```
ASSIGN M:CI,(FILE,IBQ,:DOUCI)
METASYM CI,CN,LB
    .SS R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15
    .SS SR1,SR2,SR3,SR4,D1,D2,D3,D4,$
    .END
```

```
CPC0R
        896/:C0R        916=DATA
CRC0R
        895/:C0R        897/:C0R        914=DATA
CTACT
         78/REF        1995/MTW        2000/MTW        2149/STW
CTFLAGS
         79/REF        1213/0R         1214/STW        2132/CW         2134/STS        2141/STS        2144/CW
CTGL
         80/SREF       1217/LW
CTINT
         81/SREF       1215/LI         1741/LI         1747/CI
CTIOP
       2005=EQU        2147/B
CT0C
         82/REF        1223/MTW        1989/LCW        1994/AWM
CT0CINT
       1216/BEZ        1221=LI
CTRIG
         217/DEF       1210=DISABLE    1578/B          1992/BAL
CTRIG1
       1189/B          1211=PSW
CTWD
         83/SREF       1218/WD*
CURBQ
         84/REF         383/MTW        1938/MTW
DCACCESS
         85/REF         408/LI          415/AI
DCC0R
        898/:C0R        918=DATA
DCT$MASK
         86/REF         442/LW          710/AND         770/AND
DCT$MASK$2
         87/REF         441/AND
DCTSIZ
         88/REF         389/LI          712/CI         1204/LI         1204/LI         1548/LI         2089/LI
DCT1
```

