```
ASSIGN M:CI,(FILE,RTROOT,!DOOCI)
METASYM CI,L0,CN
    .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
```

```
ALLOCATION
        239=EQU         1360/LI
ALTERR
        175/REF         2230/BEZ        2232/B
BLCKD:MASK
        163/REF         1105/CW
BT31T00
        121/EQU         122/EQU         124/EQU         126/EQU         127/EQU         166/REF         208/EQU
        210/EQU         211/EQU         230/EQU         233/EQU         237/EQU         331/LW          337/LW
        343/LW          349/LW          690/CW         1345/LW         1351/LW         1353/LW         1544/BR
       1725/BR         1772/BR         1776/BR
CALBAD
        160/REF          834/B          993/B          1276/B          1524/B          1663/B          1680/B
CHKBIT
        167/REF         1545/BAL        1562/BAL        1567/BAL
CHKBIT1
        167/REF         1539/BAL
CHKG1
        641=BDR          647/BNE        651/BNE
CHKG2
        640/BE           644=LI
CHK1
        324/BLE          326=B
CNVL
        453=CH           455/BDR
CNVOK
        454/BE           458=LH
C15HIGH
        200=EQU          203/DATA
C15LOW
        197=EQU          203/DATA        835/LI
C15TV
        835/LI           842=EQU
C19CS
        205=EQU         1256/SLS
D
         88=EQU          404/LI          533/LI          596/LI          636/LI          644/LI          648/LI
```

EXSC
1578/B 1595*SCREECH
EXUIMASK
162/REF 1101/CW
EX1A
1568/B 1604*LW
EX1B
1571*SLS 1605/B
EX11
1525/LI 1530*BCS
EX12
1515/BLZ 1525*LI
EX14
1538*PUSH 1602/B
EX15
1546/B 1553*LW
EX16
1563/B 1565*PUSH
EX17
1550/BNEZ 1562*BAL
EX18
1535/BEZ 1596*STW
EX19
1555/BLE 1557*LW
EX21
1653/BCR 1664*LI
EX22
1664/LI 1681*BCS
EX23
1679*LW 1681/BCS 1684/BAZ 1687/BNE
EX24
1669/BCR 1682*LB
EX25
1690*EQU 1715/BAL
FCD
689/LW
FLGIINH

```
        233*EQU         925/BR
FLGIINHR
        234*EQU         928/AND         1008/AND        1219/AND
FLGILIC
        230*EQU         1329/CW         1347/CW         1349/BR
FLGILICR
        231*EQU         1331/AND
FPTDCB
        209*EQU         1526/CI         1666/CI
FPTEA
        208*EQU         1598/CW
FPTF1
        207*EQU         1327/CI
GINT1
        1999/BGE        2003*LI
HIBRET
        1724/LI         1727*BAL
HBLDBN
        1328/BAZ        1342*EQU
HBLD2
        1348/BANZ       1359*ENABLE
ICB
        159/REF         405/LI          974/LI
ICBBLNK
        112*EQU
ICBCLK
        111*EQU
ICBDL
        100*EQU         1205/AI         1206/LW         2224/AI         2227/STS        2235/AI
ICBDLDATA
        104*EQU
ICBDLFLG
        102*EQU
ICBENTPSD0
        103*EQU         2236/LW
ICBGJACN
        109*EQU         648/LI          2007/LM
```

```
ICBGJNME
        108*EQU         644/LI          2008/LM
ICBGJPRI
        106*EQU         2003/LI
ICBGUN
        107*EQU         636/LI          2011/LI
ICBICBADR
        105*EQU
ICBINT
         98*EQU         404/LI          533/LI          1997/INT        2131/LW         2170/LW         2242/INT
ICBLNK
         93*EQU         1252/STW
ICBPRI
        101*EQU         976/LI          1234/AI         2098/LW         2126/STS        2163/STS
ICBPRI0
         97*EQU         1209/LI         1235/LI         2147/LI
ICBPSD1
         95*EQU         596/LI          1996/AI         2050/AI
ICBPSD2
         96*EQU
ICBSIZE
        160/REF         410/AI          982/AI
