCO	0010	0053	2114	
DIALNU	0010	0055	2116	
DIALUN	0100	0052	2113	
DIHAN1	0365	0041	0123	
DIHAN2	0366	0042	0125	
DIMA	6616	2655	0406	3020 3032
DIML	6615	2653	2756	
DIQC	0345	0040	0121	
DISK	6623	2652	3014	
DLCA	6755	1051	1156	
DLDC	6732	1033	0135 1123	
DLDR	6733	1034	1266	
DLDW	6735	1035		
DLWC	6753	1050	1160	
DMAC	6626	2656		
DMAR	6603	2643	1473 3056	
DMAW	6605	2644		
DMMT	6646	2657		
DMNT	6743	1043		
DPBOOT	7174	2113	2076	
DRCA	6757	1052		
DRCDF	6653	1411	1405	
DRCLRF	6752	1530	1451 1461	
DRDA	6734	1037		
DRDC	6736	1040	0137 2562	
DRDS	6741	1041	1173	
DRERR	6714	1454	1444 1450	
DRLQOP	6640	1376	1466	
DRL300	6731	1475		
DRL370	6746	1514	1421	
DRL70	6730	1474	1402	
DRL740	6743	1511	1506	
DRMAD	6745	1513	1414	
DRMAR	6727	1473	1374	
DRMWG	6744	1512	1436	
DROPR	6703	1441	1375	
DRREAD	6630	1366	1372 1377 1400	1416 1417 1425 1430 1431 1464 1465 1532
DRRTR	6735	1502	1410 1426 1433 1507	
DRWC	6752	1047		
DRWRIT	6632	1370	1371 1403 1422 1440	
DRXCDF	6733	1477	1406	
DRXX	6732	1476	1415 1437 1500	
DRI	6636	1374	1367	
DSAC	5612	2646		
DSAVI	4354	0626	0437 0462	
DTABLE	7247	2242	2530	2072
DX	6001	0753	2316 2525	2563
DXAC	6645	2662	0150 2771	
DXAL	6643	2661	0146 0405 2752 3000	

SYMBOL	VALUE	DEF	REFERENCES
IB1	4346	0 604	0 444 0 445
IB2	4352	0 614	0 451 0 453
ICHECK	4214	0 404	0 322 0 411
IDONE	4222	0 414	0 323 0 372
IIDONE	4262	0 460	
IIDONR	4265	0 463	0 434
ILINP	4344	0 602	0 442
IL00P	4244	0 440	0 455
ILOUTP	4350	0 612	0 450
IMOVE	4113	0 217	0 166 0 231 0 246 0 661
INITB	0311	0 037	
IRF08	4126	0 243	0 153
IRK08	4200	0 357	0 321
ISETB	4311	0 523	0 326 0 525 0 526 0 533
ISETO	4267	0 473	0 324 0 357 0 475 0 476 0 503
ISETS	4300	0 507	0 325 0 361 0 511 0 512 0 517
ISETU	4340	0 561	0 327 0 365 0 366 0 367 0 564
ISETU2	4322	0 540	0 555 0 562 0 563
KCOMM	6436	1100	1072
KCOUNT	6550	1235	1142 1221
KDLDR	6565	1266	1100
KEND	6545	1221	1167
KERR	6506	1152	1143 1213
KFCET	6553	1245	1112 1124 1133 1136 1250
KLLOC	6552	1237	1111 1122 1132 1145 1147 1155
KLPH10	6452	1114	1105
KL30	6560	1260	1107
KL400	6562	1262	1146
KL7	6557	1257	
KL70	6561	1261	1103 1106 1121
KL7400	6563	1263	1115 1130 1157
KL7777	6564	1264	1131
KNEXT	6502	1145	1222
KOPR	6516	1163	1101
KREAD	6430	1071	1075 1117 1140 1223 1246 1247
KTRACK	6551	1236	1116 1134 1135 1150 1161
KUGH	6524	1173	1205
KWRITE	6432	1073	1074 1176 1210
LBLOCK	7612	3231	3233
LDF	7136	2026	1574 1577
LESS20	7041	1632	1623
LL0C	7611	3230	3234
LNUM	7613	3232	
LTEM	4347	0605	0 443 0 452
LUNIT	7610	3227	
L20	7147	2037	1632
L30	7150	2040	1631
L6	7145	2035	2066
L7	7146	2036	1627
L7770	7151	2041	1740 1744
L7771	7152	2042	1743 1756
MAIN	7000	1571	3134 3534
MCALL	7144	2034	1616 1620 1747 1751 1752 1754 1760 1762 1763
MLOOP	7044	1640	1652
MNL	7400	2525	1675 2541 2550
MNOT	7057	1670	1642
MOVE	7200	2157	0 331 2214 2222 2223
MSYS	7137	2027	1603 1610 2075
	7143	2033	1607 1617 1777
	7330	2406	0 663 0 664 0 666 0 666 0 666

REFERENCES DEF VALUE SYMBOL

MSYSF	4364	0664	0516
MSYSI	4365	0665	0514
MSYSP7	4366	0666	0532
MSYS10	4367	0667	0530
NTABLE	7300	2356	2031
MTRUE	7064	1734	1646
MWRITE	7140	2030	1606 1611 2074
M20	7153	2043	1621
M30	7154	2044	1624
M40	7155	2045	1630
PTABLE	7141	2031	1612
RCDF	7134	2020	1575 1774
READ	7774	3536	0112 0672
RF08	7430	2712	0332
RK08	6430	1007	0660
RK080K	7165	2074	2070
SETUP1	0322	0035	0421 2307
SETUP2	0323	0036	0423 2314
SLCDF	7246	2234	2172
SRCDF	7133	2017	1614 1746 1757 2021
STCDF	7130	2011	1602 1634 1755 1765 2013
SWGET	7236	2221	2161 2163 2165 2167 2200 2211 2224
SWIN	7222	2201	2162 2212
SWLIN	7244	2232	2164 2202 2207
SWLOUT	7245	2233	2170 2204 2205
SWOUT	7224	2203	2166
SWRET	7234	2213	2173 2176
SWTMP1	7242	2230	
SWTMP2	7243	2231	
SYSBOT	7777	3541	0675
SYSGO	7617	3237	3221
SYSLD2	7615	3234	3225
SYSLQD	7600	3217	3235
TAX0	7727	3435	3371 3404 3406
TBLOCK	7732	3441	3417 3453
TCALLY	7750	3465	3360 3366 3376 3377 3407 3415 3416 3420 3421
TCDF	7131	2012	1600
TCOUNT	7751	3466	3425 3454
TDO	7653	3556	3523 3330 3343 3361 3362 3473 3474 3475
TEMP	7142	2032	1613 1640 1650 1651 1734 1737 1741 1742 1745 1766
TL00P	7723	3430	3455
TL160	7760	3507	3400
TL20	7757	3506	3405
TL40	7637	3327	3450
TL7	7756	3505	3367
TL7400	7761	3510	3413
TOPR	7731	3440	3363 3374 3375
TOUT	7752	3472	3424 3456
TPOINT	7627	3266	35217 3225
TREAD	7630	3316	3226 3322 3337 3340 3341 3357
TRET	7762	3511	3365 3347 3347
TTREAD	7647	3343	3317 3347
TTRET	7643	3336	3350
TWRITE	7632	3320	3321 3334 3414 3430 3451 3452
WRITE	7775	3537	0113 0673

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