	89/REF	1097/LH	1295/LH	1308/STH	1536/CH	1549/CH	1886/LH
DCT1A							
	90/REF	1397/LH					
DCT1P							
	91/REF	1395/LH	1396/LH				
DCT10							
	92/REF	1247/LH	1278/CH	1353/MTH	1662/LH	1690/CH	1692/MTH
DCT11							
	93/REF	1092/LW	1105/STW	1331/STW	1758/STW	2112/LW	2195/STW
DCT12							
	94/REF	1565/LW	1587/STW	1883/LW	2108/LW		
DCT13							
	95/REF	1472/STD	1602/STD	1753/LD	1755/STD	1841/LD	1885/LD
	1901/LD	2164/LD					
DCT14							
	96/REF	1164/LB	1167/STB	1169/STB	1310/LB	1311/STB	1312/STB
	1535/LB	1538/LB	1541/STB	1544/STB	1546/LB		
DCT15							
	97/REF	448/LB	1165/LB	1166/STB	1170/STB	1302/LB	1313/STB
	1539/LB	1542/STB	1543/STB	1563/MTB	1665/LB	2099/LB	
DCT16							
	98/REF	1205/CW					
DCT17							
	99/REF	1289/STH	1720/LH				
DCT18							
	100/REF	1095/LB	1288/STB	2110/LB			
DCT19							
	101/REF	1300/STCF	1594/STB				
DCT2							
	102/REF	502/LB	950/LB	1149/LB	1605/LB	2183/LB	
DCT20							
	103/REF	1601/STCF					
DCT21							
	104/REF	1598/STH					
DCT22							
	105/REF	508/LB	714/LB				
DCT23							

```
        224/DEF         1264=AND
I8STEX
        1340=LW         1377/BCR        1487/B
I8STEX1
        1342=LI         1382/BNE        1385/B
I8STEX2
        1341/BEZ        1345/BE         1348=STB        1379/BEZ
I8STEX3
        1352=STB        1442/B          1481/B
I8STEX35
        1355/BCR        1356/BCR        1357/LI         1367=EQU
I8STRT
        1262/B          1277=DISABLE
I8STRT1
        1288=STB        1441/BAZ        1453/B
I8STRT2
        1319/BDR        1327=AI
I8STRT3
        1316/BCS        1326/BGE        1330=AW
I8STRT4
        1335/BCR        1338=BR
I8STRT5
        1303/BEZ        1306=EQU
I8STRT6
        1304/LI         1314=LC
I8UNMAP
         320=IPSD        363/LPSD
I810
        1545/B          1551=EQU
I812
        1564/BEZ        1569=CW
I814
        1553/BCS        1586=EQU
I820
        1604/BAZ        1616=EQU
I822
        1577/LI         1618=LI
```

```
I830
        1622-MTW
I850
        1572/BL         1574/BGE        1584-LI
I862
        1517-EQU        1585/B
I87
        1514/BCR        1531-MTW
I870
        1516/B          1527-LI
I871
        1549-CH         1579/BDR
I875
        1536-CH         1547/BNE
I876
        1537/BNE        1546-LB
I88
        1550/BNE        1570/BAZ        1579-BDR
IPREGV
         344/EXU         353-CW
J:CTIME
         147/REF         340/AWM
J:DCBLINK
         148/REF         328/LC          331/STB         425/STS         428/STS
J:JIT
         149/REF         417/MTW         1567/LI
J:RWECB
         150/REF         779/LW
JIT
         151/REF         323/LW          341/LB
J8VVP
         152/REF         583/CI
J8VVPA
         153/REF         772/CI
JX:CMAP
         154/REF         586/L8AD        632/L8AD        775/L8AD
JXCMAP
```

```
MSG2
        227/DEF         2224*TEXTC
MSG3
        228/DEF         2225*TEXTC
MSG4
        229/DEF         2226*TEXTC
MSG5
        230/DEF         2227*TEXTC
MSG6
       2192/LI          2228*TEXTC
MSG7
        231/DEF         2229*TEXTC
MSG9
        232/DEF         2230*TEXTC
MSG9A
        233/DEF         2231*TEXTC
MTC0R
        853/CI           899/!C0R        900/!C0R        901/!C0R        920*DATA
M11
        590/AND          623/AND        1887/AND
M15
        808/AND
M16
        620/AND         1264/AND        1844/AND
M17
        794/AND
M19
        580/AND
M2
        161/EQU
M21
        671/AND         1259/AND        1840/AND
M22
        799/AND         1944/AND        1950/AND
M24
       1562/BCS*        1868/LW
M3
```

```
          162/EQU
M4
          163/EQU
M7
          164/EQU
M8
          165/EQU
NDEVKEYN
        2235-EQU          2240/LI
NEWQ
          234/DEF           437-EQU           930/EQU
NEWQNW
          235/DEF           426-EQU
NEWQNWM
          236/DEF           423-EQU
NEXTQUE
          978/BANZ         1001-LB
NL
        2125-EQU          2128/TEXTC        2128/TEXTC
NMSG
        2267/CI           2299-EQU
NWIB
           52-SET
OC
           46-EQU
OCDCT
          166/REF          2069/GEN          2275/AI
OCINT
          237/DEF          1985-EQU
OCPSD
          167/REF          1987/LD
OCQC
        2083/BAL          2248-LI
OCQUEUE
          238/DEF          2262-EQU
OCTIO
        1989-LCW          1993/B
```

```
BCT20
        1990/BNEZ       1994*AWM
BCT30
        1997*LI
BCT35
        1998*WD
BCT40
        1996/BEZ        2000*MTW
BCT60
        2145/BAZ        2148*LI
BCWRITE
         239/DEF        2058/BAL        2121/BAL        2247*RES
BCWRITE1
        2219/BAL        2268/BG         2271*LI
BC22
        2272*LB
BC23
        2276*LB         2277/ANLZ
BC51
        2287/MSG        2301*RES
BC52
        2288/MSG        2303*RES
BC53
        2285/MSG        2286/MSG        2289/MSG        2291/MSG        2292/MSG        2305*RES
BC60
        2290/MSG        2308*TEXTC
BC70
        2293/MSG        2311*TEXTC
BC71
        2294/MSG        2312*RES
BC72
        2295/MSG        2314*RES
BC73
        2296/MSG        2316*RES
BC74
        2297/MSG        2318*RES
BC75
```

```
        2298/MSG        2320-RES
BLDTNEWFC
         822/BEZ         841-RES
BRIG
         252-EQU
PFSRIB
         168/REF        2122/BAL
PFSRMES
        2120/LI         2128-TEXTC
PL5BSR4
         240/DEF         557-PLM
PTCBR
         893/ICBR        894/ICBR        912-DATA
PVCHKDA
         241/DEF         709-EQU
QBUF
         798/LW
QD30
         760/BE          769-INT
QD31
         767/BANZ        772-CI
QD33
         773/BL          777-EQU
QD4
         740/B           750-LW          782/B
QD49
         845/BLE         851-EQU
QD50
         854/BE          857-CI
QD51A
         803/BEZ         806-LW
QD52
         858/BAZ         862-CI
QD56
         863/BNE         866-LI
QD60
         856/B           861/B           872-AW
```

```
QFREE
        169/REF         379/LB          385/STB         1934/LB         1936/STB
QUEUE
        242/DEF         749=LI
QUEUE1
        243/DEF         739=LW
Q10
        440=EQU
Q11
        447/BCR         449/BNEZ        453=A1
Q13
        472=RES         875/B
Q15
        482=EQU
Q15A
        244/DEF         489=EQU
Q15AA
        497/BEZ         499/BCS         501=EQU
Q151
        484/BNEZ        486=RES
Q20
        509/BEZ         512=DISABLE
Q26
        527=CB          538/BLE
Q26A
        521/BL          526/B           529=LB
Q27
        518/B           534=STB
Q28
        514/BNE         537=CB
Q28A
        530/BNE         536=LB
Q29
        519=B           528/BE
Q30
        519/B           523/BE          525/BE          539=LB
Q40
```

```
        175/SREF        1566/BLZ
RTI8STRT
        176/SREF        1305/B
RTPRI8
        200=EQU          946/CI
RTRET1
        249/DEF         1588=EQU
RTRET2
        250/DEF         1525=EQU        1560/LI
RTT8
        177/SREF        2115/BAL
S:CUN
        178/REF          338/LW          356/LW          450/LW
SACT
        179/SREF        1624/BAL        2136/BAL
SCCHECK
       1008/AI          1021=B
SCHEDHLD
         976/BCS        1008=AI
SCHEDXIT
         972/BEZ         994/BL         1003=ENABLE     1018/EQU        1021/B          1182/LI         1446/BGEZ
SC17
         485=SCREECH
SC1900
         180/REF         611/BCS         613/BCS        1873/BCS        1917/BCS
SELECT
        1058=COM
SELECTAB
         975/INT        1058/COM        1060=SELECT     1445/LH
SETKEYIN
        1742/B          1745/BEZ        1752=AI
SI8FAIL
        1479/BCS        1484=AI
SKIPREG
         345/BL          354/B           356=LW
SKREG
         359=RES
```

```
        210/REF         2216/LW
Y08
        1862/CW
Y1
        1102/AND
Y2
        1672/CW
Y4
         424/LW          987/CW         1476/E8R        1569/CW
Y8
         427/LW          617/8R         1010/8R         1448/AND        1523/AW
ZER
        2126=EQU        2127/EQU        2127/EQU        2127/EQU        2127/EQU        2127/EQU        2127/EQU
        2127/EQU
ZER8S
        2127=EQU        2128/TEXTC
1Q1
         398=RES         456/B
1Q2
         320/!PSD        364=PUSH
1Q3
         335/LI          405=MAP         781/B
1Q4
         410/BCR         418=RES
!C8R
         885=CNAME
!TP
        2026=CNAME
```

```
                *M*     NAME:    IOQ - I/O QUEUEING MANAGER FOR CP-V SYSTEMS
                *P*
                *P*     THE FOLLOWING ROUTINES MAY BE FOUND IN THIS MODULE
                *P*
                *P*     ROUTINE          FUNCTION
                *P*     ----------       ----------------------------------------------
                *P*     CHKDA        ENTRY TO CHECK DISC ADDRS AND SAVE 4 THRU 6
                *P*     CHKDAQ       ENTRY TO CHECK DISC ADDRS - NO REGISTER SAVE
                *P*     CTRIG        PUSH ENTRY INTO CONTROL TASK QUEUE STACK
                *P*     DRIVEIO      ENTRY TO CHECK DEVICES WAITING CLEANUP/TIMEOUT,ETC.
                *P*     ENBSR4       ENTRY TO ENABLE AND B *R11
                *P*     FORCEIO      ALTERNATE ENTRY TO DRIVEIO
                *P*     INTSIM       ENTRY TO SET CLEANUP PENDING-RESET BUSY...ETC
                *P*     IOINT        I/O INTERUPT RECEIVER
                *P*     IOSCU        RETURN FROM HANDLERS POST-PROCESSING
                *P*     IOSST        RETURN FROM COMLIST FOR I/O STARTUP
                *P*     MSGOUT       SEND MSG TO OPERATOR'S CONSOLE
                *P*     MSG2         'ERROR' MESSAGE
                *P*     MSG3         'TIMED OUT' MESSAGE
                *P*     MSG4         'NOT OPERATIONAL' MESSAGE
                *P*     MSG5         'WRITE PROTECTED' MESSAGE
                *P*     MSG7         'CODE DISC ERR' MSG
                *P*     MSG9         'REQ RETRY' MSG
                *P*     MSG9A        'INCONSISTENT STATUS' MSG
                *P*     NEWQ         MONITOR TYPE I/O ENTRY
                *P*     NEWQNW       ENTRY TO NEWQ FOR NO-WAIT I/O
                *P*     NEWQNWM      ENTRY TO NEWQ (MAPPED) FOR NO-WIAT I/O
                *P*     OCINT        OPERATOR CONSOLE INTERRUPT RECEIVER
                *P*     OCQUEUE      QUEUE MSG FOR OPERATOR'S CONSOLE
                *P*     PL5BSR4      PLM INTO R5 AND B *R11
                *P*     PVCHKDA      CHECK PRIVATE PACK DISC ADDRS
                *P*     QUEUE        ENTRY FOR I/O WITH DCB AND NO END ACTION
                *P*     QUEUE1       ENTRY FOR I/O WITH DCB AND END ACTION
                *P*     Q15A         RETURN FROM RBQCK TO FINISH ENQUEUE OF I/O
                *P*     Q51          RETURN FROM RBQCK TO THROW AWAY I/O REQUEST
                *P*     RC20         ENTRY INTO REQUEST COMPLETE (REQCOM)
                *P*     RC21         ENTRY INTO REQUEST COMPLETE (REQCOM)
```

```
38                          *P*       RESCHED     RE-SCHEDULE I/O ENTRY
39                          *P*       RTRET1      REAL-TIME USER RETURN POINT
40                          *P*       RTRET2      REAL-TIME USER RETURN POINT
41                          *P*
42                          *
43                          *         SET CONTROL SETTINGS FOR UTS PROCEDURES  AND INTERNAL
44                          *         VERSIONS
45                          *
46          00000002        OC        EQU         2
47          00000001        MONPROC   SET         1
48          00000001        DISCOPROC SET         1
49          00000001        BITS      SET         1
50                                    SYSTEM      UTS
51                          *
52          00000001        NWIO      SET         1           NO WAIT I/O VERSION
53          00000001        SYMBFLAG  SET         1           SYMBIONT VERSION
54          00000001        DUALFLAG  SET         1           DUAL ACESS VERSION
55          00000000        DEFER     SET         0           DO NOT DEFER START/CLEANUP
56                          *
```

```
                                    PAGE
                          *
                          *         IOQ EXTERNAL REFERENCES
                          *
                                    REF     AVRDCT          * AVR'D DEVICE DCTX
                                    REF     AVRTBLNE        * LAST DISC PACK AVRX+1
                                    REF     BATAPE          * DCTX ==> AVRX
00000006            WABLK           EQU     BLK             *
                                    REF     BTDBIT          *
                                    REF     BUFLIMS         * LIMITS OF WA FROM MPOOL TO TOP
                                    REF     C:NOQ           * PERF. MON.. CELL FOR LACK OF A QUEUE
                                    REF     C:RTRW          *
                                    REF     CFUBIT
                                    REF     CIT1            * HEAD OF CHANNEL QUEUE #
                                    REF     CIT2            * TAIL OF CHANNEL QUEUE #
                                    REF     CIT3            * CHANNEL FLAGS
                                    REF     CIT4            * INDEX OF HOLDING QUEUE #
                                    REF     CIT5            *
                                    REF     CIT6            *
                                    REF     CJOB            * JIT POINTER AT LOC X'4F'
                                    REF     COCIO           *
                                    REF     CTACT           *
                                    REF     CTFLAGS         *
                                    SREF    CTGL            *
                                    SREF    CTINT           *
                                    REF     CTOC            *
                                    SREF    CTWD            *
                                    REF     CURBQ           *
                                    REF     DCACCESS        *
                                    REF     DCT$MASK        *
                                    REF     DCT$MASK$2      *
                                    REF     DCTSIZ          * LENGTH OF DCT TABLES
                                    REF     DCT1            * DEVICE ADDRS TABLE
                                    REF     DCT1A           * ALTERNATE DEVICE ADDRS  (DUAL-AC)
                                    REF     DCT1P           * PRIMARY DEVICE ADDRS  (DUAL-AC)
                                    REF     DCT10           * RE-ENTRANCY COUNTER
                                    REF     DCT11           * DEVICE I/O OVERDUE TIME BUCKET
```

```
                REF     DCT12           * AIO STATUS BUCKET
                REF     DCT13           * TDV STATUS BUCKET
                REF     DCT14           * CHANNEL FLINK QUEUE INDEX
                REF     DCT15           * CHANNEL BLINK QUEUE INDEX
                REF     DCT16           * DEVICE NAME IN EBCDIC
                REF     DCT17           * HANDLER CODES
                REF     DCT18           * TIME-OUT INCREMMENTS (5 SECOND UNITS)
                REF     DCT19           * SIO/AIO CONDITION CODES
                REF     DCT2            * CHANNEL  INFO TABLE INDEX
                REF     DCT20           * TDV CONDITION CODES
                REF     DCT21           * TIO STATUS
                REF     DCT22           * INDEX  INTO SEEK CONVERT TABLES
                REF     DCT23           * O/OR HGP DISPLACEMENT
                REF     DCT24           * RMA TABLE (PARTITION...ETC)
                REF     DCT25           * SIO COUNTER
                REF     DCT3            * I/O LEGALITY/DUAL ACCESS FLAGS
                REF     DCT4            * OH:NM INDEX
                REF     DCT5            * DEVICE  FLAGS
                REF     DCT6            * QUEUE HEAD INDEX
                REF     DCT7            * DA OF COMMAND TABLE
                REF     DCT8            * WA OF HANDLER POST PROCESSOR
                REF     DCT9            * WA OF HANDLER PREE PROCESSOR
                REF     DEVCTCHK        *
                REF     DID             * DIAGNOSTIC INTERFACE USER # SLOT
                REF     DISCLIMS        *
                REF     DPACCESS        *
                REF     DSCCVT          *
                REF     E:IC            * I/O COMPLETE EVENT CODE
                REF     E:IP            * I/O IN PROGRESS EVENT CODE
                SREF    ECBPOST1        * POSTS ECB GIVEN 4-WORD BLOCK
                REF     ERRLOG          * ERROR LOGGING RECORDER
                REF     INTCNT          *
                REF     INTFLG          *
                REF     IOCLOCK         * # OF 5 SECOND INTERVALS ELAPSED
                REF     IOCTQ           *
                REF     IOPSD           * PSD FROM I/O INTERRUPT
                REF     IOQ1            * BAK LINK FOR IOQ TABLES
```

```
                                                REF     IOQ10           * # OF  RETRY REQUESTS
                                                REF     IOQ11           * # OF RETRIES  REMAINING
                                                REF     IOQ12           * SEEK ADDRESS
                                                REF     IOQ13           * DBL-WORD OF END ACTION ADDRS/INFO
                                                REF     IOQ14           * REQUEST PRIORITY
                                                REF     IOQ15           * REQUESTORS USER # (>>0 ONLY)
                                                REF     IOQ16           *  ECB WORD ADDRESS
                                                REF     IOQ2            * FWD LINK FOR IOQ TABLES
                                                REF     IOQ3            * IOQ  STATUS DATA  (DUAL ACCESS,ETC)
                                                REF     IOQ4            * CALLERS FUNCTION CODE
                                                REF     IOQ5            * CURRENT FUNCTION CODE
                                                REF     IOQ6            * WA OF DCB  (NON-ZERO)
                                                REF     IOQ7            * DCT INDEX OF DEVICE
                                                REF     IOQ8            * BA OF BUF OR DBL-WORD OF CDW
                                                REF     IOQ9            * #  CDWS   OR # OF BYTES
                                                REF     IOSERCK         * CHECK STATUS FOR ERROR ROUTINE
                                                REF     J:CTIME         *
                                                REF     J:DCBLINK       * DCB POINTER IN USER JIT
                                                REF     J:JIT           * WA OF JIT
                                                REF     J:RWECB         *
                                                REF     JIT             * WA OF THE JIT
                                                REF     JOVVP           *
                                                REF     JOVVPA          *
                                                REF     JX:CMAP         *
                                                REF     JXCMAP          *
                                                REF     KEYINBUF        * OPERTOR KEYIN INTO THISBUFFER
                                                REF     MAXBQ           * MAX # OF USER I/O EVENTS
                                                REF     MBGBIT          * MON BUFFER USED BIT
                                                REF     MPOOL           * MON POOL CHAIN
                                                REF     MPOOLIM         *
00000002  S             X3                      EQU     M2              * DATA OF X'00000003'
00000003  S             X7                      EQU     M3              * DATA OF X'00000007'
00000004  S             XF                      EQU     M4              * DATA OF X'0000000F'
00000007  S             X7F                     EQU     M7              * DATA OF X'0000007F'
00000008  S             XFF                     EQU     M8              * DATA OF X'000000FF'
                                                REF     OCDCT           * DCT INDEX OF OC DEVICE
                                                REF     OCPSD           * PSD FROM O/C INTERRUPT
```

```
168                                     REF     PFSRIØ          *
169                                     REF     QFREE           * BYTE ZERØ HAS INDEX ØF FIRST FREE Q
170                                     REF     RBLIMS          * CLM PAIR ØF REMØTE BATCH DCT'S
171                                     SREF    RBQCK           *
172                                     REF     RCVPSD          * RECØVERY'S XPSD BUCKET
173                                     REF     REGIPSD         *
174                                     SREF    RTCU            *
175                                     SREF    RTINT           *
176                                     SREF    RTIØSTRT        *
177                                     SREF    RTTØ            *
178                                     REF     S:CUN           * CURRENT USER # SLØT
179                                     SREF    SACT            * ACTIVATE SYMBIØNT RØUTINES
180                                     REF     SC1900          *
181                                     REF     SL:BXMF         * LIMIT I/Ø MAX FØR BATCH JØBS
182                                     REF     SL:ØXMF         * LIMIT I/Ø MAX FØR ØNLINE JØBS
183                                     REF     SL:IØTA         *
184                                     REF     SQHD            *
185                                     REF     SSEØ            *
186                                     REF     SYSACT          * DBL-WØRD TEXTØF :SYS
187                                     REF     T:GJØB          * PASS PRIØRITY/ACCNT # RØUTINE
188                                     REF     T:PULLE         *
189                                     REF     T:REG           * REPØRT EVENT AND GIVEUP CØNTRØL
190                                     REF     T:RUE           * REPØRT UNUSUAL EVENT IN SCHED
191                                     REF     T:SAVE          * SAVE STANDARD ENVIRØNMENT
192                                     REF     T:SSE           *
193                                     REF     TB:FLGS         *
194                                     REF     TEMP            * USED FØR INT PRØCESSING
195                                     REF     TPACCESS        *
196                                     REF     UB:PRIØ         * USER'S CURRENT PRIØ TABLE
197                                     REF     UB:MF           * USER CØUNT ØF ØUTSTANDING I/Ø'S
198                                     REF     UNEXP           * CØUNT ØF UNEXPECTED INTERRUPTS
199                                     REF     UNMAP           * GØES UNMAPPED RØUTINEIN ERHNDLR
200         000000CØ            RTPRIØ  EQU     X'CØ'           * I/Ø PRIØRITY FØR REAL-TIME USERS
201                                     REF     XE7             * DATA ØF X'000000E7'
202                                     REF     XFB             * DATA ØF X'000000FB'
203                                     REF     X44             * DATA ØF X'00000044'
204                                     REF     YE              * DATA ØF X'E0000000'
```

```
205                     REF     YFF             * DATA BF X'FF000000'
206                     REF     YFFFF           * DATA BF X'FFFF0000'
207                     REF     Y00FE           * DATA BF X'00FE0000'
208                     REF     Y03             * DATA BF X'03000000'
209                     REF     Y05             * DATA BF X'05000000'
210                     REF     Y06             * DATA BF X'06000000'
```

```
211                     PAGE
212             *
213             *       I8Q INTERNAL DEFINITIONS
214             *
215                     DEF     CHKDA           *
216                     DEF     CHKDAQ          *
217                     DEF     CTRIG           *
218                     DEF     DRIVEI8         *
219                     DEF     ENBSR4          * ENABLE/8 *R11
220                     DEF     F8RCEI8         *
221                     DEF     INTSIM          *
222                     DEF     I8INT           * I/8 INTERRUPT RECEIVER
223                     DEF     I8SCU           * CLEANUP RETURN ADDRESS
224                     DEF     I8SST           * I/8 START R8UTINE
225                     DEF     I8Q             * M8DULE BASE ADDRESS
226                     DEF     MSG8UT          * WRITES MSG AS PASSED
227                     DEF     MSG2            *
228                     DEF     MSG3            *
229                     DEF     MSG4            *
230                     DEF     MSG5            *
231                     DEF     MSG7            *
232                     DEF     MSG9            *
233                     DEF     MSG9A           *
234                     DEF     NEWQ            * M8NIT8R TYPE I/8
235                     DEF     NEWQNW          * NEWQ ENTRY N8-WAIT
236                     DEF     NEWQNWM         * NEWQ ENTRY MAPPED-N8 WAIT
237                     DEF     8CINT           * 8/C INTERRUPT RECEIVER
238                     DEF     8CQUEUE         *
239                     DEF     8CWRITE
240                     DEF     PL5BSR4         * PLM 5 AND BRANCH *R11
241                     DEF     PVCHKDA         *
242                     DEF     QUEUE           * I/8 THRU DCB WITH END ACTI8N
243                     DEF     QUEUE1          * I/8 THRU DCB W/8 END ACTI8N
244                     DEF     Q15A            *
245                     DEF     Q51             *
246                     DEF     RC20            *
247                     DEF     RC21            *
```

```
248                                     DEF     RESCHED         * RE-SCHEDULE I/O RETURN
249                                     DEF     RTRET1          *
250                                     DEF     RTRET2          * RETURN FROM RTROOT
251             01 00000        IOQ     EQU     $
252             01 00000        ORIG    EQU     $
```

```
                                PAGE
                *
                *    REGISTER DEFINITIONS
                *
00000000        R0      EQU     0
00000001        R1      EQU     1
00000002        R2      EQU     2
00000003        R3      EQU     3
00000004        R4      EQU     4
00000005        R5      EQU     5
00000006        R6      EQU     6
00000007        R7      EQU     7
00000008        R8      EQU     8
00000009        R9      EQU     9
0000000A        R10     EQU     10
0000000B        R11     EQU     11
0000000C        R12     EQU     12
0000000D        R13     EQU     13
0000000E        R14     EQU     14
0000000F        R15     EQU     15
```

```
                        PAGE
*
*       BASIC I/O ROUTINES
*
*       NEWQ CALLING SEQUENCE:
*
*  R12      FC/PRI/NRT/DCTX                          (8,8,8,8)
*  R13      DATA CHAIN,CMND CHAIN,BA OF BUFFER       (1,1,6,24)
*  R14      BUFFER SIZE IN BYTES                     (0,16)
*  R15      GENERALIZED DISC ADDRESS                 (32)
*  R0       END ACTION WORD ADDRESS                  (32)
*  R1       END ACTION INFO  TO RETURN               (32)
*
*
*         QUEUF/QUEUE1  CALLING SEQUENCE:
*
*  R8       FC/DCB ADDRESS                           (8,0,17)
*  R9       END ACTION ADDRESS                       (32)
*  R10      END ACTION INFO                          (32)
*
*         BOTH ROUTINES ENTERED  ON  BAL,11
*
```

```
295                                          PAGE
296                              *
297                              *       FRONTEND - PROVIDES SCHEDULER INTERFACE FOR I/O REQUESTS
298                              *                  FROM MAPPED USERS.  A CHECK IS MADE TO SEE IF
299                              *                  THE USER HAS MORE THAN THE ALLOWED NUMBER OF
300                              *                  I/O REQUESTS ALREADY IN PROGRESS BEFORE PERMITTING
301                              *                  ANOTHER TO BE ENQUEUED.  THE USER IS BLOCKED
302                              *                  BY PLACING HIM IN 'SIOMF'.
303                              *
304                              *                  THE USER MASTER FUNCTION COUNT IS INCREMENTED
305                              *                  BEFORE THE USERS I/O IS INITIATED.
306                              *
307                              *                  FOR MAPPED REQUESTS, THE REAL RETURN FROM IOQ(R11)
308                              *                  IS SAVED IN THE MAPPED TSTACK AND A DUMMY RETURN
309                              *                  TO THE BACKEND OF FRONTEND IS SET IN R11.
310                              *
311                              *       CALLING SEQUENCE:
312                              *
313                              *       BAL,R2   FRONTEND
314                              *       B        <PROPER BACKEND ENTRY>
315                              *       B        <PROPER RECYLCE ENTRY>      FOR IOMF UNBLOCK
316                              *       ....     ......             NORMAL EXIT IS TO BAL+3
317                              *
318                              *
319                              *
320   01 00000    00000027 N    IOUNMAP  :PSD     (IA,1Q2),(WK,1),(INH)
                  1/000000
321        01 00002              FRONTEND EQU     $
322   01 00002    72400000 X             LB,R4    CJBB               ASSUME UNMAPPED
323   01 00003    32300000 X             LW,3     JIT                IF NO SYSID MUST BE MONITOR
324   01 00004    68300026               BEZ      SKREG2             YES IT IS
325                              *                                   MAPPED USER MAKING THIS REQUEST
326                              *
327   01 00005    33100000 X             MTW,1    C:RTRW             INCREMENT I/O COUNT
328   01 00006    70200000 X             LC       J:DCBLINK          GET NEWQNW/NEWQNWM FLAGS
329   01 00007    6880000F               BCR,8    CHECKMF            NOT NW OR NWM
330   01 00008    22300000 A             LI,R3    0                  ZAPPER FOR FLAGS
```

```
331  01 00009  75300000 X            STB,R3   J:DCBLINK        CLEARE THEM
332  01 0000A  68400000C            BCR,4    $+2              NEWQNW
333  01 0000B  223000FF A           LI,3     X'FF'            SET MAGIC USER NO FOR NEWQNWM
334  01 0000C  09B00000 N           PUSH     R11              SAVE REAL RETURN IN MAPPED STACK
335  01 0000D  22B00044             LI,R11   1G3              SET RETURN TO BACKEND OF FRONTEND
336  01 0000E  68000026             B        SKREG2           AND GO GET A QUEUE ENTRY
337  01 0000F                  CHECKMF RES      0
338  01 0000F  32300000 X            LW,3     S:CUN
339  01 00010  32400000 X            LW,4     SL:IOTA          GET DING
340  01 00011  66400000 X            AWM,4    J:CTIME          ADD IT IN
341  01 00012  72400000 X            LB,4     JIT              FETCH USER TYPE BITS
342  01 00013  72360000 X            LB,3     UB:MF,3          GET MASTER FUNCTION COUNT
343  01 00014  2540007A A           SLS,4    *6               ISOLATE USER TYPE TO USE AS INDEX
344  01 00015  6708001E             EXU      IPREGV,4         EXUCUTE PROPER INSTRUCTION
345  01 00016  69100021             BL       SKIPREG          LESS THAN LIMIT, SKIP REG
346  01 00017  09600000 N           PUSH     6
347  01 00018  09B00000 N           PUSH     11
348  01 00019  22600000 N           LI,6     E:IP             REPORT
                                                                 I/O PERMISSION REQUEST
349  01 0001A  6AB00000 X           BAL,11   T:REG
350  01 0001B  08B00000 N           PULL     11
351  01 0001C  08600000 N           PULL     6
352  01 0001D  68040001 A           B        1,R2             RETURN IN IOMF BLOCK
353  01 0001E  31300000 X  IPREGV   CW,3     SL:BXMF          BATCH = USER TYPE = 0
354  01 0001F  68000021             B        SKIPREG          GHOST = USER TYPE = 1
355  01 00020  31300000 X            CW,3     SL:OXMF          ONLINE  USER TYPE = 2
356  01 00021  32300000 X  SKIPREG  LW,3     S:CUN            GET USER NO
357  01 00022  73160000 X            MTB,1    UB:MF,3          INCREMENT MASTER FUNCTION COUNT
358                            *
359  01 00023                  SKREG    RES      0
360  01 00023  09B00000 N           PUSH     R11              SAVE REAL RETURN
361  01 00024  32B00002 A           LW,R11   R2               SET RETURN TO BACKEND POINTER
362  01 00025  72460000 X  SKREG1   LB,4     UB:PRIO,3        GET USER PRIORITY
363  01 00026  0C000000   SKREG2   LPSD,0   IOUNMAP          UNMAP AND DISABLE
364  01 00027  02200070 A  1Q2      PUSH     7,R5             SAVE NON VOLATILES
     01 00028  0B500000 N
365  01 00029  32600003 A           LW,R6    R3               MOVE USER NUMBER FOR GETQ
366                            *
```

```
367                                  *       GET A QUEUE ENTRY FOR THIS REQUEST
368                                  *
369                                  *       DRIVES ALL I/O IF NONE ARE AVAILABLE
370                                  *
371                                  *       R4 = PRIORITY (IN)
372                                  *       R6 = USER NUMBER (IN)
373                                  *       R12 = DCT INDEX (IN)
374                                  *
375                                  *       R3 = IOQ INDEX (OUT)
376                                  *
377                                  *
378  01 0002A                        GETQ    RES     0
379  01 0002A  723C0000 X                     LB,R3   QFREE           GET FREE ENTRY HEAD
380  01 0002B  683C0034                       BEZ     GQ10            EMPTY, DRIVE ALL I/O
381  01 0002C  754C0000 X                     STB,R4  IOQ14,R3        SAVE PRIORITY
382  01 0002D  75CC0000 X                     STB,R12 IOQ7,R3         AND DCT INDEX
383  01 0002E  33100000 X                     MTW,1   CURBQ           INCREMENT CURRENT BACKGROUND ENTRIES
384  01 0002F  725C0000 X             GQ40    LB,R5   IOQ2,R3         FLINK
385  01 00030  755C0000 X                     STB,R5  QFREE           SET HEAD TO NEXT FREE ENTRY
386  01 00031  756C0000 X                     STB,R6  IOQ15,R3        PUT AWAY USER NUMBER
387  01 00032  6D000027 A                     ENABLE                                  ** ENABLE **
388  01 00033  68040002 A                     B       2,R2            RETURN SKIPPING *2
389  01 00034  223C0000 N             GQ10    LI,R3   DCTSIZ          DRIVE I/O FOR ALL DEVICES
390  01 00035  33100000 X                     MTW,1   C:NOQ          COUNT NUMBER OF TIMES THERE ARE NONE
391  01 00036  02200000 A             GQ11    PUSH    16,R0           SAVE ALL REGS
     01 00037  0B000000 N
392  01 00038  6B100003 A                     INT,R1  R3              GET DCT INDEX INTO REG FOR DRIVEIO
393  01 00039  6A2001AC                       BAL,R2  FORCEIO         FORCE
394  01 0003A  02200000 A                     PULL    16,R0           RESTORE REGS
     01 0003B  0A000000 N
395  01 0003C  643C0036                       BDR,R3  GQ11            CONTINUE
396  01 0003D  6D000037 A                     DISABLE                         **DISABLE**
397  01 0003E  6800002A                       B       GETQ            TRY AGAIN
398  01 0003F                         IQ1     RES     0
399                                  *
400  01 0003F  6A100000 X                     MAP                     GO MAPPED FOR REG
401  01 00040  09600000 N                     PUSH    6
```

```
402   01 00041   22600000 A          LI,6     0                    DCB ADDRESS OF ZERO FOR NEWQ
403   01 00042   0F000000 X          XPSD,0   REGIPSD              REPORT TO SCHEDULER
404   01 00043   08600000 N          PULL     6                    RESTORE REG
405   01 00044   6A100000 X  1Q3     MAP                           * GO MAPPED FOR HIS JIT
406   01 00045   08B00000 N          PULL     11                   * RESTORE REAL RETURN
407   01 00046   72240000 X          LB,R2    DCT4,R2              * GET DEVICE TYPE INDEX
408   01 00047   22100000 N          LI,R1    DCACCESS             * ASSUME PUB RAD
409   01 00048   70240000 X          LC       TB:FLGS,R2           * GET DEVICE ATTRIBUTE FLAGS
410   01 00049   68800004F           BCR,8    1Q4                  * NOT TAPE OR DISC,NO ACCOUNTING
411   01 0004A   68400004D           BCR,4    INCTP                * TAPE ACCESS
412   01 0004B   68300004E           BCR,3    INCDC                * RAD ACCESS
413                                  *                             * PACK ACCESS
414   01 0004C   20100000 N          AI,R1    DPACCESS-TPACCESS    **
415   01 0004D   20100000 N  INCTP   AI,R1    TPACCESS-DCACCESS    **
416        01 0004E          INCDC   EQU      *                    **
417   01 0004E   33120000 X          MTW,+1   J:JIT,R1             * ACCOUNT FOR IT
418   01 0004F                 1Q4    RES      0
419   01 0004F                 BISR4  RES      0
420   01 0004F   E800000B A          B        *11
421                                  *
```

```
422                                        PAGE
423          01 00050              NEWQNWM EQU     $                  NO WAIT MAPPED ENTRY
424    01 00050    32300001F N             LW,3    Y4
425    01 00051    47300000  X             STS,3   J:DCBLINK
426          01 00052              NEWQNW  EQU     $
427    01 00052    32300020  N             LW,R3   Y8
428    01 00053    47300000  X             STS,R3  J:DCBLINK
429                                *F*
430                                *F*       NAME:       NEWQ
431                                *F*
432                                *F*       PURPOSE:    TO ENQUEUE A REQUEST FOR I/O
433                                *F*
434                                *F*       DESCRIPTION: CALL HERE WITH REGISTER SETUP AS  DEFINED
435                                *F*                      IN  THE COO DATA BASE TECH MANUAL.
436                                *F*
437          01 00054              NEWQ    EQU     $                  NORMAL ENTRY (LATER WILL BE QUEUE)
438                                *
439                                *
440          01 00054              Q10     EQU     $
441    01 00054    45C00000  X             AND,R12 DCT$MASK$2         CLEAN UP DCT FOR 7275
442    01 00055    32300000  X             LW,3    DCT$MASK
443    01 00056    45300000C A             AND,R3  R12
444    01 00057    70260000  X             LC      DCT24,R3           IS CAL1,1 DIAG USE BIT SET
445    01 00058    69400004F               BCS,4   BISR4              YES, ERROR EXIT
446    01 00059    70260000  X             LC      DCT3,R3            LOOK AT DEVICE DOWN BIT
447    01 0005A    68200060                BCR,2   Q11                DEVICE NOT PARTITIONED
448    01 0005B    72260000  X             LB,R2   DCT15,R3           IS THIS A REAL-TIME IOEX CALL
449    01 0005C    69300060                BNEZ    Q11                YES
450    01 0005D    32300000  X             LW,R3   S:CUN              DEV.DOWN, GET SYS ID
451    01 0005E    31300000  X             CW,R3   D:ID               IS THIS A DIAG USER
452    01 0005F    69300004F               BNE     BISR4              NO, ERROR EXIT IF DOWN
453    01 00060    20B00001  A     Q11     AI,R11  1                  INC RETURN ADDR
454                                *
455    01 00061    6A200002                BAL,2   FRONTEND           UTS INTERFACE
456    01 00062    68000003F               B       1Q1                POINTER TO NEWQ BACKEND OF FRONTEND
457    01 00063    68000002                B       FRONTEND           REPEAT FRONTEND IF IOMF UNBLOCK
458                                *
```

```
459                                    *                                BUILD Q ENTRY
460   01 00064   222C0000 A                LI,2     0
461   01 00065   352C0000 X                STW,R2   IOQ16,R3          NO ECB FOR NEWQ I/O.
462   01 00066   25C00078 A                SLS,R12  =8
463   01 00067   75C60000 X                STB,R12  IOQ10,R3          MAX TRIES
464   01 00068   75C60000 X                STB,R12  IOQ11,R3          TRY COUNT
465   01 00069   25C00078 A                SLS,R12  =8
466   01 0006A   71C60000 X                CB,R12   IOQ14,R3          CHECK AGAINST ASSUMED
467   01 0006B   6920006D                  BG       $+2               LOWER
468   01 0006C   75C60000 X                STB,R12  IOQ14,R3          PRIORITY
469   01 0006D   25C00078 A                SLS,R12  =8
470   01 0006E   328C000F A                LW,R8    R15               GET DISK ADDRESS INTO REG FOR DSCCVT
471   01 0006F   22F00000 A                LI,R15   0                 NO MBG BIT
472   01 00070                     Q13     RES      0                 MERGE POINT FOR QUEUE AND NEWQ
473   01 00070   75C60000 X                STB,R12  IOQ4,R3           FUNCTION CODE
474   01 00071   75C60000 X                STB,R12  IOQ5,R3           CURRENT FUNCTION STEP
475   01 00072   35D60000 X                STW,R13  IOQ8,R3           BUF ADDR
476   01 00073   55E60000 X                STH,R14  IOQ9,R3           BYTE COUNT
477   01 00074   6ABC0000 X                BAL,11   DSCCVT            CONVERT TO SEEK
478   01 00075   35860000 X                STW,8    IOQ12,R3          STORE SEEK
479   01 00076   15060000 X                STD,R0   IOQ13,R3          END-ACTION DATA
480   01 00077   352C0000 X                STW,R2   IOQ6,R3           DCB AND FUNCTION
481                                    *
482         01 00078               Q15     EQU      $
483   01 00078   72160000 X                LB,R1    IOQ7,3            GET DCT INDEX
484   01 00079   6930007C                  BNEZ     Q151              OK, NON-ZERO
485   01 0007A   0F000000 X        SC17    SCREECH  X'17'             BAD DCT
      01 0007B   00170000 A
486   01 0007C                     Q151    RES      0
487   01 0007C   19100000 X                CLM,R1   RBLIMS
488   01 0007D   68900000 X                BCR,9    RBQCK
489         01 0007E               Q15A    EQU      $
490         00000001                       DO       DUALFLAG
491   01 0007E   72720000 X                LB,R7    DCT3,R1           EXTRACT DCT ACCESS KEY
492   01 0007F   48700002 N                AND,R7   X3                ..
493   01 00080   50FE0110                  AH,R15   IOQINIT,R7        SET IOQ ACCESS KEY
494                                        FIN
```

```
495  01 00081  75F60000 X          STB,R15  I0Q3,R3        SAVE REQUEST SWITCHES
496  01 00082  72960000 X          LB,9     I0Q15,3        GET USER NUMBER
497  01 00083  68300087            BEZ      Q15AA          ZERO, UNMAPPED I/O
498  01 00084  6D760000 X          INT,R7   I0Q8,R3        IS THIS A USER COMMAND LIST
499  01 00085  69C00087            BCS,4+8  Q15AA          YES, SKIP CHAINCHK
500  01 00086  6A9000B8            BAL,9    CHAINCHK       NO, USER, CONVERT BUF ADR
501        01 00087       Q15AA    EQU      *
502  01 00087  72420000 X          LB,R4    DCT2,R1        GET CHANNEL INDEX
503                       *                                LINK ENTRY INTO Q
504  01 00088  72860000 X          LB,R8    I0Q14,R3       GET PRIORITY OF ENTRY
505                       *
506  01 00089  22BF0000 A          LI,R11   X'F0000'       MASK FOR COMPARE SELECTIVE(YFFFF)
507                       *
508  01 0008A  72220000 X          LB,R2    DCT22,R1       GET SUBTYPE
509  01 0008B  68300008E           BEZ      Q20            NOT A DISC
510  01 0008C  22200001 A          LI,R2    1              SET INDEX
511  01 0008D  32A60000 X          LW,R10   I0Q12,R3       GET SEEK ADDRESS
512  01 0008E  6D000037 A  Q20     DISABLE                          *** DISABLE ***
513  01 0008F  72780000 X          LB,R7    CIT2,R4        GET TAIL OF QUEUE
514  01 00090  693000A7            BNE      Q28            NOT EMPTY
515  01 00091  75380000 X          STB,R3   CIT1,R4        Q WAS EMPTY
516  01 00092  75380000 X          STB,R3   CIT2,R4
517  01 00093  75760000 X          STB,R7   I0Q1,R3
518  01 00094  680000A4            B        Q27
519  01 00095  680000A9    Q29     B        Q30            DEVICE, AT THE RIGHT SPOT
520  01 00096  45AE0000 X          CS,R10   I0Q12,R7       CHECK CYLINDER
521  01 00097  691000 9F           BL       Q26A           LOWEST NUMBERED FIRST
522  01 00098  718E0000 X          CB,R8    I0Q14,R7       CHECK PRIO AGAIN
523  01 00099  683000A9            BE       Q30            SAME
524  01 0009A  31AE0000 X          CW,R10   I0Q12,R7       CHECK DISK ADDR
525  01 0009B  683000A9            BE       Q30            SAME, CANT INVERT; PUT KINK IN Q
526  01 0009C  6800009F            B        Q26A           KEEP GOING
527  01 0009D  711E0000 X  Q26     CB,R1    I0Q7,R7        SAME DEVICE
528  01 0009E  68340095            BE       Q29,R2         YES, SWITCH ON DEVICE/DISK
529  01 0009F  726E0000 X  Q26A    LB,R6    I0Q1,R7        BLINK
530  01 000A0  693000A6            BNE      Q28A           GOT ANOTHER
531  01 000A1  75380000 X          STB,R3   CIT1,R4        SET NEW HEAD
```

```
532  01 000A2  75660000 X          STB,R6   I8Q1,R3      SET NEW BLINK
533  01 000A3  753E0000 X          STB,R3   I8Q1,R7      MAKE PREVIOS BLINK TO CURRENT
534  01 000A4  75760000 X  Q27     STB,R7   I8Q2,R3      SET CURRENT FLINK
535  01 000A5  680000B1            B        Q40          DONE
536  01 000A6  727E0000 X  Q28A    LB,R7    I8Q1,R7      GET NEXT
537  01 000A7  718E0000 X  Q28     CB,R8    I8Q14,R7     CHECK PRIO
538  01 000A8  68200090            BLE      Q26          TRY TO INVERT
539  01 000A9  726E0000 X  Q30     LB,R6    I8Q2,R7      INSERT
540  01 000AA  693000AC            BNEZ     $+2          CHECK FOR TAIL
541  01 000AB  75380000 X          STB,R3   CIT2,R4      SET NEW TAIL
542  01 000AC  75660000 X          STB,R6   I8Q2,R3      SET CURRENT FLINK
543  01 000AD  75760000 X          STB,R7   I8Q1,R3      SET CURRENT BLINK
544  01 000AE  753E0000 X          STB,R3   I8Q2,R7      SET PREV BLINK TO CURRENT
545  01 000AF  683000B1            BEZ      $+2          CHECK FOR TAIL
546  01 000B0  753C0000 X          STB,R3   I8Q1,R6      NO, SET NEXT BLINK TO CURRENT
547                        *
548  01 000B1  60000027 A  Q40     ENABLE                                **ENABLE**
549                        *
550                        *                    CALL SERVICE DEVICE
551  01 000B2  F5100000 X  Q50     STB,R1   *TSTACK      SAVE DCT INDEX IN RETURN
552  01 000B3  6A2001A9            BAL,R2   DRIVEIO      CALL I/O SCHEDULER WITH CJOB PRI
553  01 000B4  F2200000 X          LB,R2    *TSTACK      RESTORE DCT INDEX
554                        *                    RETURN TO CALLER
555       01 000B5         Q51     EQU      $
556  01 000B5  02200070 A          LCI      7            RESTORE NON-VOLATILE REGS
557  01 000B6  0A500000 X  PL5BSR4 PLM,5    TSTACK
558  01 000B7  E800000B A          B        *11
```

```
559                                          PAGE
560                                  *
561                                  *       THIS ROUTINE CHECKS THE REQUEST FOR OVERLAPPING A PAGE
562                                  *       BOUNDARY (IF A USER REQUEST). IF IT OVERLAPS, A MONITOR
563                                  *       BUFFER IS ACQUIRED AND THE OPERATION IS DIVIDED INTO
564                                  *       PAGE SIZE OR SMALLER CHUNKS AND THE REQUEST IS FLAGGED
565                                  *       AS A DATA CHAIN. IT ALSO CONVERTS THE BUFFER ADDRESS FROM
566                                  *       VIRTUAL TO PHYSICAL. IF THE OPERATION IS TO RAD, DISC OR
567                                  *
568                                  *
569                                  *
570                                  *       R2      COUNT OF COMMAND PAIRS IN CHAIN
571                                  *       R3      Q ENTRY
572                                  *       R4      WA OF MONITOR BUFFER CONTINUING DATA CHAIN
573                                  *       R9      LINK
574                                  *       R13     BYTE COUNT
575                                  *       R14     WA OF VIRTUAL PAGE
576                                  *       R15     BA OF PHYSICAL PAGE
577                                  *
578          01 000B8                CHAINCHK EQU     $
579   01 000B8    32660000 X                 LW,6    IOQ8,3          GET BUFFER ADDRESS
580   01 000B9    46600013 N                 AND,6   M19             SCRUB TO VIRTUAL BYTE ADDRESS
581   01 000BA    35660000 X                 STW,6   IOQ8,3
582   01 000BB    25600175 A                 SLD,6   =11             GET PAGE NUMBER
583   01 000BC    21600000 N                 CI,6    JOVVP           IS THE BUFFER IN THE MONITOR
584   01 000BD    E9100009 A                 BL      *9              YES GET OUT
585   01 000BE    6A100000 X                 BAL,1   MAP             GO MAPPED TO SEE USER JIT
586   01 000BF    726C0000 N                 LOAD,6  JXICMAP,6       VIRTUAL TO PHYSICAL
587   01 000C0    2560010B A                 SLD,6   11              MAKE BYTE ADDRESS AGAIN
588   01 000C1    32D60000 X                 LW,13   IOQ8,3          GET BUFFER ADDRESS
589   01 000C2    52E60000 X                 LH,14   IOQ9,3          AND BYTE COUNT
590   01 000C3    46D0000B N                 AND,13  M11             SCRUB PAGE DISP INTO BUFFER
591                                  *                               R13 CONTAINS IOQ8 UPON ENTRY
592   01 000C4    50D60000 X                 AH,13   IOQ9,3          ADD BYTE COUNT
593   01 000C5    682000CC                   BLEZ    CHAIN           32K BYTES OR GREATER
594   01 000C6    20DFF800 A                 AI,13   =2048           CHECK FOR CROSSING PAGE
595   01 000C7    692000CC                   BG      CHAIN           YES
```

```
596   01 000C8   35660000 X          STW,6   I8Q8,3          STORE PHYSICAL BUFFER ADR
597   01 000C9   6A100000 X  CHNEX   BAL,1   UNMAP           GO UNMAPPED AGAIN
598   01 000CA   72160000 X          LB,1    I8Q7,3          RESTORE DCT INDEX TO R1
599   01 000CB   E8000009 A          B       *9              RETURN
600                            *
601                            *      DATA CHAIN IS NEEDED
602                            *
603   01 000CC   6D000037 A  CHAIN   DISABLE                  *** DISABLE ***
604   01 000CD   32400000 X          LW,4    MP88L           GET A MONITOR BUFFER(34 WDS)
605   01 000CE   693000D1           BNEZ    CH21            GOT ONE
606   01 000CF   6D000027 A          ENABLE                  *** ENABLE ***
607   01 000D0   68000CC            B       CHAIN           GO TRY AGAIN
608   01 000D1   32580000 A  CH21    LW,5    0,4             GET POINTER TO NEXT MBUF
609   01 000D2   683000D5           BEZ     CH22
610   01 000D3   19500000 F          CLM,5   BUFLIMS+MP88LIM+MP88LIM  CHECK MP88L WITHIN LIMITS
611   01 000D4   69900000 X          BCS,9   SC1900          SOFTWARE CHECK 19-00
612   01 000D5   19400000 F  CH22    CLM,4   BUFLIMS+MP88LIM+MP88LIM
613   01 000D6   69900000 X          BCS,9   SC1900          SOFTWARE CHECK 19-00
614   01 000D7   35500000 X          STW,5   MP88L           MAKE IT THE NEW HEAD
615   01 000D8   6D000027 A          ENABLE                  *** ENABLE ***
616   01 000D9   2540007F A          SLS,4   -1              MAKE DOUBLEWORD ADR
617   01 000DA   49400020 N          OR,4    Y8              SET DATA CHAIN BIT
618   01 000DB   32560000 X          LW,5    I8Q8,3          GET BUFFER VIRTUAL ADDRESS
619   01 000DC   35460000 X          STW,4   I8Q8,3          SAVE POINTER TO DATA CHAIN
620   01 000DD   4BE00010 N          AND,14  M16             SCRUB BYTE COUNT
621                            *                              R14 CONTAINS BYTE COUNT UPON ENTRY
622   01 000DE   3A700006 A          LCW,7   6               FIND REMAINING BYTES IN PAGE
623   01 000DF   4B70000B N          AND,7   M11             SCRUB
624   01 000E0   693000E2           BNE     $+2             NOT ON PAGE BOUNDARY
625   01 000E1   22700800 A          LI,7    2048            WHOLE PAGE
626   01 000E2   38E00007 A          SW,14   7               ACCOUNT FOR FIRST PAGE
627   01 000E3   15680000 A          STD,6   0,4             STORE FIRST COMMAND PAIR
628   01 000E4   25500075 A          SLS,5   -11             VIRTUAL PAGE OF BUFFER START
629   01 000E5   22700800 A          LI,7    X'800'          ALL BUT FIRST AND LAST GET COUNT OF
630   01 000E6   20500001 A  CH50    AI,5    1               BUMP TO NEXT PAGE
631   01 000E7   20400001 A          AI,4    1                AND NEXT COMMAND POSITION
632   01 000E8   726A0000 N          LOAD,6  JX!CMAP,5       VIRTUAL TO PHYSICAL
```

```
633   01 000E9   2560000B A          SLS,6    11                BYTE ADDRESS
634   01 000EA   20EFF800 A          AI,14    -2048             COUNT FOR THIS COMMAND
635   01 000EB   682000EE           BLEZ     CH55              LAST COMMAND
636   01 000EC   15680000 A          STD,6    0,4               STORE COMMAND
637   01 000ED   680000E6           B        CH50              CONTINUE
638   01 000EE   30700000E A  CH55   AW,7     14                CORRECT BYTE COUNT
639   01 000EF   15680000 A          STD,6    0,4               AND STORE LAST COMMAND