ICBSTAT
         92*EQU         406/LW          489/LW          544/LW          566/STS         568/STS         571/STS
        573/STS         575/AND         576/STW         581/LW          592/STW         978/LW          1082/LW
       1214/LW          1217/STW        1247/LW         2150/STS
ICBSYSEP
        113*EQU
ICBTUN
        110*EQU
ICBTYP1
        115*EQU
ICBTYP2
        116*EQU         995/CI          1086/CI
ICBTYP3
        117*EQU         1245/CI
ICBUN
```

```
          99=EQU          975/LI          1091/LI         2096/LI
ICBXPSD
          94=EQU
INHIBIT
         910/BEZ          920=EQU
INHOFF
         924/BEZ          928=AND
INHRET
         926=STH          929/B
INTCONAD
         567/B            573=STS
INTCONEXU1
         531/EXU          551=EQU
INTCONEXU2
         532/EXU          563=EQU
INTCONR
         565/B            569/B           575=AND
INTCON2
         536/BG           581=LW
INTCON3
         533=LI           577/B
INTCON4
         583/BE           589=CW
INTCON5
         587/BANZ         590/BANZ        594=CW
INTCON6
         547/B            591=AND
INTLBSIZ
         159/REF          452/LI
INTLB1
         159/REF          453/CH
INTLB2
         159/REF          458/LH
INTLB3
         170/REF          459/LB
INTRTNA
        1224/BEZ         1233/BG         1243=ENABLE
```

```
INTRTNB
        1222*LI         1230/BNE
INTRTNERR
        1203/BEZ        1275*LW
INTRTNX
        1249/BEZ        1255/B          1264*LI
INTRTN1
        1246/BNE        1256*SLS
INTRTN2
        1259/BNE        1263*BAL
INTSIM
         168/REF        1726/B
INTSTAT
         146/DEF        1068/BAL        1077*BAL
INTSTATX
        1081/B          1100/BANZ       1126/B          1128/B          1130*STB
INTSTAT1
        1106/BANZ       1124*LI
INTSTAT2
        1078/BCS        1082*LW
INTSTAT3
        1087/BNE        1091*LI
INTSTAT4
        1102/BANZ       1127*LI
INTSTAT5
        1104/BANZ       1129*LI
IOINST
        1689/EXU        1705*EQU
IOQ8
         166/REF        1774/INT
IOSCU
         173/REF        1880/BEZ        1893/B
IOS1
        1775/BCR        1777*AI
IOWAIT:MASK
         162/REF        1103/CW
JIDCBLL
```

```
        167/REF         687/CLM
JITCBHDR
        163/REF         1200/LW         1207/STS        1346/STS        1352/STS        1580/STS        1700/STS
       2225/LW         2228/STS        2233/LW
JITCB
        175/REF         2229/LW         2243/LW
JBIPRIV
        161/REF         323/CB
JXICMAP
        167/REF         772/LOAD
LCT1
       1405/BANZ        1418*LB
LCT2
       1407/BANZ        1413/BEZ        1420*LB
LCT3
       1414*EXU         1419/B          1421/B
LOCATE
        409/BE          414*LW
LOCICB1
        400/BAZ         403*LI
LOCNA
        407/BGEZ        410*AI
LOOP
        406*LW          411/BDR
LOOP1
        639*CB          641/BDR
LOOP2
        978*LW          983/BDR
MASKS
        167/REF         286/AND         289/AND         491/AND         692/AND         696/AND         914/AND
       1084/AND        1228/AND        1257/AND        1549/AND        1559/LW         1688/AND        2105/AND
       2112/AND
MAXG
        168/REF         638/LI
MONORG
        161/REF         535/CI
MONPROC
```

```
          75*SET
MTBINST
        1409/EXU        1411/EXU        1414/EXU        1416/FXU        1424*MTB