640   01 000F0   38460000 X          SW,4     IOQ8,3            CALCULATE NO OF COMMANDS
641   01 000F1   20400001 A          AI,4     1                 IN DATA CHAIN
642   01 000F2   55460000 X          STH,4    IOQ9,3            AND SAVE IN IOQ9
643   01 000F3   6A100000 X          BAL,1    UNMAP             UNMAPPED AGAIN
644   01 000F4   72160000 X          LB,1     IOQ7,3            RESTORE DCT INDEX
645                            *
646   01 000F5   22000002 A          LI,0     2
647   01 000F6   71060000 X          CB,0     IOQ4,3
648   01 000F7   6930010F           BNE      BISR2
649   01 000F8   72620000 X          LB,6     DCT4,1            GET DEVICE TYPE
650   01 000F9   720C0000 X          LB,0     TB:FLGS,6         CHECK REVERSE BIT(=> 9 TRACK)
651   01 000FA   21000004 A          CI,0     4
652   01 000FB   6840010F           BAZ      BISR2
653                            *
654                            *      WE HAVE A READ BACKWARD DATA CHAINED ON A 9T DRIVE
655                            *      THE COMMAND LIST AND EACH PAIR IN IT MUST BE
656                            *      INVERTED BECAUSE 9T HARDWARE ACTUALLY READS BACKWARD.
657                            *      7T READ BACKWARD IS SOFTWARE SIMULATED
658                            *      R2       HIGH INDEX
659                            *      R4       COUNT
660                            *      R5       LOW INDEX
661                            *      R7       DA OF COMMAND LIST
662                            *      R12-R15  TEMP
663                            *
664   01 000FC   32200004 A          LW,2     4                 COMPUTE NO OF PASSES NEEDED
665                            *                                 TO INVERT
666   01 000FD   20400001 A          AI,4     1                 THE COMMAND LIST
667   01 000FE   2540007F A          SLS,4    -1
668   01 000FF   202FFFFF A          AI,2     -1
669   01 00100   25200001 A          SLS,2    1
```

```
670   01 00101    32760000 X          LW,7     IBQ8,3      GET DA OF COMMAND LIST
671   01 00102    48700015 N          AND,7    M21
672   01 00103    22500000 A          LI,5     0           LOW INDEX
673         01 00104             CH60 EQU      *
674   01 00104    92CE0005 A          LD,12    *5,7
675   01 00105    92EE0002 A          LD,14    *2,7
676   01 00106    20CFFFFF A          AI,12    -1
677   01 00107    20EFFFFF A          AI,14    -1
678   01 00108    30C0000D A          AW,12    13          INVERT EACH COMMAND PAIR
679   01 00109    30E0000F A          AW,14    15
680   01 0010A    95EE0005 A          STD,14   *5,7         AND INVERT THEIR POSITIONS
681   01 0010B    95CE0002 A          STD,12   *2,7
682   01 0010C    202FFFFE A          AI,2     -2
683   01 0010D    20500002 A          AI,5     2
684   01 0010E    64400104            BDR,4    CH60
685                              *
686   01 0010F                 BISR2  RES      0
687   01 0010F    E8000009 A          B        *9
688         00000001                 DO       DUALFLAG
689   01 00110    0000     A  IBQINIT DATA,2   0,1,2,4     INITIAL IBQ KEYS FOR DUAL-ACCESS
      01 00110 2  0001     A
      01 00111    0002     A
      01 00111 2  0004     A
690                                FIN
```

```
                                        PAGE
                                *F*
                                *F*     NAME:       CHKDA
                                *F*
                                *F*     PURPOSE:    TO CHECK DISC ADDRESS IN R8 FOR VALIDITY
                                *F*
                                *F*     DESCRIPTION: CALL W/ADDRS IN R8 AND CHKDA WILL INSURE
                                *F*                  THAT IT IS LEGAL.
                                *F*
                                *F*                  RETURNS W/CC = 0 IF D/A OK
                                *F*
                                *F*                  RETURNS W/CC = 15 IF D/A NOT OK
                                *F*
   01 00112                     CHKDA   EQU     $
01 00112  022,00030 A                    PUSH    3,4             SAVE 4,5,6
01 00113  054,00000 N
01 00114  226,00128                      LI,6    CHKDA1          SET INTERNAL RETURN
   01 00115                     CHKDAQ  EQU     $
01 00115  524,00008 A                    LH,R4   R8              GET DCT INDEX + POSIIBLE SECTOR ADR
   01 00116                     PVCHKDA EQU     $
01 00116  454,00000 X                    AND,R4  DCT$MASK        SCRUB OF EXTRA BITS
01 00117  683,00126                      BEZ     CHKDA2          ERROR
01 00118  214,00000 N                    CI,4    DCTSIZ          CHECK FOR LEGAL
01 00119  692,00126                      BG      CHKDA2          NO
01 0011A  724,80000 X                    LB,R4   DCT22,R4        GET SUBTYPE
01 0011B  683,00126                      BEZ     CHKDA2          NOT A DISC
01 0011C  325,00008 A                    LSECTA,R5  R8           REL SECTOR IN 5
01 0011D  454,00000 X
01 0011E  235,00280 A
01 0011F  255,00202 A
01 00120  558,00005 A
01 00121  255,00210 A
01 00122  315,80000 X                    CW,5    DISCLIMS,4      COMPARE
01 00123  681,00126                      BGE     CHKDA2          BAD
01 00124  022,000F0 A                    LCI     15              SET CC
01 00125  680,C0000 A                    B       0,6             RETURN
01 00126  022,00000 A   CHKDA2   LCI     0                       ERROR
```

```
722   01 00127   68000000 A            B       0,6      RETURN
723   01 00128   74000008 A  CHKDA1    STCF    11       SAVE CC
724   01 00129   02200030 A            PULL    3,4      RESTORE REGS
      01 0012A   0A400000 N
725   01 0012B   70300008 A            LCF     11       RESTORE CC
726   01 0012C   E8000008 A            B       *11      RETURN
727                         *
728                         *
```

```
729                                        PAGE
730                                *F*
731                                *F*     NAME:          QUEUE
732                                *F*
733                                *F*     PURPOSE:       ENTRY FOR I/O WITH A DCB AND END  ACTION
734                                *F*
735                                *F*     DESCRIPTION:   CALL HERE WITH REGISTERS AS DESCRIBED IN
736                                *F*                    THE COO DATA BASE TECH MANUAL.
737                                *F*
738                                *
739  01 0012D  32000009 A  QUEUE1  LW,R0    R9                  MOVE END ACTION ADDRESS
740  01 0012E  68000130            B        QD4
741                                *F*
742                                *F*     NAME:          QUEUE1
743                                *F*
744                                *F*     PURPOSE:       ENTRY FOR I/O WITH A DCB AND NO END ACTION
745                                *F*
746                                *F*     DESCRIPTION:   CALL HERE WITH REGISTERS AS DESCRIBED IN
747                                *F*                    THE COO DATA BASE TECH MANUAL.
748                                *F*
749  01 0012F  22000000 A  QUEUE   LI,R0    0
750  01 00130  3210000A A  QD4     LW,R1    R10                 MOVE END ACTION INFO
751  01 00131  2221FFFF A          LI,R2    X'1FFFF'            MASK FOR DCB ADDREJJ
752  01 00132  48200008 A          AND,R2   R8                  EXTRACT FROM ARGUMENT
753  01 00133  32340007 A          LW,R3    FCN,R2              CHECK FOR FUNCTION COUNT
754  01 00134  48300000 X          AND,R3   YFF                 NON-ZERO
755  01 00135  68300051            BEZ      BISR4               NO, GET OUT
756                                *
757  01 00136  22F00003 A          LI,R15   3                   EXTRACT ASN
758  01 00137  48F40000 A          AND,R15  ASN,R2              FROM DCB.
759  01 00138  21F00000 N          CI,R15   CFUBIT              CHECK FOR FILE ASSIGNMENT.
760  01 00139  68300143            BE       QD30                ---> YES.
761  01 0013A  32C40001 A          LW,R12   DSI,R2              NOT FILE.
762  01 0013B  22D0BF00 A          LI,R13   X'BF00'             CHECK DEVICE TYPE.
763  01 0013C  45C00550            CS,R12   L(X'9000')          IS IT COC...
764  01 0013D  68300000 X          BE       COCIO               ---> YES.
765  01 0013E  21C08000 A          CI,R12   X'8000'             NOT FILE; NOT COC, TEST OPLABEL BIT.
```

```
766  01 0013F  45C00008 N          AND,R12  XFF          (EXTRACT DCT INDEX)
767  01 00140  69400145            BANZ     QD31         ***> NOT OPLABEL.
768  01 00141  0F000000 X          SUA      X'32'        *****> OPLABEL IMPOSSIBLE W/ OPEN UCB.
     01 00142  00320100 A
769  01 00143  6DC40008 A  QD30    INT,R12  CDA,R2       FILE DCB.
770  01 00144  45C00000 X          AND,R12  DCT*MASK     R12= DCT INDEX.
771                       *
772  01 00145  21200000 N  QD31    CI,R2    JOVVPA       IS DCB IN THE MONITOR...
773  01 00146  69100014A           BL       QD33         ***> YES. ALREADY REAL ADDRESS.
774  01 00147  25200177 A          SLD,R2   *9           TRANSLATE
775  01 00148  72240000 N          LOAD,R2  JX:CMAP,R2   VIRTUAL TO PHYSICAL
776  01 00149  25200109 A          SLD,R2   *9           DCB ADDRESS.
777     01 0014A                   EQU      *
778  01 0014A  32D00002 A          LW,R13   R2           SAVE TRANSLATED DCB ADDRESS
779  01 0014B  32E00000 X          LW,R14   JIRWECB      GET ECB ADDRESS (IF ANY) INTO R14.
780  01 0014C  6A200002            BAL,R2   FRONTEND     SCHEDULER INTERFACE AND GETQ
781  01 0014D  68000044            B        1Q3          POINTER TO QUEUE BACKEND OF FRONTEND
782  01 0014E  68000130            B        QD4          RECYCLE IF IOMF UNBLOCK
783                       *                             RETURNS UNMAPPED WITH R4=PRIO
784                       *                                    AND  R6=USER
785                       *          UNMAP
786                       *
787  01 0014F  32200000D A          LW,R2    R13          RESTORE PHYSICAL DCB ADDRESS
788  01 00150  45800000 X          AND,R8   YFF          EXTRACT OLD FUNCTION CODE
789  01 00151  49200008 A          OR,R2    R8           MERGE WITH PHYS DCB ADDRESS
790                       *
791                       *                             BUILD Q ENTRY
792                       *
793                       *
794  01 00152  45E00011 N          AND,R14  M17          GET ECB ADDRESS ONLY.
795  01 00153  68300155            BEZ      *+2          ***> NO ECB.
796  01 00154  F310000E A          MTB,+1   *R14           ECB. BUMP I/O COUNT IN 4-WD BLK.
797  01 00155  35E60000 X          STW,R14  IOQ16,R3     PUT ECB ADDRESS INTO Q ENTRY.
798  01 00156  32D40007 A          LW,R13   QBUF,R2      GET WORD ADDRESS OF BUFFER
799  01 00157  45D00016 N          AND,R13  M22          SCRUB OFF FCN
800  01 00158  25D00002 A          SLS,R13  2            CONVERT TO BYTE ADDRESS
801  01 00159  227000C0 A          LI,R7    X'C0'        MASK FOR HBTD
```

```
802   01 0015A   4B740000 A            AND,R7   0,R2              EXTRACT FROM DCB
803   01 0015B   68300015E              BEZ      QD51A            NONE, SHORT CUT
804   01 0015C   25700061 N            SLS,R7   BTDBIT-31         ALIGN
805   01 0015D   49D00007 A            OR,R13   R7                MERGE
806   01 0015E   32E40006 A   QD51A    LW,R14   WABLK,R2          GET RECORD SIZE
807   01 0015F   25E0020F A            SCS,R14  15                RIGHT ALIGN
808   01 00160   4BE0000F N            AND,R14  M15               SCRUB
809   01 00161   69300163              BNE      $+2
810   01 00162   22E08000 A            LI,R14   X'8000'          0 => 32K BYTES
811                         *
812   01 00163   22700008 A            LI,R7    BANRA             INDEX TO NRA (NRT)
813   01 00164   F2AE0002 A            LB,R10   *R2,R7            GET NRT FROM DCB
814   01 00165   75A60000 X            STB,R10  IOQ10,R3          NUMBER OF TRIES
815   01 00166   75A60000 X            STB,R10  IOQ11,R3          TRY COUNT
816                         *
817                         *
818                         *                          CONVERT FUNCTION CODE
819   01 00167   72500002 A            LB,R5    R2                GET FUNCTION CODE
820   01 00168   72760000 X            LB,R7    IOQ7,R3           GET DCT
821   01 00169   20FFFFFF A            AI,R15   -1                CHECK FOR FILE ASSIGNMENT
822   01 0016A   68300016E             BEZ      OLDTNEWFC         YES, NO MBG BIT
823   01 0016B   32F40000 A            LW,R15   0,R2              EXTRACT MBG BIT
824   01 0016C   25F00206 N            SCS,R15  MBGBIT+6          FROM DCB
825   01 0016D   4BF00006 N            AND,R15  X20               SCRUB AND PASS TO Q13
826                         *
827                         *        AT THIS POINT, MOST DCB INFORMATION HAS BEEN MOVED
828                         *        INTO REGISTERS IN ESSENTIALLY THE SAME FORMAT AS A
829                         *        NEWQ CALL.
830                         *
831                         *        R0 = END ACTION ADDRESS
832                         *        R1 = END ACTION INFORMATION
833                         *        R13 = BUFFER (BYTE ADDRESS)
834                         *        R14 = BYTE COUNT
835                         *        R8 = DISC ADDRESS
836                         *        R15 = MBG BIT (IF APPROPRIATE)
837                         *        R12 = FUNCTION CODE FOR HANDLER
838                         *        R2 = OLD FUNCTION CODE, DCB PHYSICAL ADDRESS (8,24)
```

```
839                                 *
840                                 *
841  01 0016E                       BLDTNEWFC RES     0                 5=BLD,7=DCT,6NG
842                                 *                                   9=RA,5=NEW FC
843  01 0016E  727E0000 X                     LB,R7    DCT4,R7           GET TYPE
844  01 0016F  21700010 A                     CI,R7    X'10'             TEST FOR RESOURCE TYPE
845  01 00170  68200176                       BLE      QD49              NO
846  01 00171  726E0000 X                     LB,R6    TB:FLGS,R7        GET TYPE FLAGS FOR ADDED DEVICE
847  01 00172  2560017A A                     SLD,R6   =6                6= BITS 0,1 OF TB:FLGS
848  01 00173  25700003 A                     SLS,R7   3                 LEFT ALIGN REV BIT
849  01 00174  25600101 A                     SLD,R6   1                 MERGE TO FORM INDEX ON GENERIC TYPES
850  01 00175  727C018D                       LB,R7    GENERIC,R6        TRANSLATE
851        01 00176                 QD49      EQU      $
852  01 00176  726E018F                       LB,R6    TYPCOR,R7         TABLE OFFSET
853  01 00177  21600038 A                     CI,R6    BA(MTCOR)-BA(TYPCOR) CHECK FOR TAPE
854  01 00178  68300178                       BE       QD50              YES
855  01 00179  45500003 N                     AND,R5   X7                USE 3 BITS FOR OTHERS
856  01 0017A  68000189                       B        QD60
857  01 0017B  21500008 A           QD50      CI,R5    8                 IS IT POSITION OP
858  01 0017C  68400180                       BAZ      QD52              NO
859  01 0017D  45500004 N                     AND,R5   XF                YES, MASK
860  01 0017E  20600016 A                     AI,R6    22                INDEX TO POS OPS
861  01 0017F  68000189                       B        QD60
862  01 00180  21700008 A           QD52      CI,R7    8                 IS IT 9T
863  01 00181  69300184                       BNE      QD56              NO
864  01 00182  45500000 X                     AND,R5   X44               YES, MASK DIRECTION, R/W BITS
865  01 00183  20500022 A                     AI,R5    X'22'             ADD PACKED, BINARY BITS
866  01 00184  22700060 A           QD56      LI,R7    X'60'
867  01 00185  45700005 A                     AND,R7   R5                MASK DIREC, PACK BITS
868  01 00186  2570007E A                     SLS,R7   =2
869  01 00187  45500003 N                     AND,R5   X7                READ/WRITE BITS
870  01 00188  49500007 A                     OR,R5    R7                COMBINE
871                                 *
872  01 00189  30600005 A           QD60      AW,R6    R5                SET INDEX IN COR TABLE
873  01 0018A  72CC018F                       LB,R12   TYPCOR,R6         CONVERT TO HANDLER FUNCTION CODE
874  01 0018B  32840008 A                     LW,R8    CDA,R2            GET SEEK ADDRESS
875  01 0018C  68000070                       B        Q13               MERGE WITH NEWQ PATH
```

```
876                                     *
877                                     *       TABLE TO CONVERT TB:FLGS CONTENT TO GENERIC TYPE INDEX
878                                     *
879   01 0018D    01          A         GENERIC DATA,1  1,1,6,6,9,8,11,11
      01 0018D 1  01          A
      01 0018D 2  06          A
      01 0018D 3  06          A
      01 0018E    09          A
      01 0018E 1  08          A
      01 0018E 2  0B          A
      01 0018E 3  0B          A
880                                     *
881                                     *
882                                     *
883                                     *    FUNCTION CODE CONVERSION TABLES
884                                     *
885         00000C00                    :COR    CNAME
886                                             PROC
887                                     LF      GEN,8   BA(AF(1))=BA(TYPCOR)
888                                             PEND
889                                     *
890         01 0018F                    TYPCOR  EQU     *
891   01 0018F    10          A                 :COR    TYCOR           NULL
892   01 0018F 1  10          A                 :COR    TYCOR           TY
893   01 0018F 2  18          A                 :COR    PTCOR           PR
894   01 0018F 3  18          A                 :COR    PTCOR           PP
895   01 00190    20          A                 :COR    CRCOR           CR
896   01 00190 1  28          A                 :COR    CPCOR           CP
897   01 00190 2  20          A                 :COR    CRCOR           LP
898   01 00190 3  30          A                 :COR    DCCOR           DC
899   01 00191    38          A                 :COR    MTCOR           9T
900   01 00191 1  38          A                 :COR    MTCOR           7T
901   01 00191 2  38          A                 :COR    MTCOR           MT
902   01 00191 3  10          A                 :COR    TYCOR           DP
903   01 00192    60          A                 :COR    MBCOR           MBC TYPE DEVICES
904   01 00192 1  10          A                 :COR    TYCOR
905   01 00192 2  10          A                 :COR    TYCOR
```

```
906   01 00192 3  10        A                 :C0R      TYC0R
907                         *
908                                           B0UND     4
909                         *
910   01 00193     00        A   TYC0R       DATA,1    0,0,0,0,1,1,1,1   TY
      01 00193 1   00        A
      01 00193 2   00        A
      01 00193 3   00        A
      01 00194     01        A
      01 00194 1   01        A
      01 00194 2   01        A
      01 00194 3   01        A
911                         *
912   01 00195     08        A   PTC0R       DATA,1    8,4,0,4,1,5,3,5   PR,PP
      01 00195 1   04        A
      01 00195 2   00        A
      01 00195 3   04        A
      01 00196     01        A
      01 00196 1   05        A
      01 00196 2   03        A
      01 00196 3   05        A
913                         *
914   01 00197     02        A   CRC0R       DATA,1    2,2,0,0,1,1,3,3   CR,LP
      01 00197 1   02        A
      01 00197 2   00        A
      01 00197 3   00        A
      01 00198     01        A
      01 00198 1   01        A
      01 00198 2   03        A
      01 00198 3   03        A
915                         *
916   01 00199     00        A   CPC0R       DATA,1    0,0,1,1,0,0,1,1   CP
      01 00199 1   00        A
      01 00199 2   01        A
      01 00199 3   01        A
      01 0019A     00        A
      01 0019A 1   00        A
```

```
      01 0019A 2  01        A
      01 0019A 3  01        A
  917                       *
  918 01 0019B    00        A   DCC0R    DATA,1   0,0,0,0,4,4,4,4   DC
      01 0019B 1  00        A
      01 0019B 2  00        A
      01 0019B 3  00        A
      01 0019C    04        A
      01 0019C 1  04        A
      01 0019C 2  04        A
      01 0019C 3  04        A
  919                       *
  920 01 0019D    00        A   MTC0R    DATA,1   13,13,10,10,14,14,11,11       7 TRACK
      01 0019D 1  00        A
      01 0019D 2  0A        A
      01 0019D 3  0A        A
      01 0019E    0E        A
      01 0019E 1  0E        A
      01 0019E 2  0B        A
      01 0019E 3  0B        A
  921 01 0019F    00        A            DATA,1   13,13,00,00,14,14,01,01
      01 0019F 1  00        A
      01 0019F 2  00        A
      01 0019F 3  00        A
      01 001A0    0E        A
      01 001A0 1  0E        A
      01 001A0 2  01        A
      01 001A0 3  01        A
  922 01 001A1    0F        A            DATA,1   15,15,12,12,14,14,11,11
      01 001A1 1  0F        A
      01 001A1 2  0C        A
      01 001A1 3  0C        A
      01 001A2    0E        A
      01 001A2 1  0E        A
      01 001A2 2  0B        A
      01 001A2 3  0B        A
  923 01 001A3    0F        A            DATA,1   15,15,02,02,14,14,01,01
```

```
                01 001A3 1  0F        A
                01 001A3 2  02        A
                01 001A3 3  02        A
                01 001A4    0E        A
                01 001A4 1  0E        A
                01 001A4 2  01        A
                01 001A4 3  01        A
    924                               *
    925         01 001A5    0B        A           DATA,1   5,4,7,6,8,3,0,0   MT POSITION
                01 001A5 1  04        A
                01 001A5 2  07        A
                01 001A5 3  06        A
                01 001A6    08        A
                01 001A6 1  03        A
                01 001A6 2  00        A
                01 001A6 3  00        A
    926                               *
    927         01 001A7    00        A   MBCBR    DATA,1   0,X'80',0,X'80',0,X'80',0,X'80'  MB
                01 001A7 1  80        A
                01 001A7 2  00        A
                01 001A7 3  80        A
                01 001A8    00        A
                01 001A8 1  80        A
                01 001A8 2  00        A
                01 001A8 3  80        A
    928                               *
    929                               *           LOCAL    QUEUE
    930             01 00054          *   QUEUE   EQU      NEWQ
```

```
931                                     PAGE
932                                     SPACE

933                             *       9/1/71 J P8D8LSKY .. DUAL-ACCESS INPUT/8UTPUT SCHEDULER.
934                             *
935                             *       DRIVEI8 .. T8 DRIVE I/8 WITH CURRENT J88 PRI8RITY.
936                             *       DRIVEI81 . T8 DRIVE I/8 WITH PRI8RITY IN R0.
937                             *       F8RCEI8 .. T8 DRIVE I/8 WITH PRI8RITY X'FF' (L8WEST PRI).
938                             *       CALLING SEQUENCE ..
939                             *
940                             *               ...     ...         PRI8RITY IN R0 (F8R DRIVEI81)
941                             *               ...     ...         DCT INDEX IN R1
942                             *               BAL,R2  <NAME>      CALL DRIVEI8 8R F8RCEI8
943                             *
944                                     SPACE

945   01 001A9  72000000 X    DRIVEI8 LB,R0   CJ88                NORMAL ENTRY - SET CURRENT J88 PRI
946   01 001AA  210000C0 A    DRIVEI81 CI,R0  RTPRI8              CHECK F8R BACKGR8UND CALL
947   01 001AB  691001AD      .       BL      $+2                 IF S8, TREAT THIS CALL AS I/8 F8RCE
948   01 001AC  220000FF A    F8RCEI8 LI,R0   X'FF'               SINCE BKGD PRI IS BEL8W C8NTR8L TASK
949   01 001AD  09200000 N            PUSH    2
950   01 001AE  72220000 X            LB,2    DCT2,1
951   01 001AF  60000037 A    DSERV   DISABLE                     DEVICE SERVICE CHECK, INHIBIT
952   01 001B0  72820000 X            LB,R8   DCT5,R1             GET DEVICE STATUS SWITCHES(2)
953   01 001B1  21800088 A            CI,R8   X'88'               IS DEVICE BUSY 8R KEY-IN PENDING.
954   01 001B2  694001F4              BANZ    CL8CKI8             YES, SERVICE CL8CK & CHECK TIME8UT
955   01 001B3  21800040 A            CI,R8   X'40'               N8, IS CLEANUP 8PERATION PENDING.
956   01 001B4  69400034A             BANZ    CLEANUP             YES, D8 IT, PRI8RITY PERMITTING
```

```
957                                          PAGE
958                                *F*
959                                *F*       NAME:          IOSCHED
960                                *F*
961                                *F*       PURPOSE:       TO SELECT CHANNEL/DEVICE FOR I/O ACTIVITY
962                                *F*
963                                *F*       DESCRIPTION: CALL HERE WITH:
964                                *F*
965                                *F*       R1             DCT INDEX
966                                *F*       R2             CHANNEL INDEX
967                                *F*
968                                *F*
969  01 001B5  60000027 A  IOSCHED  ENABLE                    MAIN I/O SCHEDULING ALGORITHM
970  01 001B6  60000037 A  IOSCHED1 DISABLE                   RELEASE ANY PENDING INTERRUPTS
971  01 001B7  72340000 X          LB,R3    CIT1,R2          GET HEAD OF CHANNEL QUEUE
972  01 001B8  683001CE            BEZ      SCHEDXIT         ARE THERE ANY PENDING REQUESTS.
973  01 001B9  72540000 X          LB,R5    CIT3,R2          YES, GET SUBCHANNEL STATUS BYTE
974  01 001BA  2550007C A          SLS,R5   =4               FORM INDEX FROM BUSY/HOLD FLAGS
975  01 001BB  6B8A01E4     IOSCHED2 INT,R8   SELECTAB,R5     GET SCHEDULING KEY & COMPARE MASK
976  01 001BC  698001D1            BCS,8    SCHEDHLD         CHECK CHANNEL HOLD IF SPECIFIED
977  01 001BD  71860000 X  IOSCHED3 CB,R8    IOQ3,R3          ELSE SCAN QUEUE FOR FREE REQUEST
978  01 001BE  694001CC            BANZ     NEXTQUE          THAT IS STARTABLE ON AVAILABLE S.C.
979       00000000                 DO       DEFER
980                          *S*              CB,R0    IOQ14,R3         COMPARE REQUEST/SCHEDULER PRIORITIES
981                          *S*              BL       DEFER2           SCHEDULER HIGHER, MUST DEFER SERVICE
982                                           FIN
983  01 001BF  32A00003 A  REQSTRT LW,R10   R3               PRIORITY OK, SAVE CURRENT IOQ INDEX
984  01 001C0  72160000 X          LB,R1    IOQ7,R3          GET INDEX OF DEVICE FOR THIS REQUEST
985  01 001C1  72420000 X          LB,R4    DCT5,R1          CHECK DEVICE STATE FOR AVAILABILITY
986  01 001C2  2540027B A          SCS,R4   =5               ISOLATE BUSY/CLEANUP/INTEROP FLAGS
987  01 001C3  3140001F N          CW,R4    Y4               AND CHECK FOR DEVICE KEYIN PENDING
988  01 001C4  670801DC            EXU      REQSERV,R4       GO IF CLEANUP, NO GO IF BUSY/KEYIN
989       00000001                 DO       DUALFLAG
990  01 001C5  72460000 X          LB,R4    IOQ3,R3          START OR INTEROP, R3 HAS REQUEST
991  01 001C6  4B400003 N          AND,R4   X7               EXTRACT 3-BIT IOQ ACCESS KEY
992  01 001C7  515801E1            CH,R5    ACCHECK,R4       ARE REQUIRED SUBCHANNELS AVAILABLE.
993  01 001C8  68400023A           BAZ      STARTIO          YES, START I/O ACTIVITY FOR REQUEST
```

```
 994   01 001C9   691001CE                    BL       SCHEDXIT      NO, ARE BOTH SUBCHANNELS REQUIRED.
 995                                          ELSE
 996                          *S*             LI,R4    0             SINGLE-ACCESS ONLY, FORCE KEY TO 0
 997                          *S*             B        STARTIO       GO DIRECTLY TO STARTIO
 998                                          FIN
 999   01 001CA   6B30000A A    REQNSTRT      INT,R3   R10           NO, RESTORE CURRENT IOQ INDEX
1000   01 001CB   698001D5                    BCS,8    CHANBLK       IF SUBCHANNEL HELD, BLOCK IT OUT.
1001   01 001CC   72360000 X    NEXTQUE       LB,R3    IOQ2,R3       OTHERWISE, CONTINUE QUEUE SCAN
1002   01 001CD   693001BD                    BNEZ     IOSCHED3      ARE THERE ANY MORE REQUESTS.
1003   01 001CE   6D000027 A    SCHEDXIT      ENABLE                 NO, REMOVE INTERRUPT INHIBITS
1004   01 001CF   08200000 N                  PULL     2
1005   01 001D0   68040000 A                  B        0,2
```

```
1006                                        PAGE
1007                                        SPACE

1008  01 001D1  208001D9 .     SCHEDHLD  AI,R8    SCCHECK          SUBCHANNEL HELD OR BOTH BUSY, CHECK
1009  01 001D2  E7000008 A               EXU     *R8              IF BOTH BUSY (FCN=0), EXIT SCHEDULER
1010  01 001D3  49300020 N               BR,R3   Y8               HELD = REQUEST INDEX IN R3 = FLAG
1011  01 001D4  6800018F               B       REQSTRT          ATTEMPT SERVICE OF HOLDING REQUEST
1012        00000001                    DO      DUALFLAG
1013  01 001D5  72460000 X     CHANBLK   LB,R4   IOQ3,R3         HELD SUBCHANNEL BLOCKED, EXTRACT KEY
1014  01 001D6  48400002 N               AND,R4  X3               ..
1015  01 001D7  505801E1                AH,R5   ACCHECK,R4       SET REQUIRED SUBCHANNELS UNAVAILABLE
1016  01 001D8  6800018B               B       IOSCHED2         RE-SCHEDULE WITH NEW CHANNEL STATUS
1017                                        ELSE
1018                      *S*  CHANBLK  EQU     SCHEDXIT         SINGLE-ACCESS CHANNEL BLOCKED
1019                                        FIN
1020                                        SPACE

1021  01 001D9  680001CE      SCCHECK   B       SCHEDXIT         FUNCTION 0 .. BOTH SUBCHANNELS BUSY
1022  01 001DA  72340000 X               LB,R3   CIT5,R2          FUNCTION 1 .. SUBCHANNEL 1 HELD
1023        00000001                    DO      DUALFLAG
1024  01 001DB  72340000 X               LB,R3   CIT6,R2          FUNCTION 2 .. SUBCHANNEL 2 HELD
1025                                        FIN
1026                                        SPACE

1027  01 001DC  694001CA      REQSERV   BANZ    REQNSTRT         0 .. NO START IF KEY-IN PENDING
1028  01 001DD  72320000 X               LB,R3   DCT6,R1          1 .. INTER-OP, GET WAITING REQUEST
1029  01 001DE  6800034A               B       CLEANUP1         2 .. CLEANUP PENDING, PROCESS
1030  01 001DF  00000000 A     INVAL     DATA    0                3 .. NO SUCH ANIMAL .. S.C. 40
1031  01 001E0  680001CA               B       REQNSTRT         4 .. DEVICE BUSY, NO GO
1032                                        SPACE

1033        00000001                    DO      DUALFLAG
1034  01 001E1      000C      A     ACCHECK   GEN,16   X'C'           000 .. BOTH SUBCHANNELS REQUIRED
1035  01 001E1 2    0008      A               GEN,16   X'8'           001 .. SUBCHANNEL 1 REQUIRED
1036  01 001E2      0004      A               GEN,16   X'4'           010 .. SUBCHANNEL 2 REQUIRED
1037  01 001E2 2    0000      A               GEN,16   X'0'           011 .. UNDEFINED ACCESS KEY
1038  01 001E3      0000      A               GEN,16   X'0'           100 .. UNASSIGNED DUAL-ACCESS DEVICE
```

```
1039                                FIN
1040                                BOUND    4
```

```
1041                                    PAGE
1042                                    SPACE

1043                            *       SELECTAB .. CENTRAL SCHEDULING DECISION TABLE.  AN ENTRY IN
1044                            *       THIS TABLE IS SELECTED ACCORDING TO THE VALUE OF CIT3 BITS
1045                            *       0 THRU 3 (SUBCHANNEL 'BUSY' & 'HOLD' FLAGS).  TABLE FORMAT:
1046                            *
1047                            *            BIT  0          AT LEASE ONE SUBCHANNEL IDLE-HELD OR
1048                            *                            BOTH SUBCHANNELS BUSY
1049                            *            BITS 4-15       IF BIT 0 IS 1, THIS IS A SPECIAL FUNCTION
1050                            *                            CODE, WITH 0 = BOTH SC'S BUSY, 1 = SC1
1051                            *                            HELD, & 2 = SC2 HELD.  IF BIT 0 IS 0,
1052                            *                            THIS IS A COMPARE MASK FOR THE IOQ ACCESS
1053                            *                            KEY.  BIT 8 WILL ALWAYS BE 1, WITH BIT 14
1054                            *                            1 IF SC2 BUSY & BIT 15 1 IF SC1 BUSY.
1055                            *            BITS 16-19      USED BY 'ASSIGNSC' TO SELECT SUBCHANNEL
1056                            *            BITS 24-31      CIT CHECK MASK (INVERSE OF CIT3(0-3))
1057                                    SPACE

1058                            SELECT  COM,1,3,12,3,1,12 AF(1),0,AF(2),AF(3),AF(4),($-SELECTAB||15)**4
1059                                    SPACE

1060  01 001E4  0080B0F0 A     SELECTAB SELECT  0,X'80',-3,1      0 .. I-F/I-F .. UNRESTRICTED CHANNEL
1061  01 001E5  8002A0E0 A              SELECT  1,2,-3,0          1 .. I-F/I-H .. SCHEDULE HELD SC2
1062  01 001E6  8001C0D0 A              SELECT  1,1,-2,0          2 .. I-H/I-F .. SCHEDULE HELD SC1
1063  01 001E7  800100C0 A              SELECT  1,1,0,0           3 .. I-H/I-H .. BOTH HELD, SC1 FIRST
1064  01 001E8  0082A0B0 A              SELECT  0,X'82',-3,0      4 .. I-F/B-F .. SCHEDULE SC1 ONLY
1065  01 001E9  0082A0A0 A              SELECT  0,X'82',-3,0      5 .. I-F/B-H .. LIKEWISE - SC1 ONLY
1066  01 001EA  80010090 A              SELECT  1,1,0,0           6 .. I-H/B-F .. SCHEDULE HELD SC1
1067  01 001EB  80010080 A              SELECT  1,1,0,0           7 .. I-H/B-H .. SAME AS ABOVE - SC1
1068  01 001EC  0081C070 A              SELECT  0,X'81',-2,0      8 .. B-F/I-F .. SCHEDULE IF DUAL-ACC
1069  01 001ED  80020060 A              SELECT  1,2,0,0           9 .. B-F/I-H .. SCHEDULE HELD SC2
1070  01 001EE  0081C050 A              SELECT  0,X'81',-2,0      A .. B-H/I-F .. SC2 AVAIL IF DUAL-AC
1071  01 001EF  80020040 A              SELECT  1,2,0,0           B .. B-H/I-H .. SUBCHANNEL 2 HELD
1072  01 001F0  80000030 A              SELECT  1,0,0,0           C .. B-F/B-F .. BOTH BUSY, NOTHING
1073  01 001F1  80000020 A              SELECT  1,0,0,0           D .. B-F/B-H .. CAN BE SCHEDULED.
1074  01 001F2  80000010 A              SELECT  1,0,0,0           E .. B-H/B-F .. NOTE: I=IDLE, B=BUSY
```

```
HC1   20:42  SEP 08, 75
     1075   01 001F3    80000000 A              SELECT   1,0,0,0          F .. B=H/B=H .. AND F=FREE, H=HELD
```

```
1076                                        PAGE
1077                                        SPACE

1078                                *       CLOCKIO -- PERFORM I/O TIMEOUT CHECK FOR SCHEDULER.  IF TIME
1079                                *       EXCEEDED AND TIME-OUT INCREMENT IS NON-ZERO, FOLLOWING WILL
1080                                *       HAPPEN, DEPENDING ON DCT STATUS INFORMATION:
1081                                *
1082                                *       1.  DEVICE BUSY-MANUAL.  IF STILL IN MANUAL STATE, OPERATOR
1083                                *           WILL BE NOTIFIED.  IF NOW IN AUTOMATIC STATE, TIMEOUT
1084                                *           WILL BE SET FOR I/O NOW IN PROGRESS.
1085                                *       2.  DEVICE BUSY, NOT MANUAL.  I/O WILL BE HALTED AND CLEANUP
1086                                *           REQUEST SET.
1087                                *       3.  DEVICE KEY-IN PENDING.  OPERATOR WILL BE NOTIFIED WITH
1088                                *           'PLEASE RESPOND' MESSAGE.
1089                                *
1090                                *       R1 HAS DCT INDEX UPON ENTRY TO CLOCKIO.
1091                                        SPACE

1092  01 001F4  32A20000 X  CLOCKIO LW,R10   DCT11,R1      GET EXPECTED COMPLETION TIME
1093  01 001F5  31A00000 X          CW,R10   IOCLOCK       HAVE WE EXCEEDED TIME LIMIT.
1094  01 001F6  681001B5            BGE      IOSCHED       NO, RETURN TO SERVICE CHANNEL
1095  01 001F7  72920000 X          LB,R9    DCT18,R1      YES, IS TIME-OUT INCREMENT ZERO.
1096  01 001F8  683001B5            BEZ      IOSCHED       YES, NO LIMIT, IGNORE TIMEOUT
1097  01 001F9  52A20000 X          LH,R10   DCT1,R1       NO, PROBABLY WILL NEED I/O ADDRESS
1098  01 001FA  21800002 A          CI,R8    2             WAS DEVICE MANUAL LAST TIME.
1099  01 001FB  68400204            BAZ      CLOCKOUT      NO, TIMED OUT I/O OR EXPECTED KEY-IN
1100  01 001FC  22D004E0            LI,R13   MSG1          YES, SET UP 'MANUAL' MESSAGE
1101  01 001FD  CUB0000A A          TIO,R11  *R10          STATUS OF I/O
1102  01 001FE  45B0001D N          AND,R11  Y1            EXTRACT MANUAL/AUTOMATIC FLAG
1103  01 001FF  68B004D1            BCR,11   TYPEMSG       TYPE MSG IF STATUS AVAIL & MANUAL
1104  01 00200  30900000 X          AW,R9    IOCLOCK       DEVICE NOW AUTO OR INDETERMINATE
1105  01 00201  35920000 X          STW,R9   DCT11,R1      SET TIMEOUT FOR I/O NOW IN PROGRESS
1106  01 00202  73E20000 X          MTB,-2   DCT5,R1       RESET DEVICE-MANUAL INDICATOR
1107  01 00203  680001B5            B        IOSCHED       RETURN TO SERVICE CHANNEL QUEUE
```

```
1108                                        PAGE
1109                                        SPACE

1110   01 00204   70220000 X   CLOCKOUT LC        DCT5,R1      IS DEVICE BUSY, OR IS KEYIN PENDING.
1111   01 00205   688004D0     CLOCKOUT BCR,8      TYPERSP      NOT BUSY, KEYIN; 'PLEASE RESPOND'
1112   01 00206   60000037 A   CLOCKOUT DISABLE                 **TO SET TIMED OUT BIT
1113   01 00207   72920000 X   CLOCKOUT LB,R9      DCT3,R1      GET DEVICE SWITCHES(1)
1114   01 00208   499 00005 N  CLOCKOUT OR,R9      X10          SET I/O TIMEOUT FLAG
1115   01 00209   75920000 X   CLOCKOUT STB,R9     DCT3,R1      **
1116   01 0020A   225001AF     CLOCKXIT LI,R5      DSERV        SET RETURN FROM 'INTSIM'
1117                                        SPACE   5

1118                          *                                ENTER 'INTSIM' TO CLEAN UP 'BUSY'
1119                          *                                DEVICE AND SET CLEANUP PENDING.
1120                          *                                SET CHANNEL NOT BUSY.  RETURN TO
1121                          *                                'CLEANUP' TO TYPE 'TIMED OUT'
1122                          *                                MESSAGE (PRIORITY PERMITTING,
1123                          *                                OF COURSE).
1124                          *
```

```
1125                                        PAGE
1126                                        SPACE

1127                                *       INTSIM .. ROUTINE TO SET DEVICE IN CLEANUP-PENDING STATE
1128                                *       FOLLOWING AN I/O HALT.  CALLING SEQUENCE ..
1129                                *
1130                                *                BAL,R5   INTSIM      DCT INDEX PASSED IN R1
1131                                *                ...      ...         USES REGISTERS 6 THRU 9
1132                                *
1133                                *       THE FOLLOWING ACTIONS WILL BE TAKEN:
1134                                *
1135                                *       1.  DEVICE STATE SWITCHED FROM 'BUSY' TO 'CLEANUP-PENDING'
1136                                *       2.  IF DATA TRANSFER WAS SET, 'SUBCHANNEL-BUSY' IS RESET.
1137                                *
1138                                *       NOTE: NO INDICATORS FOR RECOVERY -- SUCH AS 'TIMED-OUT' -- ARE
1139                                *       SET BY INTSIM.  THERE MAY BE FUTURE ENHANCEMENTS TO ALLOW
1140                                *       FOR SOME KIND OF RECOVERY ATTEMPT AFTER I/O HALT, BUT CUR-
1141                                *       RENTLY THE ONLY MODULES USING INTSIM, OUTSIDE OF 'SERDEV',
1142                                *       ARE THE PFSR AND RTRBOT ROUTINES.
1143                                        SPACE

1144  01 0020B  72820000 X  INTSIM  LB,R8    DCT5,R1          GET DCT SWITCHES(2)
1145  01 0020C  49800007 N          AND,R8   X7F              RESET DEVICE BUSY FLAG
1146  01 0020D  49800007 N          OR,R8    X40              SET CLEANUP PENDING FLAG
1147  01 0020E  21800010 A          CI,R8    X'10'            WAS THERE DATA TRANSFER.
1148  01 0020F  68400217            BAZ      INTSEXIT         NO, SKIP CHANNEL STATUS RESET
1149  01 00210  72620000 X          LB,R6    DCT2,R1          YES, GET CIT INDEX (DON'T USE R2)
1150  01 00211  729C0000 X          LB,R9    CIT3,R6          GET CHANNEL STATUS FLAGS
1151        00000001                DO       DUALFLAG
1152  01 00212  72720000 X          LB,R7    DCT6,R1          GET INDEX OF REQUEST USING DEVICE
1153  01 00213  727E0000 X          LB,R7    IOQ3,R7          EXTRACT 3-BIT IOU ACCESS KEY
1154  01 00214  48700002 N          AND,R7   X3               ..
1155  01 00215  489E02B7            EOR,R9   CBFLAGS,R7       RESET SUBCHANNEL BUSY INDICATOR
1156                                ELSE
1157                        *S*     EOR,R9   CBFLAGS          SINGLE-ACCESS IMPLEMENTATION
1158                                FIN
1159  01 00216  759C0000 X          STB,R9   CIT3,R6          RESTORE CHANNEL STATUS
```

```
1160  01 00217  75820000 X  INTSEXIT STB,R8   DCT5,R1    RESTORE DEVICE SWITCHES(2)
1161  01 00218  325O0005 A             LW,R5    R5        IS THIS A REAL-TIME IOEX CALL
1162  01 00219  691A0000 A             BLZ      0,R5      YES, RETURN
1163  01 0021A  60000037 A             DISABLE
1164  01 0021B  72620000 X             LB,6     DCT14,1   GET FORWARD LINK
1165  01 0021C  72720000 X             LB,7     DCT15,1   GET BACK LINK
1166  01 0021D  757C0000 X             STB,7    DCT15,6   AND CROSS LINK THEM
1167  01 0021E  756E0000 X             STB,6    DCT14,7
1168  01 0021F  22700000 A             LI,7     0         ZAP
1169  01 00220  75720000 X             STB,7    DCT14,1   ANY
1170  01 00221  75720000 X             STB,7    DCT15,1   GARBAGE
1171  01 00222  680A0000 A             B        0,R5      RETURN TO CALLING PROGRAM
```

```
1172                                    PAGE
1173                                    SPACE

1174                        *           I/O SCHEDULER CONTROL TASK DEFER ROUTINES.
1175                        *
1176                        *           DEFER1 .. DEFER TO CONTROL TASK, RETURN TO IOSCHED.
1177                        *           DEFER2 .. DEFER TO CONTROL TASK, RETURN TO SCHEDXIT.
1178                                    SPACE

1179        00000000                    DO      DEFER
1180                    *S* DEFER1      LI,R11  IOSCHED         ENTRY FROM CLEANUP, SET RETURN
1181                    *S*             B       DEFER3          GO SET CONTROL TASK FUNCTION
1182                    *S* DEFER2      LI,R11  SCHEDXIT        ENTRY FROM I/O SCHEDULER, SET RETURN
1183                    *S* DEFER3      LB,R7   IOQ7,R3         GET DEVICE ASSOCIATED WITH REQUEST
1184                    *S*             LB,R8   DCT5,R7         GET DEVICE SWITCH BYTE 2
1185                    *S*             CI,R8   4               IS CONTROL TASK ALREADY SET.
1186                    *S*             BANZ    *R11            YES, TAKE DEFER EXIT NOW
1187                    *S*             MTB,4   DCT5,R7         NO, SIGNAL CONTROL TASK FUNCTION
1188                    *S*             LW,R8   R7              SET CONTROL WORD EQUAL TO DCT INDEX
1189                    *S*             B       CTRIG1          GO SET CONTROL TASK FUNCTION
1190                                    FIN
```

```
1191                                        PAGE
1192                                        SPACE

1193                                *       CTRIG .. TRIGGER CONTROL TASK ROUTINE.
1194                                *       CALLING SEQUENCE ..
1195                                *
1196                                *               ...     ...         CONTROL TASK FUNCTION WORD IN R8
1197                                *               BAL,R11 CTRIG       CALL TO STACK IN 'IOCTQ'
1198                                *
1199                                *       NO VULNERABLE REGISTERS.  RETURNS WITH INTERRUPTS ENABLED.
1200                                *       NOTE: MAY USE 'CTRIG1' IF ALREADY DISABLED UPON ENTRY.
1201                                        SPACE

1202  01 00223  12800000 X  TP30    LD,R8   KEYINBUF            GET MESSAGE FROM KEYIN BUFFER
1203  01 00224  25800368 A          SCD,R8  =24                 ALIGN ADDRESS FOR SEARCH
1204  01 00225  22100001 N          LI,R1   DCTSIZ*DCTSIZ+1     INITIAL INDEX
1205  01 00226  31920000 X          CW,R9   DCT16,R1            CHECK ONE
1206  01 00227  68300505             BE      TP31                GOT IT
1207  01 00228  201FFFFE A          AI,R1   -2                  BACK UP AN ENTRY
1208  01 00229  69200226             BGZ     $-3                 CONTINUE
1209  01 0022A  32800000 X  TP30A    LW,R8   Y03                 SPECIAL ENTRY FOR KEYIN EA
1210  01 0022B  60000037 A  CTRIG    DISABLF                     SET ALL INTERRUPT INHIBITS
1211  01 0022C  09800000 X  CTRIG1   PSW,R8  IOCTQ               PUSH CONTROL WORD INTO C.T. STACK
1212  01 0022D  22800001 A          LI,R8   1                   SET FLAG FOR CONTROL TASK PROCESSOR
1213  01 0022E  49800000 X          OR,R8   CTFLAGS             ..
1214  01 0022F  35800000 X          STW,R8  CTFLAGS             ..
1215  01 00230  22800000 N          LI,R8   CTINT               IS THERE INTERRUPT FOR CONTROL TASK.
1216  01 00231  68300235             BEZ     CTOCINT             NO, GO TRIGGER CONSOLE INTERRUPT
1217  01 00232  32800000 X          LW,R8   CTGL                YES, GET GROUP LEVEL OF INTERRUPT
1218  01 00233  ED800000 X          WD,R8   *CTWD               TRIGGER CONTROL TASK LEVEL
1219  01 00234  68000238             B       ENBSR4              RETURN TO CALLING PROGRAM
1220                                        SPACE

1221  01 00235  22800010 A  CTOCINT  LI,R8   X'10'               SELECT OPERATOR CONSOLE INTERRUPT
1222  01 00236  60801700 A          WD,R8   X'1700'             TRIGGER FOR CONTROL TASK
1223  01 00237  33100000 X          MTW,1   CTOC                AND FLAG INTERRUPT HANDLER
1224                                        SPACE
```

```
1225   01 00238    6D000027 A   ENBSR4   ENABLE                REMOVE INTERRUPT INHIBITS **ENABLE**
1226   01 00239    E8000008 A            B        *R11         RETURN TO CALLING PROGRAM
1227                                     SPACE
```

```
1228                                        PAGE
1229                                        SPACE

1230                                *       STARTIO .. INITIATE I/O ACTIVITY FOR A REQUEST.
1231                                *       AT THIS POINT, THERE IS A STARTABLE REQUEST IN R3.  THE DEVICE
1232                                *       ACTIVITY COUNTER IS SET IN R14 AND INTERRUPTS ARE ENABLED.
1233                                *       THE I/O HANDLER PRE-PROCESSOR IS CALLED UNLESS USER COMMAND
1234                                *       LIST IS SPECIFIED.  HANDLER RETURN IS TO 'IOSST'.
1235                                *       REGISTER SETUP FOR I/O HANDLER:
1236                                *
1237                                *       R0  ..  DOUBLEWORD ADDRESS OF COMMAND LIST
1238                                *       R1  ..  PRIORITY, CIT CHECK MASK, DCT INDEX (8,4,20)
1239                                *       R2  ..  FLAGS, SERDEV EXIT, CIT INDEX (3,10,19)
1240                                *       R3  ..  REQUEST IOQ INDEX
1241                                *       R4  ..  HANDLER FLAGS, SUBCHANNEL ALLOCATION CODE (8,24)
1242                                *       R10 ..  DEVICE OPERATION TABLE ('DOT') FOR 'IOSST'
1243                                *       R14 ..  DEVICE ACTIVITY COUNT FOR RE-ENTRANCY CHECK
1244                                *       R15 ..  NOT USED - SAVED FOR FUTURE EXPANSION
1245                                *
1246                                        SPACE

1247  01 0023A  52E20000 X  STARTIO LH,R14  DCT10,R1        START, SET DEVICE ACTIVITY COUNTER
1248  01 0023B  6D000027 A          ENABLE                  RUN HANDLER & INITIAL START ENABLED
1249  01 0023C  7590000 2 A         STB,9   2
1250  01 0023D  75000001 A          STB,R0  R1              SAVE PRIORITY & MASK IN R1(0-11)
1251  01 0023E  32620000 X          LW,R6   DCT8,R1         GET HANDLER PRE-PROCESSOR ADDRESS
1252  01 0023F  6D760000 X          INT,R7  IOQ8,R3         IS USER COMMAND LIST SPECIFIED.
1253  01 00240  684C0000 A          BCR,4   0,R6            NO, CALL I/O HANDLER, RETURN 'IOSST'
1254        00000001                DO      DUALFLAG
1255  01 00241  68200243            BCR,2   *+2             YES, IS OPERATION RESTRICTED TO SC1.
1256  01 00242  724802BD            LB,R4   SSCFORCE,R4     YES, FORCE TO SC1 IF UNALLOCATED.
1257                                FIN
1258  01 00243  32060000 X          LW,0    IOQ8,3
1259  01 00244  4D000015 N          AND,0   M21
1260  01 00245  52860000 X          LH,R8   IOQ9,R3         GET I/O TIMEOUT INCREMENT
1261  01 00246  22900000 A          LI,R9   0               SET NULL RE-TRY & FOLLOW-ON CODES
1262  01 00247  6800024C            B       IOSTRT          GO TO ENTRY DISABLE POINT
```

```
1263                                        SPACE

1264   01 00248   45000010 N   I8SST   AND,R0   M16          HANDLER RETURN, MASK C8MMAND LIST
1265   01 00249   72760000 X            LB,R7    I8Q5,R3      GET CURRENT FUNCTI8N STEP INDEX
1266   01 0024A   E58E000A A            INT,R8   *R10,R7      GET 'D8T' INF8RMATI8N FR8M HANDLER
1267   01 0024B   45800008 N            AND,R8   XFF          MASK TIME8UT INCREMENT IN BYTE 2
```

```
1268                                        PAGE
1269                                        SPACE

1270                                *       IOSTRT .. INITIATE I/O ACTIVITY ON COMPLETED COMMAND LIST.
1271                                *       REGISTER SETUP IS AS IN STARTIO, WITH R8 CONTAINING THE
1272                                *       TIMEOUT INCREMENT (IN 5-SECOND INTERVALS) FOR THE OPERATION
1273                                *       AND R9 CONTAINING THE RE-TRY & FOLLOW-ON OPERATIONS.  THE
1274                                *       OBJECTIVE IS TO GET THE I/O GOING AS SOON AS POSSIBLE, THUS,
1275                                *       THE FRANTIC CODE AT THE BEGINNING.
1276                                        SPACE

1277  01 0024C  60000037 A  IOSTRT  DISABLE                    DISABLE POINT, START CRITICAL CODE
1278  01 0024D  51E20000 X          CH,R14    DCT10,R1        HAS START/CLEANUP BEEN SCHEDULED.
1279  01 0024E  69300385            BNE       RESCHED         YES, RE-ENTERED, ABORT I/O START
1280  01 0024F  22E00000 A          LI,R14    0               SET FOR NO MESSAGE
1281  01 00250  72540000 X          LB,R5     CIT3,R2         NO PRE-EMPT, GET CHANNEL STATUS
1282  01 00251  72A60000 X          LB,R10    IOQ3,R3         AND GET REQUEST SWITCH BYTE
1283        00000001                DO        DUALFLAG
1284  01 00252  670802AC             EXU       CHANTEST,R4     SELECT RELEVANT STATUS IF ASSIGNED
1285                                FIN
1286  01 00253  71500002 A          CB,5      2
1287  01 00254  69400385            BANZ      RESCHED         YES, ABORT START, BACK TO IOSCHED
1288  01 00255  75820000 X  IOSTRT1 STB,R8    DCT18,R1        NO, SAVE I/O TIMEOUT INTERVAL COUNT
1289  01 00256  55920000 X          STH,R9    DCT17,R1        SAVE RE-TRY & FOLLOW-ON CODES
1290  01 00257  72920000 X          LB,R9     DCT5,R1         GET DEVICE SWITCH BYTE 2
1291  01 00258  48900003 N          AND,R9    X7              RESET STATE FLAGS & DATA XFER BIT
1292        00000001                DO        DUALFLAG
1293  01 00259  670802B1             EXU       IOALOAD,R4      GET DEVICE I/O ADDRESS IN R6
1294                                ELSE
1295                        *S*     LH,R6     DCT1,R1         SINGLE-ACCESS ONLY, GET I/O ADDRESS
1296                                FIN
1297  01 0025A  33120000 X          MTW,1     DCT25,R1        BUMP THE NUMBER OF SIO'S ATTEMPTED
1298  01 0025B  02200000 A          LCI       0
1299  01 0025C  4CCC0000 A          SIO,R12   0,R6            ATTEMPT I/O START ON THIS ADR.
1300  01 0025D  74020000 X          STCF      DCT19,R1        SAVE SIO CONDITION CODES
1301  01 0025E  69C002CE            BCS,12    IOREJECT        IF IT FAILED, EXIT TO ANALYZE FAULT
1302  01 0025F  72720000 X          LB,R7     DCT15,R1        IS THIS A REAL-TIME IOEX REQUEST
```

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1303  01 00260   683 00263          BEZ      IOSTRT5     NO, CONTINUE
1304  01 00261   227 00268          LI,R7    IOSTRT6     YES, SET RETURN FROM RTROOT
1305  01 00262   68 000000  X       B        RTIOSTRT    SPECIAL PROCESSING IN RTROOT
1306        01 00263          IOSTRT5  EQU    *
1307        00000001                   DO       DUALFLAG
1308  01 00263   556 20000  X       STH,R6   DCT1,R1     ACCEPTED, SET 'ACTIVE' I/O ADDRESS
1309                                 FIN
1310  01 00264   727 00000  X       LB,7     DCT14       GET HEAD
1311  01 00265   751 00000  X       STB,1    DCT14       MAKE CURRENT REQUEST NEW HEAD
1312  01 00266   757 20000  X       STB,7    DCT14,1     LINK TO REST OF CHAIN
1313  01 00267   751 E0000  X       STB,1    DCT15,7     AND BACK LINK
1314                          IOSTRT6  ;
1315  01 00268   702 0000D  A       LC       R13         CHECK FOR DEVICE 'MANUAL' OR 'AUTO'
1316  01 00269   691 00275          BCS,1    IOSTRT3     AUTOMATIC, CONTINUE PROCESSING
1317  01 0026A   727 20000  X       LB,R7    DCT4,R1     MANUAL, SPECIAL TEST FOR PAPER TAPE
1318  01 0026B   487 00002  N       EOR,R7   X3          IS DEVICE PAPER READER/PUNCH (2/3).
1319  01 0026C   647 00272          BDR,R7   IOSTRT2     NO, DEVICE IS DEFINITELY MANUAL.
1320  01 0026D   022 00000  A       LCI      0
1321  01 0026E   4ED C0000  A       TDV,R13  0,R6        GET TDV STATUS
```

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1322                                          PAGE
1323                                          SPACE

1324  01 0026F  25DE0003 A                   SLS,R13  3,R7       CHECK BIT 2 = PUNCH, BIT 3 = READER
1325  01 00270  21D00000 A                   CI,R13   0          IS SPECIFIED SUB-UNIT MANUAL.
1326  01 00271  68100275                    BGE      IOSTRT3    NO, OTHER ONE MUST BE - IGNORE IT
1327  01 00272  20900002 A   IOSTRT2       AI,R9    2          MANUAL, SET FLAG IN DCT SWITCHES
1328  01 00273  22E004E0                    LI,R14   MSG1       SET UP TO OUTPUT 'MANUAL' MESSAGE
1329  01 00274  22800003 A                   LI,R8    3          AND SET 15-SECOND TIME-OUT INCREMENT
1330  01 00275  30800000 X   IOSTRT3       AW,R8    IOCLOCK    ADD CURRENT I/O CLOCK TO TIMEOUT
1331  01 00276  35820000 X                   STW,R8   DCT11,R1   SAVE I/O DEADLINE VALUE IN DCT
1332  01 00277  20900080 A                   AI,R9    X'80'      SET DEVICE TO 'BUSY' MODE
1333  01 00278  70200004 A                   LC       R4         GET I/O HANDLER PRE-PROCESSOR FLAGS
1334  01 00279  698002A3                    BCS,8    RELEASSC   IS SUBCHANNEL RELEASE SPECIFIED.
1335  01 0027A  68200027D                   BCR,2    IOSTRT4    NO, IS SUBCHANNEL TO BE HELD.
1336  01 0027B  495802BA                    OR,R5    CHFLAGS,R4 YES, SET APPROPRIATE HOLD FLAGS.
1337  01 0027C  670802B4                    EXU      CHSAVE,R4  SAVE REQUEST INDEX IN CIT5 OR CIT6
1338  01 0027D  495802B7   IOSTRT4         OR,R5    CBFLAGS,R4 SET APPROPRIATE SUBCHANNEL(S) BUSY
1339  01 0027E  20900010 A                   AI,R9    X'10'      AND SET DEVICE 'DATA-TRANSFER' BIT
1340  01 0027F  32660000 X   IOSTEX        LW,R6    IOQ6,R3    IS THIS A DCB I/O REQUEST.
1341  01 00280  68300287                    BEZ      IOSTEX2    NO, SKIP DCB INITIALIZATION
1342  01 00281  22C00003 A   IOSTEX1       LI,R12   3          YES, GET 2-BIT ASSIGNMENT MASK
1343  01 00282  4BCC0000 A                   AND,R12  0,R6       EXTRACT ASN FROM DCB WORD ZERO
1344  01 00283  21C00000 N                   CI,R12   CFUBIT     IS I/O BEING DONE FOR FILE.
1345  01 00284  68300287                    BE       IOSTEX2    YES, DO NOT RESET 'TYC' FIELD
1346  01 00285  32D00000 X                   LW,R13   YOOFE      NO, SET 7-BIT 'TYC' FIELD TO ZERO
1347  01 00286  47CC0002 A                   STS,R12  2,R6       ..
1348  01 00287  75320000 X   IOSTEX2       STB,R3   DCT6,R1    LINK THIS REQUEST TO DEVICE
1349  01 00288  75540000 X                   STB,R5   CIT3,R2    SAVE CHANNEL STATUS FLAGS
1350  01 00289  75920000 X                   STB,R9   DCT5,R1    AND DEVICE STATUS BYTE 2
1351  01 0028A  20A00080 A                   AI,R10   X'80'      SET REQUEST BUSY IN IOQ3 SWITCHES
1352  01 0028B  75A60000 X   IOSTEX3       STB,R10  IOQ3,R3    RESTORE UPDATE IOQ3 SWITCH BYTE
1353  01 0028C  53120000 X                   MTH,1    DCT10,R1   UPDATE DEVICE ACTIVITY COUNTER
1354  01 0028D  70200004 A                   LC       4          GET FLAGS
1355  01 0028E  68800298                    BCR,8    IOSTEX35   IS SUBCHANNEL RELEASE SPECIFIED
1356  01 0028F  68400298                    BCR,4    IOSTEX35   WAS FCN DECREMENTED
1357  01 00290  22500298                    LI,5     IOSTEX35   SET RETURN ADDRESS
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1358  01 00291  02200090 A          PUSH    9,R13          SAVE REGS LIKE REQCOM
      01 00292  0BD00000 N
1359  01 00293  32460000 X          LW,4    IOQ6,3         GET DCB ADDRESS
1360  01 00294  72560000 X          LB,5    IOQ15,3        AND USER NUMBER
1361  01 00295  22000000 A          LI,0    0              ZAP USER NUMBER
1362  01 00296  35060000 X          STW,0   IOQ6,3
1363  01 00297  75060000 X          STB,0   IOQ15,3        SO WE REPORT ONLY ONCE
1364  01 00298  46060000 X          XW,0    IOQ16,3        GET & ZERO USER ECB/EA POINTER.
1365  01 00299  32300000 A          LW,3    0              GET TO RIGHT REG FOR RC28.
1366  01 0029A  6800042F            B       RC28           WADE INTO END OF REQCOM
1367     01 0029B          IOSTEX35 EQU     $
1368  01 0029B  6D000027 A          ENABLE                 REMOVE INTERRUPT INHIBITS
1369  01 0029C  72000001 A          LB,R0   R1             RESTORE PRIORITY CODE INTO R0
1370  01 0029D  32D0000E A          LW,R13  R14            IS THERE ANY MESSAGE TO BE OUTPUT.
1371  01 0029E  683002A0            BEZ     $+2            NO, DON'T ASK FOR ANY TYPEOUT
1372  01 0029F  6A5004D7            BAL,R5  MSGOUT         YES, PASS MESSAGE INDEX IN R13
1373  01 002A0  70220000 X          LC      DCT5,R1        WAS CLEANUP SET BY I/O START.
1374  01 002A1  684001B6            BCR,4   IOSCHED1       NO, RE-ENTER SCHEDULER FOR MORE I/O
1375  01 002A2  6800001AF           B       DSERV          YES, CHECK DEVICE PRIOR TO SCHEDULER
1376                                SPACE
1377  01 002A3  68400279F    RELEASSC BCR,4   IOSTEX         SUBCHANNEL RELEASE, DECR FCN COUNT.
1378  01 002A4  32660000 X          LW,R6   IOQ6,R3        YES, REQUEST COMPLETE (E.G., REWIND)
1379  01 002A5  68300287            BEZ     IOSTEX2        IS THERE A DCB FOR THIS REQUEST.
1380  01 002A6  72760000 X          LB,R7   IOQ10,R3       YES, GET MAX RECOVERY TRIES
1381  01 002A7  71760000 X          CB,R7   IOQ11,R3       HAVE WE ALREADY DONE A RE-TRY.
1382  01 002A8  69300281            BNE     IOSTEX1        YES, DON'T DECREMENT FCN COUNT
1383  01 002A9  22700001C A         LI,R7   BAFCN          NO, SET POINTER TO FUNCTION COUNT
1384  01 002AA  F3FE0006 A          MTB,-1  *R6,R7         DECREMENT ACTIVE FUNCTION COUNT
1385  01 002AB  68000281            B       IOSTEX1        RETURN TO FINISH UP I/O START
```