MTRTNO
         164/REF        1265/B
NB31T80
         119/EQU         123/EQU         125/EQU         166/REF         231/EQU         234/EQU        1215/AND
        1216/AND        1721/AND        1835/AND
NEWQNW
         165/REF        1577/BAL
NINTS
         159/REF         403/LI          977/LI
NXTDCT
         735*CH          739/BDR
PB!LCT
         170/REF        1424/MTB        1425/MTB
QFINA
         979/BGEZ        982*AI          999/BG
QFI0K
         996/BE         1000*LI
QFI1
         981/BE          994*BAL
RBBATIUN
         240*EQU        1363/LI
RT!GINT
         152/DEF        1953*EQU
RT!GINTP
         173/REF        1990/INT        1995/INT
RT!INTENTRY
         154/DEF        2180*EQU
RT!UINT
         153/DEF        2016*EQU
RT!UINTP
         174/REF        2046/INT        2049/INT
RTALTCP
         134/DEF         785*EQU
RTCAL0K
```

```
        824/BCR         835*LI
RTCAL15C0DES
        203*DATA        823/CLM
RTCHKGUN
        145/DEF         600*EQU     1088/BAL
RTCHKPRIV
        136/DEF         294*EQU      907/BAL     1322/BAL     1512/BAL     1652/BAL
RTCL0CK#
        176/REF         854/LI
RTCNVTXT
        138/DEF         401/BAL      417*EQU
RTC0NNECT#
        176/REF         849/LI
RTCU
        150/DEF        1839*EQU
RTDCBCHK
        140/DEF         654*EQU     1528/BAL     1668/BAL
RTDEVCHK
        141/DEF         703*EQU     1527/BAZ     1667/BAZ
RTDISC0N#
        176/REF         850/LI
RTERRIBADCAL
        223*EQU         833/LI
RTERRIINTRTN
        225*DATA       1275/LW
RTERRII0EX1
        227*DATA       1662/LW
RTERRII0EX2
        228*DATA       1679/LW
RTERRIPARAM
        226*DATA       1523/LW
RTERRIQFI
        224*DATA        992/LW
RTGJ0BC0N#
        176/REF         848/LI
RTH0LD
        853/B          1278*EQU
```

```
RTICBHDR
        163/REF         1251/LW         1253/STW
RTICBTYP
        139/DEF          462*EQU         994/BAL         1085/BAL        1244/BAL
RTINT
        149/DEF         1780*EQU
RTINTCBN
        851/B            857*EQU
RTINTCBNTRBL
        494*EQU          915/BAL        1261/BAL        1263/BAL
RTINTRTN
        144/DEF         1133*EQU
RTINTSTAT
        855/B           1016*EQU
RTIBEX1
        846/B           1473*EQU
RTIBEX2
        847/B           1607*EQU
RTIBSTRT
        148/DEF         1730*EQU
RTLCT
        143/DEF         1334/BAL        1357/BAL        1368*EQU
RTLBCICB
        137/DEF          363*EQU         911/BAL        1077/BAL
RTNRRTSEG
        162/REF          837/LI
RTQFI
        852/B            931*EQU
RTRESDF#
        170/REF          843/LI
RTRETC
        332/B            338/B           344/B           352*EQU
RTRET1
        172/REF         1837/B
RTRET2
        172/REF         1831/BCS        1834/BANZ
RTRBBT
```

```
SIRTCORE
        161/REF         1337/AWM        1358/AWM        1464/SW
SIRTIR
        174/REF         2154/STW
SIRTUN
        175/REF         2155/STW
SISTL#
        170/REF         1466/LW
SBIGJOBUN
        168/REF          639/CB
SIOREJECT
        237*EQU         1879/AND
SLIRSVP
        171/REF         1467/SW
STATA
        121*EQU          545/CW          555/LW          589/CW
STATAE
        120*EQU          554/LW
STATAETR
        221*EQU          553/LW
STATAR
        119*EQU
STATBLK
        218*EQU         1125/LI
STATC
        127*EQU