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1386                                        PAGE
1387                                        SPACE

1388          00000001                      D0        DUALFLAG
1389   01 002AC   02000000 A   CHANTEST     N0P                    SUBCHANNEL ASSIGNMENT CHECK LIST
1390   01 002AD   4B20054F                  AND,2     =X'A0FFFFFF'
1391   01 002AE   4B200550                  AND,2     =X'50FFFFFF'
1392   01 002AF   680002BF                  B         FORCESC      011 .. DUAL-ACCESS RESTRICTED TO SC1
1393   01 002B0   680002C4                  B         ASSIGNSC     100 .. UNASSIGNED DUAL-ACCESS
1394                                        SPACE

1395   01 002B1   52620000 X   IOALOAD      LH,R6     DCT1P,R1     LOAD I/O ADDRESS: 00 = BOTH SC'S
1396   01 002B2   52620000 X                LH,R6     DCT1P,R1     01 .. ON SC1 .. PRIMARY I/O ADDRESS
1397   01 002B3   52620000 X                LH,R6     DCT1A,R1     10 .. ON SC2 .. SECONDARY ADDRESS
1398                                        FIN
1399                                        SPACE

1400   01 002B4   75340000 X   CHSAVE       STB,R3    CIT5,R2      SAVE HOLDING REQUEST - BOTH SC'S
1401          00000001                      D0        DUALFLAG
1402   01 002B5   75340000 X                STB,R3    CIT5,R2      01 .. HOLD ON SUBCHANNEL 1
1403   01 002B6   75340000 X                STB,R3    CIT6,R2      10 .. HOLD ON SUBCHANNEL 2
1404                                        FIN
1405                                        SPACE

1406   01 002B7   000000C0 A   CBFLAGS      DATA      X'C0'        SUBCHANNEL BUSY FLAGS: 00 = BOTH
1407          00000001                      D0        DUALFLAG
1408   01 002B8   00000080 A                DATA      X'80'        01 .. SUBCHANNEL 1 ONLY
1409   01 002B9   00000040 A                DATA      X'40'        10 .. SUBCHANNEL 2 ONLY
1410                                        FIN
1411                                        SPACE

1412   01 002BA   00000030 A   CHFLAGS      DATA      X'30'        SUBCHANNEL HOLD FLAGS: 00 = BOTH
1413          00000001                      D0        DUALFLAG
1414   01 002BB   00000020 A                DATA      X'20'        01 .. SUBCHANNEL 1 HELD
1415   01 002BC   00000010 A                DATA      X'10'        10 .. SUBCHANNEL 2 HELD
1416                                        SPACE
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1417   01 002BD   00010200 A   SSCFORCE DATA     X'00010200'      ALLOCATION CODE TRANSLATION TABLE
1418   01 002BE   03000000 A            DATA     X'03000000'      TO FORCE DUAL-ACCESS TO S.C. 1 ONLY
1419                                    FIN
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1420                                        PAGE
1421                                        SPACE

1422                                *       FORCESC .. FORCE DUAL-ACCESS TO SUBCHANNEL 1 OPERATION.
1423                                *       ASSIGNSC .. ROUTINE TO DETERMINE SUBCHANNEL ASSIGNMENT FOR
1424                                *       A NEW OPERATION ON A DUAL-ACCESS DEVICE.  ASSIGNMENT HAS
1425                                *       BEEN DELAYED TO 'IOSTRT' TIME IN ORDER TO AVOID RE-SCHEDULING
1426                                *       DUE TO PRE-EMPTION OF THE SUBCHANNEL BY A HIGHER-PRIORITY
1427                                *       TASK.  ALGORITHM WORKS AS FOLLOWS:
1428                                *
1429                                *       1.  IF NEITHER SUBCHANNEL IS AVAILABLE (NOT BUSY, NOT HELD),
1430                                *           THE I/O SCHEDULER IS RE-ENTERED.
1431                                *       2.  IF ONE AND ONLY ONE SUBCHANNEL IS AVAILABLE, THAT SUB-
1432                                *           CHANNEL IS TAKEN BY DEFAULT.
1433                                *       3.  IF BOTH SUBCHANNELS ARE AVAILABLE, THE 'PREFERRED' BIT
1434                                *           IS EXTRACTED FROM THE CIT STATUS AND IS USED TO SELECT
1435                                *           THE SUBCHANNEL TO BE USED.  THE BIT IS THEN INVERTED.
1436                                        SPACE

1437        00000001                        DO      DUALFLAG
1438  01 0028F  22400001 A      FORCESC   LI,R4    1               DUAL-ACCESS DEVICE FORCED TO SC1
1439  01 002C0  20AFFFFD A                AI,R10   -3              FORCE IOQ ACCESS KEY TO 001
1440  01 002C1  215000A0 A                CI,R5    X'A0'           IS SUBCHANNEL 1 IDLE AND FREE.
1441  01 002C2  68400255                  BAZ      IOSTRT1         YES, RETURN TO START I/O ON SC1
1442  01 002C3  68000288                  B        IOSTEX3         NO, RE-SCHEDULE WITH NEW ACCESS KEY
1443                                        SPACE

1444  01 002C4  25500027D A     ASSIGNSC  SCS,R5   -3              R4 KEY = 100; UNASSIGNED DUAL-ACCESS
1445  01 002C5  526A01E4                  LH,R6    SELECTAB,R5     GET RIGHT HALFWORD OF SELECTAB ENTRY
1446  01 002C6  681001CE                  BGEZ     SCHEDXIT        IS ANY SUBCHANNEL IDLE & FREE.
1447  01 002C7  25600573 A                SAD,R6   -13             YES, SET UP SUBCHANNEL SELECT DATA:
1448  01 002C8  45700020 N                AND,R7   Y8              SC1:-3/0, SC2:-2/0, EITHER:-3/1***31
1449  01 002C9  10400006 A                AD,R4    R6              SELECT, INVERT 'PREFERRED' IF EITHER
1450  01 002CA  25500203 A                SCS,R5   3               RESTORE (POSSIBLY NEW) CIT STATUS
1451  01 002CB  22B00007 A                LI,R11   7               MOVE SUBCHANNEL INDEX TO IOQ3
1452  01 002CC  4AA00004 A                LS,R10   R4              TO FORM NEW IOQ ACCESS KEY
1453  01 002CD  68000255                  B        IOSTRT1         AND RETURN TO CONTINUE I/O START
```

1454

FIN

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1455                                        PAGE
1456                                        SPACE

1457                                *       IOREJECT .. PROCESS REJECTED 'SIO' INSTRUCTION.  ACTION TO
1458                                *       BE TAKEN IS A FUNCTION OF CONDITION CODE STATUS AS FOLLOWS:
1459                                *
1460                                *       01 .. SIMPLE SIO REJECTION.  REVERSE IOQ ACCESS KEY IF DEVICE
1461                                *             IS DUAL-ACCESS AND DEVICE IS 'RESERVED' .. A CONDITION
1462                                *             NORMALLY UNEXPECTED BUT MAY OCCUR AFTER SPECIAL I/O,
1463                                *             SUCH AS SYSTEM START-UP OR RECOVERY.
1464                                *       10 .. SELECTOR IOP BUSY WITH ANOTHER CONTROLLER OR CON-
1465                                *             TROLLER BUSY WITH ANOTHER DEVICE.  SET 'SIO-FAIL'
1466                                *             BIT IN DCT3 AND CLEANUP PENDING.
1467                                *       11 .. DEVICE ADDRESS NOT RECOGNIZED.  SET 'SIO-FAIL' AND
1468                                *             CLEANUP PENDING.
1469                                        SPACE

1470  01 002CE  32C00000 A  IOREJECT LW,12  0                NON-OP DEVICE LEAVES GARBAGE
1471  01 002CF  7400000C A            STCF    12              SIO REJECTED SAVE CC
1472  01 002D0  15C20000 X            STD,R12 DCT13,R1        SAVE SIO STATUS IN DCT
1473  01 002D1  72620000 X            LB,R6   DCT3,R1         GET DEVICE STATUS BYTE 1
1474        00000001                  DO      DUALFLAG
1475  01 002D2  22700003 A            LI,R7   3               SET ACCESS KEY COMPARE MASK
1476  01 002D3  48D0001F N            EOR,R13 Y4              AND CHECK FOR DEVICE STATUS '10'
1477  01 002D4  31D00000 X            CW,R13  YE              IS DEVICE STATUS 'RESERVED' (10)
1478  01 002D5  45600007 A            CS,R6   R7              AND IS DEVICE DUAL-ACCESS (KEY=11).
1479  01 002D6  69F002D9              BCS,15  SIOFAIL         AND IS SIO CC1 ZERO (STATUS AVAIL).
1480  01 002D7  48A00007 A            EOR,R10 R7              YES, RE-SCHEDULE ON OTHER CONTROLLER
1481  01 002D8  68000288              B       IOSTEX3         BY INVERTING IOQ ACCESS KEY.
1482                                  FIN
1483                                  SPACE

1484  01 002D9  20600008 A  SIOFAIL   AI,R6   8               DEVICE NOT STARTABLE, SET FAIL BIT
1485  01 002DA  75620000 X            STB,R6  DCT3,R1         ..
1486  01 002DB  20900050 A            AI,R9   X'50'           SET CLEANUP PENDING, DATA TRANSFER
1487  01 002DC  6800027F              B       IOSTEX          FINISH UP I/O START & EXIT
```

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1488                                        PAGE
1489                                *F*
1490                                *F*     NAME:         I8INT
1491                                *F*
1492                                *F*     PURP8SE:      I/8 INTERRUPT RECEIVER
1493                                *F*
1494                                *F*     DESCRIPTI8N:  WHENEVER THERE IS AN I/8 INTERUPT
1495                                *F*                   THE XPSD AT L8CATI8N X'5C' WILL BRING US HERE.
1496                                *F*
1497          01 002DD              I8INT   EQU           $
1498                                *
1499   01 002DD    35100000 X               STW,1   TEMP              SAVE F8R LATER PUSH
1500   01 002DE    22100013 A               LI,1    19                8PEN
1501   01 002DF    13100000 X               MSP,1   TSTACK             STACK
1502   01 002E0    221FFFF1 A               LI,1    -15               REG 0
1503   01 002E1    30100000 X               AW,1    TSTACK            STACK L8C
1504   01 002E2    46100000 X               XW,1    TEMP              RESTERE REGS
1505   01 002E3    02200000 A               LCI     0                 STACK
1506   01 002E4    A8000000 X               STM,0   *TEMP               'EM
1507   01 002E5    223FFFFF A               LI,3    -1
1508   01 002E6    12000000 X               LD,0    I8PSD             STACK
1509   01 002E7    95060000 X               STD,0   *TEMP,3             C8NTR8L INF8
1510   01 002E8    60000027 A               ENABLE                    LET 'EM C8ME
1511   01 002E9    02200000 A               LCI     0
1512   01 002EA    6E100000 A               AI8,1   0                 ACKN8WLEDGE
1513   01 002EB    74000003 A               STCF    R3                SAVE AI8 CC STATUS
1514   01 002EC    688002FB                 BCR,8   I87               BRANCH IF 8K
1515   01 002ED    33100000 X               MTW,1   UNEXP             ELSE, C8UNT UNEXP INTS
1516   01 002EE    680002F7                 B       I870              D8N'T L8G UNRECEGNIZED
1517          01 002EF              I862    EQU     $
1518   01 002EF    32F00001 A               LW,R15  R1                M8VE AI8 W8RD T8 MSG  8RD ZER8
1519   01 002F0    557000F  A               STH,R7  R15               ST8RE C8DE/C8UNT FIELDS
1520   01 002F1    32200003 A               LW,R2   R3                REC8RD
1521   01 002F2    25200078 A               SLS,R2  -8
1522   01 002F3    2260000F A               LI,R6   R15               ADDRESS 8F ERR8R REC8RD
1523   01 002F4    30600020 N               AW,R6   Y8                TELL ERR8R L8GGER WE'RE 8N AN INT.
1524   01 002F5    6A500000 X               BAL,5   ERRL8G            L8G THE GLITCH
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1525          01 002F6                RTRET2  EQU     *               EXTERNAL RETURN FROM RTROOT(IOEX)
1526    01 002F6    33F00000 X                MTW,-1  INTCNT          COUNT 'EM DOWN
1527    01 002F7    22200020 A        I070    LI,2    X'20'           CLEAR IO LEVEL
1528    01 002F8    6D000037 A                DISABLE
1529    01 002F9    6D201200 A                WD,2    X'1200'         CLEAR I/O LEVEL
1530    01 002FA    68000000 X                B       T:PULLE         AND PULLEXIT
1531    01 002FB    33100000 X        I07     MTW,1   INTCNT          COUNT 'EM UP
1532    01 002FC    2220FFFF A                LI,2    X'FFFF'
1533    01 002FD    4B200001 A                AND,2   1               DEVICE ADDR
1534    01 002FE    6D000037 A                DISABLE                 DISABLE WHILE HANDLING CHAIN
1535    01 002FF    72700000 X                LB,7    DCT14           GET HEAD
1536    01 00300    512E0000 X        I075    CH,2    DCT1,7          CHECK DEVICE ADDRESS
1537    01 00301    69300304                  BNE     I076            NO
1538    01 00302    726E0000 X                LB,6    DCT14,7         YES, DEQUEUE IT
1539    01 00303    725E0000 X                LB,5    DCT15,7         BACK LINK
1540    01 00304    22800000 A                LI,8    0
1541    01 00305    758E0000 X                STB,8   DCT14,7         ZAP ANY GARBAGE
1542    01 00306    758E0000 X                STB,8   DCT15,7         IN FLINK AN BLINK
1543    01 00307    755C0000 X                STB,5   DCT15,6         CROSS LINK
1544    01 00308    756A0000 X                STB,6   DCT14,5         REMAINING ENTRIES
1545    01 00309    6800030F                  B       I010
1546    01 0030A    727E0000 X        I076    LB,7    DCT14,7         FLINK TO NEXT DEVICE
1547    01 0030B    69300300                  BNE     I075            WITH I/O IN PROGRESS
1548    01 0030C    22700000 N                LI,7    DCTSIZ          TOOOK IT UP
1549    01 0030D    512E0000 X        I071    CH,2    DCT1,7
1550    01 0030E    69300324                  BNE     I08             NOT YET FOUND
1551          01 0030F                I010    EQU     *
1552    01 0030F    702E0000 X                LC      DCT5,R7         TEST DEVICE BUSY BIT
1553    01 00310    69800327                  BCS,8   I014            DEVICE WAS BUSY
1554                                *
1555                                *       NOTE:   IF DEVICE WAS NOT BUSY GO DIRECTLY TO THE
1556                                *               HANDLER'S BREAK ADDRESS WHICH IS POST-PROCESSING
1557                                *               ADDRESS-1. YOU MUST HAVE A BIT IN DCT9 TO INDICATE
1558                                *               THAT AN UN-BUSY INT IS OKAY.
1559                                *
1560    01 00311    22B002F6                  LI,R11  RTRET2          LOAD RETURN ADDRESS FOR HANDLER
1561    01 00312    6B5E0000 X                INT,R5  DCT9,R7         TEST IF DEVICE CAN HAVE THIS
```

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1562  01 00313  E94A0018 N          BCS,4   *M24,R5        GO TO HANDLER'S BREAK ADDRESS
1563  01 00314  730E0000 X          MTB,0   DCT15,R7         CHECK FOR PRE- EMPTED
1564  01 00315  68300319            BEZ     I812             NO, MIGHT BE AVR
1565  01 00316  326E0000 X          LW,R6   DCT12,R7         GET ENTRY ADDRESS
1566  01 00317  69100000 X          BLZ     RTINT            IF A REAL-TIME IOEX INTERRUPT
1567  01 00318  22500000 N          LI,R5   J'JIT
1568  01 00319  680C0000 A          B       0,R6             GO TO DEVICE INTERRUPT HANDLER
1569  01 0031A  3110001F N  I812     CW,1    Y4               CHK DEVICE END
1570  01 0031B  68400324            BAZ     I88              NO
1571  01 0031C  21700000 N          CI,7    BATAPE           IF TAPE OR PACK, MUST BE AVR
1572  01 0031D  69100325            BL      I850
1573  01 0031E  21700000 N          CI,7    BATAPE+AVRTBLNE
1574  01 0031F  68100325            BGE     I850
1575  01 00320  3280001A N          LW,8    Y02              ASSUME AVR
1576  01 00321  49800007 A          OR,8    7                COMBINE DCT
1577  01 00322  22B0033F            LI,11   I822              SET RETURN
1578  01 00323  6800022B            B       CTRIG            TRIGGER CONTROL TASK
1579  01 00324  64700309     I88    BDR,7   I871             TRY NEXT ENTRY
1580                               *
1581                               *       CAN'T FIND THE DEVICE OR IT WASNT BUSY, LOG
1582                               *       AN ERROR RECORD.
1583                               *
1584  01 00325  22701304 A  I850    LI,7    X'1304'          CODE/COUNT
1585  01 00326  680002EF            B       I862             LOG ERROR
1586        01 00327        I814    EQU     $
1587  01 00327  351E0000 X          STW,1   DCT12,7          SAVE AIO INFO
1588        01 00328        RTRET1  EQU     $                EXTERNAL RETURN FROM RTROOT(IOEX)
1589  01 00328  726E0000 X          LB,R6   DCT5,R7          GET DEVICE FLAGS
1590  01 00329  48600007 N          AND,R6  X7F              STRIP DEVICE BUSY
1591  01 0032A  49600007 N          OR,R6   X40              SET CLEANUP PENDING
1592  01 0032B  756E0000 X          STB,R6  DCT5,R7          REPLACE IT
1593  01 0032C  72300003 A          LB,R3   R3               POSITION AIO CONDITION CODES
1594  01 0032D  753E0000 X          STB,3   DCT19,7          SAVE
1595  01 0032E  02200000 A          LCI     0
1596  01 0032F  40340000 A          TIO,3   0,2              STATUS OF I/O
1597  01 00330  52300003 A          LH,3    3
1598  01 00331  553E0000 X          STH,3   DCT21,7          SAVE IN DCT
```

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1599  01 00332  02200000 A          LCI     0
1600  01 00333  4E240000 A          TDV,2   0,2             GET TDV STATUS
1601  01 00334  740E0000 X          STCF    DCT20,7         SAVE STATUS & CC
1602  01 00335  152E0000 X          STD,2   DCT13,7         SAVE THE INFO IN DCT
1603  01 00336  21600010 A          CI,6    X'10'           DATA XFER
1604  01 00337  68400033F           BAZ     I820            NOPE
1605  01 00338  725E0000 X          LB,5    DCT2,7          CIT INDEX
1606  01 00339  724A0000 X          LB,4    CIT3,5          CIT SWITCHES
1607        00000001                DO      DUALFLAG
1608  01 0033A  723E0000 X          LB,R3   DCT6,R7         GET IOQ INDEX
1609  01 0033B  72360000 X          LB,R3   IOQ3,R3         GET IOQ SWITCHES
1610  01 0033C  4B300002 N          AND,R3  X3              EXTRACT ACCESS KEY
1611  01 0033D  484602B7            EOR,R4  CBFLAGS,R3      SET SUBCHANNEL(S) NOT BUSY
1612                                ELSE
1613                        *S*     EOR,R4  CBFLAGS         SET SINGLE-ACCESS NOT BUSY
1614                                FIN
1615  01 0033E  754A0000 X          STB,4   CIT3,5
1616        01 0033F                I820    EQU     *       READY TO EXIT INTERRUPT HANDLER
1617                                *  EXECUTE SPECIAL END ACTION FROM R1 HERE
1618  01 0033F  22600020 A    I822  LI,6    X'20'           CLEAR
1619  01 00340  6U601200 A          WD,6    X'1200'          IO LEVEL
1620  01 00341  32100007 A          LW,R1   R7              GET DCT FOR SCHEDULER
1621  01 00342  6A2001A9            BAL,R2  DRIVEIO         CALL I/O SCHEDULER
1622  01 00343  33F00000 X    I830  MTW,-1  INTCNT          COUNT 'EM DOWN
1623  01 00344  69300000 X          BNEZ    T'PULLE
1624  01 00345  6AB00000 X          BAL,11  SACT
1625  01 00346  22B00000 A          LI,11   0
1626  01 00347  46B00000 X          XW,11   INTFLG          SEE RC28 IN REQCOM
1627  01 00348  68300000 X          BEZ     SSEO
1628  01 00349  68000000 X          B       T'SSE
```

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1629                                        PAGE
1630                                        SPACE

1631                            *           CLEANUP  - DO POST-PROCESSING, PRIORITY PERMITTING.
1632                            *           CLEANUP1 - DO POST-PROCESSING, REGARDLESS OF PRIORITY.
1633                            *
1634                            *           IF PRIORITY PERMITS, THE DEVICE ACTIVITY COUNT IS SET IN R14,
1635                            *           INTERRUPTS ARE ENABLED, AND THE REQUEST CURRENTLY BEING SER-
1636                            *           VICED BY THE DEVICE IS PROCESSED BY THE I/O HANDLER, WITH
1637                            *           THE DEVICE RETURNED TO THE 'FREE', 'INTER-OP', OR 'KEYIN-
1638                            *           PENDING' STATE, AS APPLICABLE.  REGISTER SETUP:
1639                            *
1640                            *           R1  .. PRIORITY, DCT INDEX (8,24)
1641                            *           R2  .. FLAGS, SERDEV EXIT, CIT INDEX (3,10,19)
1642                            *           R3  .. SCRATCH, IOQ INDEX (8,24)
1643                            *           R12 .. FLAGS RETURNED FROM HANDLER:
1644                            *                  BIT 16 .. RE-TRY SEQUENCE
1645                            *                  BIT 17 .. FOLLOW-ON SEQUENCE
1646                            *                  BIT 18 .. INTER-OPERATIVE REQUEST
1647                            *                  BIT 19 .. KEY-IN PENDING (NORMAL)
1648                            *                  BIT 20 .. KEY-IN PENDING (SPECIAL)
1649                            *                  BIT 21 .. CONTINUE CHANNEL HOLD
1650                            *                  BYTE 3 .. TYPE OF COMPLETION
1651                            *           R13 .. MESSAGE TO BE TYPED (0 IF NONE)
1652                            *           R14 .. DEVICE ACTIVITY COUNT
1653                            *           R15 .. NOT USED - RESERVED FOR FUTURE SYSTEMS
1654                                        SPACE

1655        00000000                        DO      DEFER
1656                            *S* CLEANUP LB,R3    DCT6,R1         SERVICE CLEANUP-PENDING, GET REQUEST
1657                            *S*         CB,R0    IOQ14,R3        IS REQUEST PRIORITY BELOW SCHEDULER.
1658                            *S*         BL       DEFER1          YES, DEFER CLEANUP, RETURN IOSCHED
1659                                        ELSE
1660   01 0034A                     CLEANUP RES      0
1661                                        FIN
1662   01 0034A 52E20000 X          CLEANUP1 LH,R14  DCT10,R1        NO, SET DEVICE ACTIVITY COUNTER
1663   01 0034B 72320000 X                   LB,R3   DCT6,R1         PRE-EMPT REQUEST INDEX
```

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1664  01 0034C  75000001 A   STB,R0   R1          SAVE PRIORITY OF SCHEDULER CALL
1665  01 0034D  72520000 X   LB,R5    DCT15,R1    IS THIS A REAL-TIME IOEX CLEANUP
1666  01 0034E  69300000 X   BNEZ     RTCU        YES, BY-PASS HANDLER POST-PROCESSOR
1667  01 0034F  60000027 A   ENABLE                RUN I/O HANDLER IN ENABLED STATE
1668  01 00350  32520000 X   LW,R5    DCT9,R1     GET I/O HANDLER CLEANUP ENTRY
1669  01 00351  72F60000 X   LB,15    IOQ15,3
1670  01 00352  31F00000 X   CW,15    DID         IS IT DIAG USR
1671  01 00353  693A0000 A   BNE      0,5         NO
1672  01 00354  31500001E N   CW,5     Y2          IS IT DIAG REQ
1673  01 00355  684A0000 A   BAZ      0,5         NO
1674  01 00356  6A900000 X   BAL,9    IOSERCK
1675  01 00357  02000000 A   NOP
```

```
1676                                        PAGE
1677                                *F*
1678                                *F*     NAME:         IOSCU
1679                                *F*
1680                                *F*     PURPOSE:      RETURN POINT FROM HANDLERS POST-PROCESSING
1681                                *F*                   ROUTINES.
1682                                *F*
1683                                *F*     DESCRIPTION:  HANDLERS RETURN HERE WITH THE STANDARD I/O
1684                                *F*                   REGISTER SETUP PLUS THEIR FLAGS IN R12/R13.
1685                                *F*
1686                                *F*                   IOSCU WILL DECODE THE FLAGS AND TAKE APPROPRIATE
1687                                *F*                   AACTION.
1688                                *F*
1689  01 00358  6D000037 A  IOSCU   DISABLE                      RETURN FROM HANDLER POST-PROCESSOR
1690  01 00359  51E20000 X          CH,R14    DCT10,R1          WAS START/CLEANUP RE-ENTERED.
1691  01 0035A  69300385            BNE       RESCHED           YES, CLEANUP HAS ALREADY BEEN DONE
1692  01 0035B  53120000 X          MTH,1     DCT10,R1          NO, INCREMENT ACTIVITY COUNT
1693  01 0035C  72420000 X          LB,R4     DCT3,R1           RESET TIMEOUT/SIO-FAIL IN DCT3
1694  01 0035D  4B400000 X          AND,R4    XE7               ..
1695  01 0035E  75420000 X          STB,R4    DCT3,R1           ..
1696  01 0035F  72560000 X          LB,R5     IOQ3,R3           GET REQUEST SWITCH BYTE
1697  01 00360  22400000 A          LI,R4     0                 EXTRACT ASSIGNMENT CODE FROM IOQ3
1698  01 00361  4A400002 N          LS,R4     X3                ..
1699  01 00362  72820000 X          LB,R8     DCT5,R1           SET UP SWITCHES(2) IN R8
1700  01 00363  4B800551            AND,R8    =X'15'            SAVE DATA-XFER, CONTROL-TASK, MODE
1701  01 00364  72940000 X          LB,R9     CIT3,R2           GET CHANNEL STATUS FLAGS
1702  01 00365  319802BA            CW,R9     CHFLAGS,R4        IS SUBCHANNEL CURRENTLY BEING HELD.
1703  01 00366  68400036F           BAZ       IOSCCHK           NO, CONTINUE CLEANUP CHECKS
1704  01 00367  446802B4            ANLZ,R6   CHSAVE,R4         YES, GET CIT HOLD TABLE ADDRESS
1705  01 00368  727C0000 A          LB,R7     0,R6              GET INDEX OF HOLDING REQUEST
1706  01 00369  21C00400 A          CI,R12    X'400'            IS SUBCHANNEL TO REMAIN HELD.
1707  01 0036A  48700003 A          EOR,R7    R3                OR IS IT HELD FOR DIFFERENT REQUEST.
1708  01 0036B  697 0036F           BCS,7     IOSCCHK           YES, CANNOT RELEASE HOLD NOW.
1709  01 0036C  489802BA            EOR,R9    CHFLAGS,R4        NO, RESET SUBCHANNEL HOLD FLAG(S).
1710  01 0036D  75940000 X          STB,R9    CIT3,R2           ..
1711  01 0036E  757C0000 A          STB,R7    0,R6              CLEAR SUBCHANNEL HOLD REQUEST INDEX
1712  01 0036F  21C0D800 A  IOSCCHK CI,R12    X'D800'           IS THERE ANY ADDITIONAL ACTIVITY.
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    1713   01 00370   684 00398          BAZ      REQCOM      NO, REQUEST COMPLETE, END-ACTION
    1714   01 00371   21C 01800 A        CI,R12   X'1800'     YES, IS KEY-IN REQUIRED.
    1715   01 00372   694 00387          BANZ     IOKEYIN     YES, GO TO KEY-IN PROCESSOR.
    1716   01 00373   205FFF80 A         AI,R5    =X'80'      NO, RESET REQUEST 'BUSY' FLAG
    1717   01 00374   75560000 X         STB,R5   IOQ3,R3     SO THAT REQUEST MAY BE STARTED
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1718                                                PAGE
1719                                                SPACE

1720   01 00375  52A20000 X                LH,R10   DCT17,R1          GET RETRY/FOLLOW-ON CODES
1721   01 00376  21C08000 A                CI,R12   X'8000'          IS RE-TRY FLAG SET BY HANDLER.
1722   01 00377  6840037B                  BAZ      IOFOLLOW         NO, FOLLOW-ON, PRESUMABLY NO ERROR
1723   01 00378  73F60000 X                MTB,-1   IOQ11,R3         YES, RE-TRY, DECREMENT RE-TRY COUNT
1724   01 00379  6880038F                  BNC      REQERR           NO MORE ATTEMPTS - ERROR COMPLETION
1725   01 0037A  25A00078 A                SLS,R10  -8               RE-TRY OK, GET HANDLER FUNCTION CODE
1726   01 0037B  75A60000 X    IOFOLLOW    STB,R10  IOQ5,R3          SAVE CODE AS NEXT FUNCTION STEP
1727   01 0037C  21C02000 A                CI,R12   X'2000'          IS INTER-OPERATION REQUESTED.
1728   01 0037D  6840037F                  BAZ      $+2              NO, SEQUENCE IS 'INTERRUPTABLE'
1729   01 0037E  20800020 A                AI,R8    X'20'            YES, SET DEVICE INTER-OPERATION MODE
1730   01 0037F  22D00000 A                LI,R13   0                NO MSG FOR RE-TRY/FOLLOW-ON
1731   01 00380  75820000 X    IOSCEXIT    STB,R8   DCT5,R1          SAVE UPDATED DCT SWITCHES(2)
1732   01 00381  6D000027 A    IOCUEXIT    ENABLE                     NOW PERMIT INTERRUPTS TO FIRE
1733   01 00382  21D00000 A                CI,R13   0                IS MESSAGE TO BE OUTPUT.
1734   01 00383  68300385                  BEZ      RESTPRI          NO, SKIP CALL TO MESSAGE QUEUE
1735   01 00384  6A5004D7                  BAL,R5   MSGOUT           YES, CALL TO OUTPUT MSG IN R13
1736   01 00385                  RESCHED   RES      0
1737   01 00385  72000001 A      RESTPRI   LB,R0    R1               RESTORE SCHEDULER PRIORITY
1738   01 00386  6800018B                  B        IOSCHED          RE-ENTER SCHED
1739                                                SPACE

1740         00000000                               DC       0
1741                              *S*  IOKEYIN    LI,R9    CTINT            KEY-IN, DOES CONTROL TASK EXIST.
1742                              *S*               B        SETKEYIN         NOT FOR U.T.S. -- BRANCH
1743                              *S*  *           THIS BRANCH WILL BE REMOVED WHEN CTINT IS DEF'ED AS 0 OR
1744                              *S*  *           AS THE CONTROL TASK INTERRUPT
1745                              *S*               BEZ      SETKEYIN         NO, FOREGROUND NO PROBLEM
1746                              *S*               LB,R9    IOQ14,R3         YES, GET REQUEST PRIORITY
1747                              *S*               CI,R9    CTINT-X'50'      IS IT ABOVE CONTROL TASK PRIORITY.
1748                              *S*               BL       REQERR           YES, COMPLETE REQUEST IN ERROR
1749                                                ELSE
1750   01 00387                       IOKEYIN     RES      0
1751                                                FIN
1752   01 00387  20800008 A    SETKEYIN  AI,R8    8                NO, OK, SET DEVICE KEY-IN PENDING
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```
1753  01 00388  12A20000 X   LD,R10   DCT13,R1   GET TDV STATUS INFORMATION
1754  01 00389  55C0000B A   STH,R12  R11        SAVE FLAGS, TYC WITH TDV INFO
1755  01 0038A  15A20000 X   STD,R10   DCT13,R1   ..
1756  01 0038B  22A00006 A   LI,R10    6          SET 30 SECOND TIME-OUT INTERVAL
1757  01 0038C  30A00000 X   AW,R10    IOCLOCK    ..
1758  01 0038D  35A20000 X   STW,R10   DCT11,R1   ..
1759  01 0038E  6B000380     B         IOSCEXIT   GO RESTORE DCT SWITCHES & EXIT
```

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1760                                    PAGE
1761                            *       REQC0M = REQUEST C0MPLETE
1762                            *
1763                            *
1764                            *   R1,R3,R4 SET AS F0R CLEANUP
1765                            *
1766                            *   R10 HAS CCA
1767                            *   R11 HAS RBC
1768                            *   R12 HAS TYC
1769                            *
1770                            *       BAL,R5  REQC0M
1771                            *
1772                            *   R13 T0 R4 WILL BE SAVED         *
1773                            *
1774  01 0038F  22C00008 A      REQERR  LI,R12  8                   ERR0R,F0RCE ENTRY FR0M 'I0SCU'
1775                            *
1776                            *       D0N'T H0LD CHANNEL IF RETRIES ARE ZER0
1777                            *
1778  01 00390  319802BA                CW,R9   CHFLAGS,R4        GET SUBCHANNEL H0LD FLAGS
1779  01 00391  68400399                BAZ     REQC0M+1          N0NE SET
1780  01 00392  20700000 A              AI,R7   0                 IS SUBCHANNEL HELD F0R THIS REQUEST
1781  01 00393  69300399                BNE     REQC0M+1          N0, D0N'T RELEASE H0LD
1782  01 00394  489802BA                E0R,R9  CHFLAGS,R4        YES, RESET H0LD FLAGS
1783  01 00395  75940000 X              STB,R9  CIT3,R2
1784  01 00396  757C0000 A              STB,R7  0,R6              CLEAR SUBCHANNEL H0LD REQUEST INDEX
1785  01 00397  68000399                B       $+2               ..
1786  01 00398  22D00000 A      REQC0M  LI,R13  0                 REQUEST C0MPLETE, N0 MSG
1787  01 00399  75820000 X              STB,R8  DCT5,R1           SAVE DCT SWITCHES
1788  01 0039A  22500381                LI,R5   I0CUEXIT          SET RETURN ADDRESS IN R5
1789  01 0039B  02200090 A      REQC0M1 PUSH    9,R13             SAVE REGS
      01 0039C  0BD00000 N
1790  01 0039D  72020000 X              LB,R0   DCT5,R1           GET DCT SWITCHES (2)
1791  01 0039E  32460000 X              LW,R4   I0Q6,R3           DCB
1792  01 0039F  683003FF                BEZ     RC20              N0 DCB
1793  01 003A0  4BC00008 N              AND,R12 XFF               MASK TYC
1794  01 003A1  21C00008 A              CI,R12  8                 IS IT ERR0R
1795  01 003A2  693003A6                BNE     RC3               N0
```