STATE
        122*EQU          556/LW          594/CW
STATER
        123*EQU          557/LW          574/LW
STATEXU
        215*EQU         1127/LI
STATINTSHFT
        130*EQU         1083/SLS
STATIOW
        217*EQU         1129/LI
STATNA
```

```
        219*EQU         1071/CI         1080/LI
STATB
        126*EQU         1248/AND
STATRIG
        124*EQU          559/LW          586/CW
STATRIGR
        125*EQU          591/AND
STATWAIT
        216*EQU         1096/LI
STATYPSHFT
        129*EQU          490/SLS
TIGJOB
        174/REF         2009/BAL
TIOVERLAY
        166/REF          838/B
TIPULLE
        176/REF         2177/B          2249/B
TIREG
        160/REF         1013/BAL
TIRUE
        175/REF         2158/B
TISAVE
        167/REF         1994/BAL        2048/BAL
TISSE
        174/REF         2013/B          2053/B
TISSEM
        169/REF         1264/LI
TITOTSZ
        160/REF         1335/BAL        1355/BAL        1462/BAL
TIUTSXTS
        176/REF         2231/BAL
TIC
       1404/CI
TRAPEXIT
        162/REF          361/B          1014/B          1716/LI         1728/B
TSTACK
        358/AW          1003/AW         1069/LW         1547/LW*        1557/LW*        1692/LW         2237/LW
```

```
        2247/LW
UB!ACP
        169/REF         1418/LB
UB!APB
        169/REF         1410/LB
UB!APR
        169/REF         1408/LB
UB!ASP
        169/REF         1412/LB
UB!DB
        169/REF         1420/LB
UB!DV
        169/REF         1415/LB
UB!PRIB
        173/REF         1212/STB        1240/STB        1570/LB
UB!PRIBB
        173/REF          998/CB         1211/STB        1232/CB         1236/LB         1241/STB        2143/CB
        2145/LB         2146/STB
UB!US
        163/REF         1095/LB
UFLAGS
         77=SET
UH!DL
        174/REF         1010/LH         1221/LH         2104/LH         2161/LH         2165/STH
UH!FLG
        164/REF          922/LH          926/STH        1007/LH         1009/STH        1218/LH         1220/STH
        1403/LH
UH!FLG2
        163/REF         1326/LH         1332/STH        1350/STH
UINTQ
        155/DEF         2051/BAL        2055=EQU
UINTQ1
        2098=LW         2100/ANLZ
UINT1
        2112=AND        2119/B
UINT2
        2113/BEZ        2117/BL         2121=LI
```

YC
172/REF 1579/LW 1699/LW 1832/CW
YF
171/REF 356/LW 1001/LW 1697/LW
YFF
174/REF 2099/LW
YFFFF
171/REF 451/BR
Y06
86/REF 120/EQU
Y2
210*EQU 2149/LW
24BM14
175/REF 2248/STW*
24BM18
175/REF 2241/STW*

```
                *M*     RTR88T RESIDENT REAL-TIME M8DULE
                *
         01 00000 RTR88T EQU     $
                  DEF     RTR88T          M8DULE BIAS
                ********************************************************************
                *P*     NAME:   RTR88T
                *,*
                *,*     PURP8SE: T8 PR8VIDE THE RESIDENT INTERFACE F8R ALL CAL1,5'S
                *,*             (EXCEPT M:EXU, M:MASTER & M:SLAVE WHICH ARE HANDLED
                *,*             IN ALTCP.
                *,*
                *,*             T8 PR8VIDE THE INTERRUPT HANDLERS F8R REAL AND PSEUD8
                *,*             INTERRUPTS.
                *,*
                *,*             T8 PR8VIDE THE I88 SUBR8UTINES WHICH ARE REQUIRED 8NL
                *,*             AS THE RESULT 8F M:I8EX (REAL-TIME) CAL1,5'S.