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1796   01 003A3   3140001B N          CW,R4    Y04          READ OR WRITE
1797   01 003A4   684003A6            BAZ      $+2          READ
1798   01 003A5   22C00009 A          LI,R12   9            WRITE
1799   01 003A6                 RC3   RES      0
1800   01 003A6   22600000 A          LI,R6    0            CLEAR REG FOR RESETTING EGV
1801   01 003A7   22F0000F A          LI,R15   X'F'         EXTRACT ASN
1802   01 003A8   45F80000 A          AND,R15  0,R4         FROM DCB
1803   01 003A9   21F00003 A          CI,R15   3            CHECK FOR DEVICE
1804   01 003AA   693003B3            BNE      RC4          NO DONT CLOBBER
1805   01 003AB   22500004 A          LI,R5    4            DISP TO NRT
1806   01 003AC   72760000 X          LB,R7    IOQ11,R3     GET REAL NUMBER REMAINING
1807   01 003AD   F57A0004 A          STB,R7   *R4,R5       TRANSFER TO DCB
1808   01 003AE   22720000 A          LI,R7    X'20000'     SET BIN BIT IN DCB ACCORDING TO
1809   01 003AF   21000001 A          CI,R0    1            TO THE BIN BIT IN DCT5
1810   01 003B0   684003B2            BAZ      $+2
1811   01 003B1   22620000 A          LI,R6    X'20000'
1812   01 003B2   47680000 A          STS,R6   0,R4
1813        01 003B3                 RC4   EQU      $
1814   01 003B3   22D0003F A          LI,R13   X'3F'         MASK FOR TYC
1815   01 003B4   25C00111 A          SLD,R12  17           ALIGN MASK AND TYC
1816   01 003B5   45C80002 A          CS,R12   TYC,R4       TEST FOR NEW PEAK VALUE
1817   01 003B6   682003B8            BLE      RC5          DONT CHANGE, PREVIOUS PEAK
1818   01 003B7   47C80002 A          STS,R12  TYC,R4       SAVE NEW VALUE
1819   01 003B8   3AD00019 N     RC5  LCW,R13  Y01          DECREMENT FUNCTION COUNT
1820   01 003B9   66D80007 A          AWM,R13  FCN,R4       IN DCB.
1821   01 003BA   32760000 X          LW,R7    IOQ16,R3     IF AN ECB IS ASSOCIATED
1822   01 003BB   683003C0            BEZ      RC6          WITH THIS REQUEST,
1823   01 003BC   25C00007 A          SLS,R12  +7           UPDATE THE TYC IN
1824   01 003BD   45CE0002 A          CS,R12   2,R7         THE 4-WORD BLOCK
1825   01 003BE   682003C0            BLE      RC6          IF NEW TYC IS BIGGER.
1826   01 003BF   47CE0002 A          STS,R12  2,R7
1827        01 003C0                 RC6   EQU      $
1828   01 003C0   22701000 A          LI,R7    X'1000'
1829   01 003C1   47680000 A          STS,R6   0,R4         CLEAR EGV
1830   01 003C2   21F00002 A          CI,R15   2
1831   01 003C3   691003DD            BL       RC10         DO NOT STORE ARS FOR DISC, BLOCKED L
1832   01 003C4   692003C8            BG       RC8
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1833  01 003C5  22500003 A          LI,R5    3
1834  01 003C6  45580005 A          CS,R5    ACS,R4
1835  01 003C7  693003DD            BNE      RC10
1836        01 003C8                RC8      EQU      $
1837  01 003C8  52860000 X          LH,R8    I8Q9,R3          BYTE C8UNT.
1838  01 003C9  32560000 X          LW,R5    I8Q8,R3
1839  01 003CA  681003D5            BGEZ     RC9  BRANCH IF N8 DATA CHAINING
1840  01 003CB  45500015 N          AND,R5   M21
1841  01 003CC  12A20000 X          LD,R10   DCT13,R1         GET STATUS
1842  01 003CD  38A00005 A          SW,R10   R5               TAKE NUMBER 8F C8MMANDs USED
1843  01 003CE  20A00001 A          AI,R10   1                T8 C8MPUTE ARS
1844  01 003CF  45A00010 N          AND,R10  M16              SCRUB C8MMAND C8UNT
1845  01 003D0  22900000 A          LI,R9    0                CLEAR ACCUMULAT8R F8R C8UNT
1846  01 003D1  108A0000 A  RC7     AD,R8    0,5              ADD C8UNT FR8M 8NE A8MMND
1847  01 003D2  20500001 A          AI,R5    1                GET NEXT C8MMAND
1848  01 003D3  64A003D1            BDR,R10  RC7              D8 ALL ACTIVE C8MMANDS
1849  01 003D4  32800009 A          LW,R8    R9               T8TAL C8UNT 8F BYTES IN R8 N8W.
1850        01 003D5                RC9      EQU      $
1851  01 003D5  38800008 A          SW,R8    R11              C8MPUTE ARS = BC - RBC.
1852  01 003D6  22907FFF A          LI,R9    X'7FFF'            15 BIT MASK.
1853  01 003D7  25800111 A          SLD,R8   17               P8SITI8N ARS AND MASK.
1854  01 003D8  47880004 A          STS,R8   ARS,R4           ST8RE ARS IN DCB.
1855  01 003D9  32660000 X          LW,R6    I8Q16,R3         IF AN ECB IS ASS8CIATED
1856  01 003DA  683003DD            BEZ      RC10             WITH THIS REQUEST,
1857  01 003DB  25800016 F          SLD,R8   =17              UPDATE THE REC8RD SIZE IN
1858  01 003DC  478C0002 A          STS,R8   2,R6             THE 4-W8RD BL8CK.
1859                                *                    TEST T8 RELEASE BUFFER
1860  01 003DD  21F00000 N  RC10    CI,R15   CFUBIT           D8ES ASN = FILE
1861  01 003DE  683003FB            BE       RC15             YES
1862  01 003DF  31400016 N          CW,R4    Y08              IS IT P8SITI8N 8PERATI8N
1863  01 003E0  694003ED            BANZ     RC14             YES, D8 N8T RELEASE
1864  01 003E1  31400018 N          CW,R4    Y04              IS IT READ 8P
1865  01 003E2  684003ED            BAZ      RC14             YES, D8 N8T RELEASE
1866  01 003E3  70260000 X          LC       I8Q3,R3          IS M8N BUF USED
1867  01 003E4  682003ED            BCR,2    RC14             N8
1868  01 003E5  32E00018 N          LW,R14   M24              GET BUFFER ADDR MASK
1869  01 003E6  45E60000 X          AND,R14  I8Q8,R3          GET BUFF ADDR
```

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1870  01 003E7  25E0007E A          SLS,R14  -2                 MAKE WORD ADDR
1871  01 003E8  328 00000 X        LW,R8    MP00L               NEXT AVAIL BUF
1872  01 003E9  19E00000 F         CLM,14   BUFLIMS+MP00LIM+MP00LIM   CHECK MP00L WITHIN LIMITS
1873  01 003EA  69900000 X         BCS,9    SC1900              SOFTWARE CHECK 19-00
1874  01 003EB  35E00000 X         STW,R14  MP00L               RELEASED BUF TO HEAD
1875  01 003EC  B580000E A         STW,R8   *R14                NEXT AVAIL TO RELEASED BUF
1876                               *
1877        01 003ED                RC14     EQU     $
1878  01 003ED  21F00003 A         CI,R15   3                   IS IT DEVICE
1879  01 003EE  693003FB           BNE      RC15                NO - STILL NOT DIAG CAL
1880  01 003EF  6DB80005 A         INT,R11  5,R4                TEST FOR DIAG BIT
1881  01 003F0  682003FB           BCR,2    RC15                NO
1882                               *  DIAG RETURN -
1883  01 003F1  32720000 X         LW,R7    DCT12,R1            AIO STATUS
1884  01 003F2  25700070 A         SLS,7    -16                 SAVE ONLY STATUS
1885  01 003F3  128 20000 X        LD,R8    DCT13,R1            TDV STATUS
1886  01 003F4  52A20000 X         LH,R10   DCT1,R1             DEVICE ADDRESS
1887  01 003F5  4BA0000B N         AND,10   M11
1888  01 003F6  02200000 A         LCI      0
1889  01 003F7  CDB0000A A         TIO,11   *10                 STATUS OF I/O
1890  01 003F8  32A0000B A         LW,10    11
1891  01 003F9  02200040 A         LCI      4
1892  01 003FA  2B78000F A         STM,7    15,4                SAVE IN DCB
1893        01 003FB                RC15     EQU     $
1894  01 003FB  12A60000 X         LD,R10   IOQ13,R3
1895  01 003FC  46A0000B A         XW,R10   R11                 EAI IN R10, E-A ADDR IN R11
1896  01 003FD  328 60000 X        LW,R8    IOQ6,R3             DCB ADDR
1897  01 003FE  68000405           B        RC21
1898                               *                            COMPLETION INFO IF NO DCB
1899  01 003FF  75C0000B A         RC20     STB,R12  R11        TYC
1900  01 00400  32C0000B A         LW,R12   R11                 TYC, RBC
1901  01 00401  12D20000 X         LD,R13   DCT13,R1            CCA
1902  01 00402  12A60000 X         LD,R10   IOQ13,R3            END-ACTION INFO
1903  01 00403  32E0000B A         LW,R14   R11                 EAI IN R14
1904  01 00404  46B0000A A         XW,R11   R10                 MIGHT AS WELL GETEA REGS COMP.
1905  01 00405                     RC21     RES     0
1906  01 00405  32F60000 X         LW,R15   IOQ8,R3             BUF ADDR
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1907   01 00406   21000001 A          CI,R0    1                  CHECK FOR BIN BIT IN DCTS
1908   01 00407   68400409            BAZ      RC22
1909   01 00408   49F0001A N          OR,R15   Y02                SET BIN FOR NEWQ
1910                            *                            RELEASE Q ENTRY
1911        01 00409               RC22 EQU      $
1912   01 00409   32660000 X          LW,R6    IOQ8,R3            DATA CHAIN
1913   01 0040A   68100411            BGEZ     RC23               NO
1914   01 0040B   25600001 A          SLS,R6   1                  TO BUILD DATA CHAIN
1915   01 0040C   32700000 X          LW,R7    MPOOL              RELEASE BUFFER
1916   01 0040D   19600000 F          CLM,6    BUFLIMS+MPOOLIM+MPOOLIM   CHECK MPOOL WITHIN LIMITS
1917   01 0040E   69900000 X          BCS,9    SC1900             SOFTWARE CHECK 19-00
1918   01 0040F   35600000 X          STW,R6   MPOOL
1919   01 00410   357C0000 A          STW,R7   0,R6
1920                            *
1921        01 00411               RC23 EQU      $
1922   01 00411   72660000 X          LB,6     IOQ2,3             FLINK
1923   01 00412   72760000 X          LB,R7    IOQ1,R3            BLINK
1924   01 00413   68300416            BEZ      RC24               FIRST ENTRY
1925   01 00414   756E0000 X          STB,R6   IOQ2,R7            CUR FLINK TO PREV FLINK
1926   01 00415   68000417            B        $+2
1927   01 00416   75640000 X          STB,R6   CIT1,R2            CUR FLINK TO HEAD
1928   01 00417   20600000 A          AI,R6    0                  TEST FLINK
1929   01 00418   68300418            BEZ      RC26               LAST ENTRY
1930   01 00419   757C0000 X          STB,R7   IOQ1,R6            CUR BLINK TO NEXT BLINK
1931   01 0041A   68000410            B        $+2
1932   01 0041B   75740000 X          STB,R7   CIT2,R2            CUR BLINK TO TAIL
1933                            *
1934   01 0041C   72700000 X          LB,R7    QFREE              HEAD OF FREE ENTRIES
1935   01 0041D   75760000 X          STB,R7   IOQ2,R3            TO FLINK
1936   01 0041E   75300000 X          STB,R3   QFREE              CUR IS NEW HEAD
1937                            *
1938   01 0041F   33F00000 X          MTW,-1   CURBQ              YES, DEC NO. BIGRND ENTRIES
1939   01 00420   72560000 X          LB,5     IOQ15,3
1940   01 00421   72760000 X          LB,R7    IOQ7,R3            GET DCT INDEX FOR POSSIBLE E A
1941   01 00422   32360000 X          LW,R3    IOQ16,R3           GET USER ECB/EA POINTER.
1942   01 00423   60000027 A          ENABLE
1943                            *
```

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1944  01 00424  45BC0016 N          AND,R11  M22        IS THERE END ACTION
1945                     *
1946  01 00425  6830042F            BEZ      RC28
1947  01 00426  02200030 A          PUSH     3,R3        SAVE ECB,DCB,USER#.
      01 00427  0B300000 N
1948  01 00428  32600000F A         LW,R6    R15         BUF ADDR
1949  01 00429  68200428            BLEZ     *+2
1950  01 0042A  45600016 N          AND,R6   M22
1951  01 0042B  25600007E A         SLS,R6   =2          MAKE WORD ADDR
1952  01 0042C  EAB0000B A          BAL,R11  *R11        GO TO END-ACTION RECEIVER
1953  01 0042D  02200030 A          PULL     3,R3        RESTORE ECB,DCB,USER#.
      01 0042E  0A300000 N
1954  01 0042F  215000FF A  RC28    CI,5     X'FF'
1955  01 00430  68400440            BAZ      RC30
1956  01 00431  68300440            BE       RC30        NEWONW
1957  01 00432  32700003 A          LW,R7    R3          DID USER SPECIFY ECB OR EA
1958  01 00433  6830043C            BEZ      RC29        ==> NO.
1959  01 00434  F3F00007 A          MTB,=1   *R7         ARE ALL PHYSICAL I/O'S DONE
1960  01 00435  6930043C            BNEZ     RC29        ==> NO.
1961  01 00436  328E0003 A          LW,R8    3,R7        IS CAL COMPLETED YET
1962  01 00437  6810043C            BGEZ     RC29        ==> NO.
1963  01 00438  32800005 A          LW,R8    R5          R8= USER#.
1964  01 00439  329E0002 A          LW,R9    2,R7        R9= TYC/RBC FOR ECB INFO WORD.
1965  01 0043A  32AE0001 A          LW,R10   1,R7        R10=ECB ADDRESS.
1966  01 0043B  6AB00000 X          BAL,R11  ECBPOST1     POST THE ECB. (USING BLK IN R7)
1967  01 0043C                 RC29 RES      0
1968  01 0043C  32100004 A          LW,R1    R4          GET DCB ADDRESS
1969  01 0043D  22600000 N          LI,6     E'IC        REPORT I/O COMPLETE
1970  01 0043E  35600000 X          STW,6    INTFLG
1971  01 0043F  6AB00000 X          BAL,11   T'RUE
1972  01 00440  02200090 A  RC30    PULL     9,R13       RESTORE REGS
      01 00441  0AD00000 N
1973  01 00442  680A0000 A          B        0,R5
```

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1974                                        PAGE
1975                                *
1976                                *F*
1977                                *F*     NAME:       8CINT
1978                                *F*
1979                                *F*     PURP8SE:    8PERAT8RS C8NS8LE INTERRUPT RECEIVER.
1980                                *F*
1981                                *F*     DESCRIPTI8N: WHENEVER THERE IS AN INTERRUPT FR8M L8CATI8N
1982                                *F*                  X'5D' WE WILL WIND UP HERE WITH C8NDITI8N C8DES
1983                                *F*                  EQUAL T8 6.
1984                                *F*
1985          01 00443              8CINT   EQU         $
1986  01 00443    0BD00000 X                PSM,R13     TSTACK          SAVE 13,14,15,0,1,2
1987  01 00444    12000000 X                LD,R0       8CPSD           GET PSD
1988  01 00445    6A200000 X                BAL,R2      T:SAVE          SAVE STANDARD ENV
1989  01 00446    3A800000 X  8CT10         LCW,R8      CT8C            WAS TASK TRIGGERED
1990  01 00447    69300044B                 BNEZ        8CT20           YES
1991  01 00448    32800019 N                LW,R8       Y01             C8DE F8R KEYIN
1992  01 00449    6AB0022B                  BAL,R11     CTRIG           TRIGGER C8NTR8L TASK
1993  01 0044A    68000446                  B           8CT10
1994  01 0044B    66800000 X  8CT20         AWM,R8      CT8C            CLEAR TRIGGER FLAG
1995  01 0044C    33000000 X                MTW,0       CTACT           IS C8NTR8L TASK ACTIVE
1996  01 0044D    68300451                  BEZ         8CT40           N8
1997  01 0044E    22200010 A  8CT30         LI,R2       X'10'
1998  01 0044F    6B201200 A  8CT35         WD,R2       X'1200'         ARM AND ENABLE (CLEAR)
1999  01 00450    68000000 X                B           T:SSE           T8 SSE T8 P8INT 8F INTERRUPT
2000  01 00451    33100000 X  8CT40         MTW,1       CTACT           SET C8NTR8L TASK ACTIVE
2001  01 00452    22200010 A                LI,R2       X'10'
2002  01 00453    6B201200 A                WD,R2       X'1200'         CLEAR 8C LEVEL
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2003                                        PAGE
2004                                    *
2005          01 00454                  CTIOP   EQU     $                   CONTROL TASK I/O PROCESSOR
2006                                    *
2007                                    *     CALLED BY CONTROL TASK OR CONTROL TASK SIMULATOR
2008                                    *     EXECUTES FUNCTIONS FOUND IN CONTROL TASK I/O STACK
2009                                    *
2010                                    *         BAL,R11  CTIOP
2011                                    *
2012                                    *     USES ALL REGS
2013                                    *
2014                                    *
2015    01 00454     60000037 A         TP5     DISABLE                                             **DISABLE**
2016                                    *
2017    01 00455     08800000 X                 PLW,R8   IOCTQ          GET NEXT FUNCTION
2018    01 00456     69200497                   BCS,2    TP90           STACK EMPTY
2019                                    *
2020    01 00457     60000027 A                 ENABLE                                              **ENABLE**
2021                                    *
2022    01 00458     72700008 A                 LB,R7    R8             GET CODE
2023    01 00459     727E045B                   LB,R7    TPBASE,R7      GET DISP TO ENTRY POINT
2024    01 0045A     680E045B                   B        TPBASE,R7      SWITCH TO IT
2025                                    *
2026          00000000                  :TP     CNAME    0
2027                                            PROC
2028                                    LF      GEN,8    AF(1)-TPBASE
2029                                            PEND
2030                                    *
2031                                    *
2032    01 0045B     02         A      TPBASE  :TP      TP10           0 => DEVICE FUNCTION
2033    01 0045B 1   02         A              :TP      TP20           1 => CONSOLE INTERRUPT
2034    01 0045B 2   00         A              :TP      TP40           2 => AVR
2035    01 0045B 3   10         A              :TP      TP50           3 => KEYIN MSG IN BUF
2036    01 0045C     16         A              :TP      TP60           4 => CHECK ALL DEVICES
2037    01 0045C 1   31         A              :TP      TP70           5 => PFSR I/O RESTART
2038                                            BOUND    4
2039                                    *
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2040          00000000                          D0        DEFER              CONTROL TASK DEFERRED CLEANUP
2041                                  *S* TP10    LW,R1     R8                 SET DCT INDEX
2042                                  *S* *
2043                                  *S*         DISABLE                                         **DISABLE**
2044                                  *S* *
2045                                  *S*         LB,R9     DCT5,R1            GET DCT SWITCHES
2046                                  *S*         AND,R9    XFB                RESET CONTROL TASK BIT
2047                                  *S*         STB,R9    DCT5,R1            RESTORE SWITCHES
2048                                  *S* *
2049                                  *S*         ENABLE                                          **ENABLE**
2050                                  *S* *
2051                                  *S*         BAL,R2    FORCEIO            SERVICE DEVICE WITH PRI X'FF'
2052                                  *S*         B         TP5
2053                                              ELSE
2054    01 0045D                          TP10    RES       0
2055                                              FIN
2056                                      *
2057    01 0045D  22100466                TP20    LI,R1     TP25               MESSAGE ADDRESS
2058    01 0045E  6AB00510                        BAL,R11   BCWRITE            OUTPUT NL=BANG
2059    01 0045F  22D00000 N                      LI,R13    BA(KEYINBUF)       BUFFER ADDRESS
2060    01 00460  22000223                        LI,R0     TP30               END ACTION ROUTINE
2061    01 00461  22E00048 A                      LI,R14    72                 SIZE
2062    01 00462  32C00467                        LW,R12    TP26               SET FUN AND PRIO
2063    01 00463  6AB00054                        BAL,R11   QUEUE
2064    01 00464  02000000 A                      NOP
2065    01 00465  68000454                        B         TP5
2066                                      *
2067                                      *
2068    01 00466  02155A00 A              TP25    DATA      X'02155A00'        TEXTC NL=BANG
2069    01 00467  0UF00F00 N              TP26    GEN,8,8,8,8 0,X'F0',15,BCDCT
2070                                      *
2071          01 00468                    TP40    EQU       $
2072    01 00468  22F000FF A                      LI,R15    X'FF'
2073    01 00469  4BF00008 A                      AND,R15   R8                 DCTX
2074    01 0046A  35F00000 X                      STW,15    AVRDCT             SET DCTX FOR KEYIN
2075                                      *
2076          01 0046B                    TP50    EQU       $
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2077   01 0046B   12000474                LD,0    KEYIN
2078   01 0046C   12800000 X              LD,8    SYSACT          SET UP KEYIN'S ACCOUNT
2079   01 0046D   22F000F0 A              LI,15   X'F0'           SET UP KEYIN'S PRIORITY
2080   01 0046E   6AA00000 X              BAL,10  TIGJOB          SEE IF WE CAN START UP KEYIN
2081   01 0046F   68800454                BCR,8   TP5
2082   01 00470   22100003 A              LI,R1   3               LATER MESSAGE
2083   01 00471   6AB00510                BAL,11  OCQC
2084   01 00472   68000454                B       TP5
2085                              *
2086                              *       BOUND   8
2087   01 00474   05D2C5E8 A     KEYIN    TEXTC   'KEYIN'
       01 00475   C9D54040 A
2088                              *                               TIME-OUT TEST, ALL BUSY DEVICES
2089   01 00476   22100000 N     TP60     LI,R1   DCTSIZ
2090        01 00477              TP62     EQU     $
2091   01 00477   72820000 X              LB,R8   DCT5,R1         DCT SWITCHES
2092   01 00478   21800088 A              CI,R8   X'88'           DEV BUSY OR KEYIN PENDING
2093   01 00479   68400047E               BAZ     TP63
2094   01 0047A   09100000 N              PUSH    R1
2095   01 0047B   6A2001AC                BAL,R2  FORCEIO         YES, FORCE I/O WITH PRIORITY X'FF'
2096   01 0047C   08100000 N              PULL    R1
2097   01 0047D   68000480                B       TP64
2098        01 0047E              TP63     EQU     $
2099   01 0047E   72820000 X              LB,R8   DCT15,R1        PRE-EMPTED DEVICE
2100   01 0047F   69300483                BNEZ    TP65            YES, GO CHECK IT
2101        01 00480              TP64     EQU     $
2102   01 00480   64100477                BDR,R1  TP62            DO NEXT
2103   01 00481   35100000 X              STW,R1  DEVCTCHK        CLEAR FLAG
2104   01 00482   68000454                B       TP5
2105                              *
2106                              *
2107        01 00483              TP65     EQU     $               CHECK FOR POSSIBLE IOEX TIMEOUT
2108   01 00483   32620000 X              LW,R6   DCT12,R1        INTERRUPT EXPECTED
2109   01 00484   68100480                BGEZ    TP64            NO
2110   01 00485   72820000 X              LB,R8   DCT18,R1        TIME-OUT REQUESTED
2111   01 00486   68300480                BEZ     TP64            NO
2112   01 00487   32820000 X              LW,R8   DCT11,R1        OVERDUE TIME VALUE
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2113  01 00488  318800000 X          CW,R8    IOCLOCK          ARE WE OVERDUE
2114  01 00489  68100480             BGE      TP64             NO
2115  01 0048A  6AB00000 X          BAL,R11  RTTO              REAL-TIME (IOEX) TIME-OUT PROCESSING
2116  01 0048B  68000480             B        TP64
2117                                 *
2118                                 *
2119        01 0048C                 TP70     EQU      $
2120  01 0048C  22100490             LI,R1    PFSRMES
2121  01 0048D  6AB00510             BAL,R11  OCWRITE          WRITE 'POWER FAIL-SAFE' ON OC
2122  01 0048E  6AB00000 X          BAL,R11  PFSRIO           RESTART I/O AFTER PFSR
2123  01 0048F  68000454             B        TP5
2124                                 *
2125        TEXT                     NL       EQU      'N'              NEW LINE X'15'
2126        TEXT                     ZER      EQU      ' '
2127        LIST                     ZEROS    EQU      ZER,ZER,ZER,ZER,ZER,ZER,ZER
2128  01 00490  18000000 A          PFSRMES  TEXTC    ZEROS,NL,'POWER FAIL-SAFE',NL
      01 00491  00000000 A
      01 00492  15D7D6E6 A
      01 00493  C5D940C6 A
      01 00494  C1C9D360 A
      01 00495  E2C1C6C5 A
      01 00496  15404040 A
2129  01 00497  22200000 A          TP90     LI,R2    0
2130        00000001                 DO       SYMBFLAG
2131  01 00498  223 00100 A          LI,3     X'100'           IS SYMFLAG SET
2132  01 00499  313 00000 X          CW,3     CTFLAGS
2133  01 0049A  684 0049F            BAZ      TP91             NO
2134  01 0049B  472 00000 X          STS,2    CTFLAGS          YES-SET FLAG OFF
2135  01 0049C  60 000027 A          ENABLE                    AND START SYMBIONTS
2136  01 0049D  6AB00000 X          BAL,11   SACT
2137  01 0049E  68000454             B        TP5
2138        01 0049F                 TP91     EQU      $
2139                                 FIN
2140  01 0049F  223 00001 A          LI,R3    1
2141  01 004A0  472 00000 X          STS,R2   CTFLAGS          RESET FLAG
2142                                 *
2143  01 004A1  22101001 A          LI,R1    X'1001'
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2144   01 004A2   31100000 X            CW,R1     CTFLAGS
2145   01 004A3   68004A6               BAZ       BCT60
2146   01 004A4   60000027 A            ENABLE
2147   01 004A5   68000454               B         CTIBP
2148   01 004A6   22100000 A   BCT60    LI,R1     0
2149   01 004A7   35100000 X            STW,R1    CTACT
2150   01 004A8   60000027 A            ENABLE
2151   01 004A9   68000000 X            B         TISSE
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2152                                        PAGE
2153   01 004AA   60000037 A   TP33         DISABLE                                  ***** DISABLE *****
2154   01 004AB   49100000 X                R8,R1        YFF                         SET PRIORITY
2155   01 004AC   72820000 X                LB,R8        DCT5,R1                     GET DCT SWITCHES
2156   01 004AD   21800008 A                CI,R8        8                           CHECK FOR KEYIN PENDING
2157   01 004AE   68400050E                BAZ          TP32                        ERROR NO
2158   01 004AF   208FFFF8 A                AI,R8        -8                          RESET KEYIN PENDING
2159   01 004B0   75820000 X                STB,R8       DCT5,R1                     RESTORE SWITCHED
2160   01 004B1   72320000 X                LB,R3        DCT6,R1                     GET IOQ INDEX
2161   01 004B2   72860000 X                LB,R8        IOQ3,R3                     GET REQUEST SWITCHES
2162   01 004B3   208FFF80 A                AI,R8        -X'80'                      RESET BUSY BIT
2163   01 004B4   75860000 X                STB,R8       IOQ3,R3                     STORE REQUEST SWITCHES
2164   01 004B5   12820000 X                LD,R8        DCT13,R1                    GET TDV STATUS
2165   01 004B6   52C00009 A                LH,R12       R9                          GET HANDLER FLAGS
2166   01 004B7   72820000 X                LB,R8        DCT4,R1                     GET TYPE
2167   01 004B8   21800008 A                CI,R8        8
2168   01 004B9   691004C0                 BL           KEYDV
2169   01 004BA   2180000A A                CI,R8        10
2170   01 004BB   692004C0                 BG           KEYDV
2171   01 004BC   72860000 X                LB,R8        IOQ5,R3                     GET FUNCTION
2172   01 004BD   21800008 A                CI,R8        8                           REWIND
2173   01 004BE   693004C0                 BNE          KEYDV
2174   01 004BF   73F60000 X                MTB,-1       IOQ11,R3                    DECREMENT RETRY COUNT
2175   01 004C0   09B00000 N   KEYDV        PUSH         11                          SAVE END ACTION RETURN
2176   01 004C1   722404C3                 LB,2         KEYTV,R2                    TRANSLATE
2177   01 004C2   680404C0                 B            KEYDV,R2                    SWITCH
2178   01 004C3   00           A   KEYTV    DATA,1       0,CKEYN-KEYDV,RKEYN-KEYDV,EKEYN-KEYDV
       01 004C3 1 04           A
       01 004C3 2 0A           A
       01 004C3 3 0E           A
2179   01 004C4   21C00800 A    CKEYN       CI,R12       X'800'                      CHECK FOR CONTINUE ALLOWED
2180   01 004C5   694004CA                 BANZ         RKEYN                       NO, TREAT AS R
2181   01 004C6   22B00000 A                LI,R11       0                           RBC 0
2182   01 004C7   22C00001 A                LI,R12       1                           NORMAL TYC
2183   01 004C8   72220000 X   CKEYN1       LB,R2        DCT2,R1                     GET CIT INDEX
2184   01 004C9   6A500398                  BAL,R5       REQCOM1                     REQUEST COMPLETE
2185   01 004CA   60000027 A   RKEYN        ENABLE                                   ***** ENABLE *****
```

```
2186  01 004CB  6A2001AC          BAL,R2   F0RCEI0
2187  01 004CC  08B00000 N        PULL     11          RESTORE EA RETURN
2188  01 004CD  680000238        B        ENBSR4      RETURN
2189  01 004CE  22C00008 A EKEYN  LI,R12    8           ERROR
2190  01 004CF  6B0004C8          B        CKEYN1
```

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2191                                        PAGE
2192  01 004D0  22D004F2      TYPERSP  LI,R13   MSG6              WAITING KEYIN
2193  01 004D1  22A0000A A    TYPEMSG  LI,R10   10                TIME IN
2194  01 004D2  30A00000 X             AW,R10   IOCLOCK           CURRENT TIME
2195  01 004D3  35A20000 X             STW,R10  DCT11,R1          TIME OUT
2196  01 004D4  72320000 X             LB,R3    DCT6,R1           Q PNTR
2197  01 004D5  6U000027 A             ENABLE
2198  01 004D6  225001B5               LI,R5    IOSCHED           FORCE RETURN
2199                                 *F*
2200                                 *F*       NAME:        MSGOUT
2201                                 *F*
2202                                 *F*       PURPOSE:     TO WRITE EITHER A CANNED MSG/MSG INTERNALLY
2203                                 *F*                    TO THE OPERATOR.
2204                                 *F*
2205                                 *F*       DESCRIPTION: CALL HERE WITH:
2206                                 *F*
2207                                 *F*       R1           DCT INDEX
2208                                 *F*       R3           IOQ INDEX
2209                                 *F*       R5           RETURN LINK
2210                                 *F*       R13          MESSAGE WORD  ADDRESS
2211                                 *F*
2212                                 *F*                    NOTE THAT ALL REGISTERS ARE SAVED
2213                                 *F*
2214        01 004D7                 MSGOUT   EQU          $
2215  01 004D7  022000A0 A             PUSH     10,R11            SAVE R11-R4
      01 004D8  0BB00000 N
2216  01 004D9  32C00000 X             LW,R12   Y06               FUNCTION
2217  01 004DA  32F00001 A             LW,R15   R1                DCT INDEX
2218  01 004DB  32100000 A             LW,R1    R13               MESSAGE ADDRESS
2219  01 004DC  6AB00519               BAL,R11  @CWRITE1          WRITE IT
2220  01 004DD  022000A0 A             PULL     10,R11            RESTORE REGS
      01 004DE  0AB00000 N
2221  01 004DF  E8000005 A             B        *R5               RETURN
2222                                 *
2223  01 004E0  0840D4C1 A    MSG1     TEXTC    ' MANUALN'
      01 004E1  D5E4C1D3 A
      01 004E2  15404040 A
```

```
2224  01 004E3  0740C5D9 A  MSG2   TEXTC  ' ERR0RN'
      01 004E4  D9D6D915 A
2225  01 004E5  0B40F3C9 A  MSG3   TEXTC  ' TIMED 0UTN'
      01 004E6  D4C5C440 A
      01 004E7  D6E4E315 A
2226  01 004E8  1140D5D6 A  MSG4   TEXTC  ' N0T 0PERATI0NALN'
      01 004E9  E340D6D7 A
      01 004EA  C5D9C1E3 A
      01 004EB  C9D6D5C1 A
      01 004EC  D3154040 A
2227  01 004ED  1140F6D9 A  MSG5   TEXTC  ' WRITE PR0TECTEDN'
      01 004EE  C9E3C540 A
      01 004EF  D7D9D6E3 A
      01 004F0  C5C3F3C5 A
      01 004F1  C4154040 A
2228  01 004F2  1040D7D3 A  MSG6   TEXTC  ' PLEASE RESP0NDN'
      01 004F3  C5C1F2C5 A
      01 004F4  40D9C5E2 A
      01 004F5  D7D6D5C4 A
      01 004F6  15404040 A
2229  01 004F7  0B40C3D6 A  MSG7   TEXTC  ' C0DE DISC ERRN'
      01 004F8  C4C540C4 A
      01 004F9  C9E2C340 A
      01 004FA  C5D9D915 A
2230  01 004FB  0B40D9C5 A  MSG9   TEXTC  ' REQ RETRYN'
      01 004FC  D840D9C5 A
      01 004FD  E3D9E815 A
2231  01 004FE  1540C9D5 A  MSG9A  TEXTC  ' INC0NSISTENT STATUSN'
      01 004FF  C3D6D5E2 A
      01 00500  C9E2E3C5 A
      01 00501  D5E340E2 A
      01 00502  E3C1E3E4 A
      01 00503  E2154040 A
```

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2232                                        PAGE
2233                                    *
2234   01 00504    00        A      DEVKEYN  DATA,1   0,'C','R','E'
       01 00504 1  C3        A
       01 00504 2  D9        A
       01 00504 3  C5        A
2235         00000003                NDEVKEYN EQU      3
2236   01 00505    2510007F  A      TP31     SLS,R1   *1                DCTINDEX
2237   01 00506    72700008  A               LB,R7    R8                CHECK SYNTAX
2238   01 00507    21700068  A               CI,R7    ','               COMMA
2239   01 00508    69300050E               BNE      TP32              ERROR
2240   01 00509    22200003  A               LI,R2    NDEVKEYN          NUMBER OF DEVICE KEYINS
2241   01 0050A    52800008  A               LH,R8    R8                GET COMMAND BYTE
2242   01 0050B    71840504                  CB,R8    DEVKEYN,R2        CHECK IT
2243   01 0050C    683004AA                  BE       TP33              GOT IT
2244   01 0050D    64200508                  BDR,R2   $-2              TRY MORE
2245   01 0050E    60000027  A      TP32     ENABLE                              ***** ENABLE *****
2246   01 0050F    22100004  A               LI,R1    4                 EH MESSAGE
2247   01 00510                    QCWRITE  RES      0
2248   01 00510    22700000  A      QCQC     LI,R7    0                 CANNED MESSAGE
2249                                    *F*
2250                                    *F*       NAME:         QCQUEUE
2251                                    *F*
2252                                    *F*       PURPOSE:      TO ENQUEUE  A I/O REQUEST TO  THE QC.
2253                                    *F*
2254                                    *F*       DESCRIPTION:  CALL HERE WITH;
2255                                    *F*
2256                                    *F*       R1            MESSAGE CODE
2257                                    *F*       R7            DCT INDEX (0 MEANS CANNED MSG)
2258                                    *F*       R11           RETURN LINK
2259                                    *F*
2260                                    *F*                     SAVES R5 THRU R11 (SEE  MSGOUT)
2261                                    *F*
2262         01 00511                   QCQUEUE  EQU      $
2263   01 00511    32C00019  N               LW,R12   Y01               SET ASSUMED FUNCTION CODE
2264   01 00512    32F00007  A               LW,R15   R7                SET DCT INDEX
2265   01 00513    68300515                  BEZ      $+2               ASSUMPTION IS RIGHT
```

```
2266  01 00514  32C0001A N          LW,R12   Y02              SET TO WRITE WITH DEVICE NAME
2267  01 00515  2110000E A          CI,R1    NMSG             CHECK FOR RECOGNIZED MESSAGE
2268  01 00516  69200519           BG       0CWRITE1         NO
2269  01 00517  72120523           LB,R1    MSGBASE,R1       TRANSLATE CODE TO ADDRESS
2270  01 00518  20100523           AI,R1    MSGBASE          ADD BASE ADDRESS FOR MESSAGES
2271  01 00519  22000000 A  0CWRITE1 LI,R0    0                SET NO END ACTION
2272  01 0051A  72200000 X  0C22     LB,R2    CJ0B             PRIORITY
2273  01 0051B  25200010 A          SLS,R2   16
2274  01 0051C  49C00002 A          BR,R12   R2
2275  01 0051D  20C00000 N          AI,R12   0CDCT            DCTX OF OC DEVICE
2276  01 0051E  F2E00001 A  0C23     LB,R14   *R1              BYTE COUNT FOR MESSAGE
2277  01 0051F  44D0051E            ANLZ,R13 0C23             GET BYTE ADDRESS TO R13
2278  01 00520  20BFFFFF A          AI,R11   -1               FIX RETURN
2279  01 00521  20D00001 A          AI,R13   1                SKIP COUNT
2280  01 00522  68000054            B        QUEUE            OUTPUT MSG
2281        00000000       MSG      CNAME    0
2282                               PR0C
2283                       LF       GEN,8    AF(1)-MSGBASE
2284                               PEND
2285  01 00523    0A       A  MSGBASE MSG      0C53             0 => EH MESSAGE
2286  01 00523 1  0A       A          MSG      0C53             1 => EH MESSAGE
2287  01 00523 2  04       A          MSG      0C51             2 => AVRERR MESSAGE
2288  01 00523 3  07       A          MSG      0C52             3 => LATER MESSAGE
2289  01 00524    0A       A          MSG      0C53             4 => EH MESSAGE
2290  01 00524 1  0D       A          MSG      0C60             5 => AVAIL
2291  01 00524 2  0A       A          MSG      0C53             6 =>
2292  01 00524 3  0A       A          MSG      0C53             7 =>
2293  01 00525    0F       A          MSG      0C70             8 => SYMB NOT ACTIVE
2294  01 00525 1  14       A          MSG      0C71             9 => SYMB ACTIVE
2295  01 00525 2  18       A          MSG      0C72             10=> SYMB NOT SUSP
2296  01 00525 3  1C       A          MSG      0C73             11=> NOT AVAIL
2297  01 00526    21       A          MSG      0C74             12=> SYMB NOT SUSPENDED
2298  01 00526 1  26       A          MSG      0C75             13=> SYMB TERMINATED
2299        0000000E       NMSG     EQU      BA($)-BA(MSGBASE)
2300                               BOUND    4
2301  01 00527                  0C51     RES      0
2302  01 00527    0A155A5A A            TEXTC    'N  AVRERRN'
```

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                01 00528     C1E5D9C5 A
                01 00529     D9D91540 A
    2303        01 0052A                        0C52      RES       0
    2304        01 0052A     08         A                 DATA,1    8,X'15',5,'L','A','T','E','R',X'15',0,0,0
                01 0052A 1   15         A
                01 0052A 2   05         A
                01 0052A 3   D3         A
                01 00528     C1         A
                01 00528 1   E3         A
                01 00528 2   C5         A
                01 00528 3   D9         A
                01 0052C     15         A
                01 0052C 1   00         A
                01 0052C 2   00         A
                01 0052C 3   00         A
    2305        01 0052D                        0C53      RES       0
    2306        01 0052D     08154040 A                   TEXTC     'N  EH  N'
                01 0052E     C5C86F40 A
                01 0052F     15404040 A
    2307                                        *
    2308        01 00530     0740C1E5 A         0C60      TEXTC     ' AVAILN'          DEVICE
                01 00531     C1C9D315 A
    2309                                        *
    2310              00000001                          DB        SYMBFLAG
    2311        01 00532     1140F2E8 A         0C70      TEXTC     ' SYMB NOT ACTIVEN'  SYMBIONT
                01 00533     D4C240D5 A
                01 00534     D6E340C1 A
                01 00535     C3E3C9E5 A
                01 00536     C5154040 A
    2312        01 00537                        0C71      RES       0
    2313        01 00537     0040F2E8 A                   TEXTC     ' SYMB ACTIVEN'
                01 00538     D4C240C1 A
                01 00539     C3E3C9E5 A
                01 0053A     C5154040 A
    2314        01 0053B                        0C72      RES       0
    2315        01 0053B     0140F2E8 A                   TEXTC     ' SYMB NOT SUSPN'
                01 0053C     D4C240D5 A
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        01 0053D   D6E340E2 A
        01 0053E   E4E2D715 A
2316    01 0053F              0C73    RES     0
2317    01 0053F   1040F2E8 A        TEXTC   ' SYMB NOT AVAILN'
        01 00540   D4C240D5 A
        01 00541   D6E340C1 A
        01 00542   E5C1C9D3 A
        01 00543   15404040 A
2318    01 00544              0C74    RES     0
2319    01 00544   1040F2E8 A        TEXTC   ' SYMB SUSPENDEDN'
        01 00545   D4C240E2 A
        01 00546   E4E2D7C5 A
        01 00547   D5C4C5C4 A
        01 00548   15404040 A
2320    01 00549              0C75    RES     0
2321    01 00549   1040C4C9 A        DATA    X'1040C4C9'       CNT,' DI'
2322    01 0054A   E2C340C2 A        TEXT    'SC BLOCK BAD'
        01 0054B   D3D6C3D2 A
        01 0054C   40C2C1C4 A
2323    01 0054D   15000000 A        DATA    X'15000000'
2324                                 FIN
2325                         *
2326                                 LOCAL
2327                         *
2328                                 END
        01 0054E   00009000 A
        01 0054F   A0FFFFFF A
        01 00550   50FFFFFF A
        01 00551   00000015 A

CONTROL SECTION SUMMARY: 01 00552   PT 0
```

* SYMBOL VALUES

ABA/00000004
ACCHECK/01 001E1
ACD/00000015
ACNDISP/00000009
ACNMAX/0000000C
ACS/00000005
AGV/00000000
ANSPROC/00000000
ARS/00000004
ASN/00000000
ASSIGNSC/01 002C4
ATINVAT/00000005
ATCYLBIT/00008000
ATPRIVBIT/00004000
BAATNGC/00000007
BAAVRNBU/00000005
BACIS/0000002C
BACOS/0000002C
BACSC/00000038
BACVI/00000024
BACVO/00000024
BADEVTP/00000006
BADSC/0000004C
BADSI/00000007
BAFCN/0000001C
BAFILDISP/0000002C
BAFUNM/00000002
BAHSC/00000050
BAIMT/00000038
BAKEYM/00000030
BALVA/00000029
BANLR/00000015
BANRA/00000008
BAORG/00000017
BAOVC/0000002D
BARAX/00000015
BARNDEV/00000016
BASCR/00000044
BASLIDES/00000003
BASPARE/0000004F
BASVA/0000004D
BAVDCTX/00000028
BAVNO/0000002C
BAVSND/00000024
BBUD/00000010
BCDA/0000000F
BFL/00000010
BISR2/01 0010F
BISR4/01 0004F
BITS/00000001
BLINK/00000000
BLK/00000006
BTD/00000000
BUF/00000002
BUFF1/00009400
BUFF2/00009600
BUFSIZ/00000800
BUFX/00000009
BUF1/FUNC
BUF1MSK/0000001F
BUF2/FUNC
BUF2MSK/000003E0
CBD/00000012
CBFLAGS/01 002B7
CCBD/00000004
CDA/00000008
CDAM/00000002
CFU/00000001
CFUPRIVBIT/00010000
CHAIN/01 000CC
CHAINCHK/01 000B8
CHANBLK/01 001D5
CHANTEST/01 002AC
CHECKMF/01 0000F
CHFLAGS/01 002BA
CHKDA1/01 00128
CHKDA2/01 00126
CHNEX/01 000C9
CHSAVE/01 002B4
CH21/01 000D1
CH22/01 000D5
CH50/01 000E6
CH55/01 000EE
CH60/01 00104
CIS/0000000B
CKEYN/01 004C4
CKEYN1/01 004C8
CLEANUP/01 0034A
CLEANUP1/01 0034A
CLOCK10/01 001F4
CLOCKBUT/01 00204
CLOCKXIT/01 0020A
CMD/00000014
COS/0000000B
CPCOR/01 00199
CRCOR/01 00197
CSC/0000000E
CTIOP/01 00454
CTOCINT/01 00235
CTRIG1/01 0022C
CVA/00000014
CVI/00000009
CVO/00000009
CYL/00000000
DCBCDAM/00000015
DCBCYLBIT/00020000
DCBNOSEPBIT/00000200
DCBPRIVBIT/00000800
DCBPROC/00000000
DCBSWXVBIT/00008000
DCCOR/01 0019B
DCT$FLD/LIST
DCT$SHIFT$AMT/00000010
DEFER/00000000
DEVKEYN/01 00504
DIR/00000000
DISCBPROC/00000001
DPADFDA/00010002
DPFDFDA/00010004
DRIVEI01/01 001AA
DSC/00000013
DSERV/01 001AF
DSI/00000001
DUALFLAG/00000001
EGV/00000000
EKEYN/01 004CE
EOP/00000000
ERA/00000003
EXT/00000000
FCD/00000000
FCN/00000007
FCON/00000000
FDA/00000001
FILDISP/0000000B
FIL1/00000005
FLD/00000015
FLINK/00000001
FLP/00000006
FNEMAX/00000020
FORCESC/01 002BF
FPARAM/0000000B
FRM/00000000

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FRONTEND/01 00002      FSP/00000007           FUN/00000001           FVA/00000014
GAVAL/00000003         GENERIC/01 0018D       GETQ/01 0002A          GQ10/01 00034
GQ11/01 00036          GQ40/01 0002F          HAACD/0000002A         HACCBD/00000008
HACMD/00000028         HAFLD/0000002B         HAPBD/00000029         HASND/00000019
HLC/00000013           HSC/00000014           HWDS1/00000003         IMT/0000000E
INCDC/01 0004E         INCTP/01 0004D         INTSEXIT/01 00217      INVAL/01 001DF
IOALOAD/01 002B1       IOCUEXIT/01 00381      IOFOLLOW/01 0037B      IOKEYIN/01 00387
IOQINIT/01 00110       IOREJECT/01 002CE      IOSCCHK/01 0036F       IOSCEXIT/01 00380
IOSCHED/01 001B5       IOSCHED1/01 001B6      IOSCHED2/01 001BB      IOSCHED3/01 001BD
IOSTEX/01 0027F        IOSTEX1/01 00281       IOSTEX2/01 00287       IOSTEX3/01 0028B
IOSTEX35/01 0029B      IOSTRT/01 0024C        IOSTRT1/01 00255       IOSTRT2/01 00272
IOSTRT3/01 00275       IOSTRT4/01 0027D       IOSTRT5/01 00263       IOSTRT6/01 00268
IOUNMAP/01 00000       I010/01 0030F          I012/01 0031A          I014/01 00327
I020/01 0033F          I022/01 0033F          I030/01 00343          I050/01 00325
I062/01 002EF          I07/01 002FB           I070/01 002F7          I071/01 0030D
I075/01 00300          I076/01 0030A          I08/01 00324           IPREGV/01 0001E
KAD/00000012           KBUF/0000000A          KEYDV/01 004C0         KEYIN/01 00474
KEYM/0000000C          KEYTV/01 004C3         LDA/00000007           LRDLO/0000004E
LSLIDES/0000004D       LVA/0000000A           MAXACN/00000010        MBG/00000000
MIDIS/0000000C         MIUD/00000010          MOCOR/01 001A7         MOD/00000000
MONPROC/00000001       MPBITS/00000000        MSGBASE/01 00523       MSG1/01 004E0
MSG6/01 004F2          MTCOR/01 0019D         M1/00000001  S         M10/0000000A  S
M11/0000000B  S        M12/0000000C  S        M13/0000000D  S        M14/0000000E  S
M15/0000000F  S        M16/00000010  S        M17/00000011  S        M18/00000012  S
M19/00000013  S        M2/00000002  S         M20/00000014  S        M21/00000015  S
M22/00000016  S        M23/00000017  S        M24/00000018  S        M25/00000019  S
M26/0000001A  S        M27/0000001B  S        M28/0000001C  S        M29/0000001D  S
M3/00000003  S         M30/0000001E  S        M31/0000001F  S        M32/00000020  S
M4/00000004  S         M5/00000005  S         M6/00000006  S         M7/00000007  S
M8/00000008  S         M9/00000009  S         NAV/00000004           NAVX/00000002
NDEVKEYN/00000003      NEXTQUE/01 001CC       NL/TEXT                NLR/00000005
NMSG/0000000E          NOSEP/00000000         NOU/00000000           NRA/00000002
NVA/00000008           NWIO/00000001          NWK/00000005           NXTA/00000010
NXTF/00000005          OC/00000002            OCQC/01 00510          OCT10/01 00446
OCT20/01 0044B         OCT30/01 0044E         OCT35/01 0044F         OCT40/01 00451
OCT60/01 004A6         OCWRITE1/01 00519      OC22/01 0051A          OC23/01 0051E
OC51/01 00527          OC52/01 0052A          OC53/01 0052D          OC60/01 00530
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  8C70/01 00532          8C71/01 00537          8C72/01 0053B          8C73/01 0053F
  8C74/01 00544          8C75/01 00549          8LDTNEWFC/01 0016E     8NWK/00000005
  8RG/00000005           8RIG/01 00000          8VC/0000000B           PAT/00000011
  PBD/00000014           PCK/00000000           PFSRMES/01 00490       PRIV/00000000
  PTC8R/01 00195         QBUF/00000007          QD30/01 00143          QD31/01 00145
  QD33/01 0014A          QD4/01 00130           QD49/01 00176          QD50/01 0017B
  QD51A/01 0015E         QD52/01 00180          QD56/01 00184          QD60/01 00189
  Q10/01 00054           Q11/01 00060           Q13/01 00070           Q15/01 00078
  Q15AA/01 00087         Q151/01 0007C          Q20/01 0008E           Q26/01 0009D
  Q26A/01 0009F          Q27/01 000A4           Q28/01 000A7           Q28A/01 000A6
  Q29/01 00095           Q30/01 000A9           Q40/01 000B1           Q50/01 000B2
  R$LDCTX/00000C00       R$LSECTA/00000000      R$STDCTX/00000000      R$STSECTA/00000000
  RAX/00000005           RC10/01 003DD          RC14/01 003ED          RC15/01 003FB
  RC22/01 00409          RC23/01 00411          RC24/01 00416          RC26/01 0041B
  RC28/01 0042F          RC29/01 0043C          RC3/01 003A6           RC30/01 00440
  RC4/01 003B3           RC5/01 003B8           RC6/01 003C0           RC7/01 003D1
  RC8/01 003C8           RC9/01 003D5           RDLO/0000004C          RELEASSC/01 002A3
  REQC8M/01 00398        REQC8M1/01 0039B       REQERR/01 0038F        REQNSTRT/01 001CA
  REQSERV/01 001DC       REQSTRT/01 001BF       RESTPRI/01 00385       RKEYN/01 004CA
  RLIM/00000015          RNDEV/00000005         RNR/00000010           RST8RE/00000014
  RSZ/00000003           RTPRI8/000000C0        RWS/0000000D           R0/00000000
  R1/00000001            R10/0000000A           R11/0000000B           R12/0000000C
  R13/0000000D           R14/0000000E           R15/0000000F           R2/00000002
  R3/00000003            R4/00000004            R5/00000005            R6/00000006
  R7/00000007            R8/00000008            R9/00000009            SCCHECK/01 001D9
  SCFU/00000004          SCHEDHLD/01 001D1      SCHEDXIT/01 001CE      SCR/00000011
  SC17/01 0007A          SECT$FLD/LIST          SELECTAB/01 001E4      SEQ/00000005
  SETKEYIN/01 00387      SID/00000015           SI8FAIL/01 002D9       SKIPREG/01 00021
  SKREG/01 00023         SKREG1/01 00025        SKREG2/01 00026        SND/0000000C
  SQS/00000014           SREC/00000006          SSCF8RCE/01 002BD      START18/01 0023A
  SVA/00000013           SWXV/00000000          SYMBFLAG/00000001      S69PR8C/00000001
  TAB1/0000000F          TCFU/0000000F          TDA/00000005           TLB/0000000E
  T8F/00000000           T8PMSK/00007C00        TPBASE/01 0045B        TP10/01 0045D
  TP20/01 0045D          TP25/01 00466          TP26/01 00467          TP30/01 00223
  TP30A/01 00228         TP31/01 00505          TP32/01 0050E          TP33/01 004AA
  TP40/01 00468          TP5/01 00454           TP50/01 0046B          TP60/01 00476
  TP62/01 00477          TP63/01 0047E          TP64/01 00480          TP65/01 00483
```

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    TP70/01 0048C           TP90/01 00497           TP91/01 0049F           TRN/00000005
    TTL/00000000            TYC/00000002            TYC0R/01 00193          TYPC0R/01 0018F
    TYPEMSG/01 004D1        TYPERSP/01 004D0        UFLAGS/00000000         ULB/0000000C
    USR/00000000            UTSPR0C/00000001        VDCTX/0000000A          VFC/00000000
    VN0/00000005            VSND/00000009           VT0C:BITMAP/00000007
    VT0C:MAPWL/00000004     VT0C:NVAT/00000005      VT0C:SNTD/00000003      WABLK/00000006
    WAT/00000000            WFNEMAX/00000008        WRDL0/00000013          WXBUFSIZ/00000100
    XBUFSIZ/00000400        XF/00000004  S          XFF/00000008  S         X1/00000001  S
    X10/00000005  S         X100/00000009  S        X1000/0000000D  S       X2/00000002  S
    X20/00000006  S         X200/0000000A  S        X2000/0000000E  S       X3/00000002  S
    X4/00000003  S          X40/00000007  S         X400/0000000B  S        X4000/0000000F  S
    X7/00000003  S          X7F/00000007  S         X8/00000004  S         X80/00000008  S
    X800/0000000C  S        X8000/00000010  S       Y0001/00000011  S       Y0002/00000012  S
    Y0004/00000013  S       Y0008/00000014  S       Y001/00000015  S        Y002/00000016  S
    Y004/00000017  S        Y008/00000018  S        Y01/00000019  S        Y02/0000001A  S
    Y04/0000001B  S         Y08/0000001C  S         Y1/0000001D  S         Y2/0000001E  S
    Y4/0000001F  S          Y8/00000020  S          ZER/TEXT                ZER0S/LIST
    1Q1/01 0003F            1Q2/01 00027            1Q3/01 00044            1Q4/01 0004F
*   EXTERNAL DEFINITIONS
    CHKDA/01 00112          CHKDAQ/01 00115         CTRIG/01 0022B          DRIVEI0/01 001A9
    ENBSR4/01 00238         F0RCEI0/01 001AC        INTSIM/01 0020B         I0INT/01 002DD
    I0G/01 00000            I0SCU/01 00358          I0SST/01 00248          MSG0UT/01 004D7
    MSG2/01 004E3           MSG3/01 004E5           MSG4/01 004E8           MSG5/01 004ED
    MSG7/01 004F7           MSG9/01 004FB           MSG9A/01 004FE          NEWQ/01 00054
    NEWQNW/01 00052         NEWQNWM/01 00050        0CINT/01 00443          0CQUEUE/01 00511
    0CWRITE/01 00510        PL5BSR4/01 000B6        PVCHKDA/01 00116        QUEUE/01 0012F
    QUEUE1/01 0012D         Q15A/01 0007E           Q51/01 000B5            RC20/01 003FF
    RC21/01 00405           RESCHED/01 00385        RTRET1/01 00328         RTRET2/01 002F6
*   PRIMARY REFERENCES
    AVRDCT          AVRTBLNE        BATAPE          BTDBIT          BT31T80         BUFLIMS         C:N8Q
    C:RTRW          CFUBIT          CIT1            CIT2            CIT3            CIT4            CIT5
    CIT6            CJ88            C80C10          CTACT           CTFLAGS         CT0C            CURBQ
    DCACCESS        DCT$MASK        DCT$MASK$2      DCTSIZ          DCT1            DCT1A           DCT1P
    DCT10           DCT11           DCT12           DCT13           DCT14           DCT15           DCT16
    DCT17           DCT18           DCT19           DCT2            DCT20           DCT21           DCT22
    DCT23           DCT24           DCT25           DCT3            DCT4            DCT5            DCT6
    DCT7            DCT8            DCT9            DEVCTCHK        DID             DISCLIMS        DPACCESS
```

DSCCVT	E:IC	E:IP	ERRL0G	INTCNT	INTFLG	I0CL0CK
I0CTQ	I0PSD	I0Q1	I0Q10	I0Q11	I0Q12	I0Q13
I0Q14	I0Q15	I0Q16	I0Q2	I0Q3	I0Q4	I0Q5
I0Q6	I0Q7	I0Q8	I0Q9	I0SERCK	J:CTIME	J:DCBLINK
J:JIT	J:RWECB	JIT	J0VVP	J0VVPA	JX:CMAP	JXCMAP
KEYINBUF	MAP	MASKS	MAXBQ	MBGBIT	MP00L	MP00LIM
0CDCT	0CPSD	PFSRI0	QFREE	RBLIMS	RCVPSD	REGIPSD
S:CUN	SC1900	SECT0R$MASK	SL:BXMF	SL:I0TA	SL:0XMF	SQHD
SSE0	SYSACT	T:GJ0B	T:PULLE	T:REG	T:RUE	T:SAVE
T:SSE	IB:FLGS	TEMP	TPACCESS	TSTACK	UB:MF	UB:PRI0
UNEXP	UNMAP	XE7	XFB	X44	YE	YFF
YFFFF	Y00FE	Y03	Y05	Y06	:BIG	:B560
:B9						

* SECONDARY REFERENCES

CTGL	CTINT	CTWD	ECBP0ST1	RBQCK	RTCU	RTINT
RTI0STRT	RTT0	SACT				

* NO UNDEFINED SYMBOLS
* ERROR SEVERITY LEVEL: 0
* NO ERROR LINES