                *,*
                *,*     DESCRIPTI8N:   ALL CAL1,5'S (EXCEPT AS N8TED AB8VE) PASS
                *,*             THR8UGH RTR88T.  C8NTR8L IS PASSED T8 THE RTNR M8DULE
                *,*             IN THE RT8V 8VERLAY F8R THE FOLL8WING CAL1,5'S:
                *,*                             RESDF MEMORY   (FPT C8DE = .18)
                *,*                             M:ST8PI8                    .1C
                *,*                             M:STARTI8                   .1D
                *,*                             M:GJ88C8N                   .20
                *,*                             M:C8NNECT                   .21
                *,*                             M:DISC8NNECT                .22
                *,*                             M:CL8CK                     .26
                *,*             ALL 8THERS ARE HANDLED IN RTR88T:
                *,*                             M:I8EX (SI8)   (FPT C8DE = .1E)
                *,*                             M:I8EX (TI8/TDV/HI8)        .1F
                *,*                             M:INTC8N/M:INHIBIT          .23
                *,*                             M:8FI                       .24
                *,*                             M:H8LD                      .25
                *,*                             M:INTSTAT                   .27
                *,*
                *,*             REAL-TIME INTERRUPT-RECEIVING R8UTINES ALS8 RESIDE
                *,*             IN RTR88T (THEY INTERFACE T8 THE SCHEDULER).
```

```
*,*           THE OCCURRENCES OF REAL & PSEUDO INTERRUPTS CAUSE
*,*           THE MAPPED REAL-TIME USER (CENTRALLY CONNECTED) TO BE
*,*           SCHEDULED BASED UPON INFORMATION CONTAINED IN THE
*,*           INTERRUPT CONTROL BLOCK (ICB) ASSOCIATED WITH THE
*,*           OCCURRING INTERRUPT.
*,*
*,*           CERTAIN IOQ SUBROUTINES THAT NEED BE PRESENT ONLY IN
*,*           A REAL-TIME SYSTEM ALSO RESIDE IN RTROOT.
*,*           THESE PERFORM THE SPECIAL PROCESSING REQUIRED (OF
*,*           IOEX-TYPE REQUESTS) FOR INTERRUPT END-ACTION INTER-
*,*           FACE TO USER'S PROGRAM, TIME-OUT INTERFACE TO USER'S
*,*           PROGRAM, AND CLEAN-UP OPERATIONS.
*
*K* PSEUDO-INTERRUPT AN INTERRUPT WHOSE ADDRESS IS GIVEN AS A VALUE
*,*                 BETWEEN X'1000' AND X'7FFF'; SUCH INTERRUPTS ARE
*,*                 CAPABLE OF BEING TRIGGERED ONLY VIA THE M:INTCON
*,*                 (INTERRUPT CONTROL) CAL1,5 AND ARE USEFUL FOR
*,*                 INTER-PROGRAM COMMUNICATION.
*
*K* CENTRALLY-CONNECTED-INTERRUPT ANY INTERRUPT (REAL OR PSEUDO) WHICH
*,*                               HAS BEEN ASSOCIATED WITH A USER VIA
*,*                               A CAL1,5 (E.G., M:CONNECT/M:GJOBCON).
*,*                               INFORMATION ABOUT THE 'CONNECTED'
*,*                               INTERRUPT AND USER IS CARRIED IN AN
*,*                               INTERRUPT CONTROL BLOCK (ICB).
*
*K* INTERRUPT-CONTROL-BLOCK A 12-WORD, SYSGEN-BUILT DATA BLOCK USED TO
*,*                         STORE INFORMATION ABOUT AN INTERRUPT AND THE
*,*                         USER WHO IS 'CONNECTED' TO THAT INTERRUPT.
**********************************************************************
          TITLE   'R T R O O T   D A T A'
```

```
                                  ****************************************************************
                                  *                               S E C T I O N   II
                                  *
                                  *                                 DATA DEFINITIONS
                                  ****************************************************************
                                  *
          00000001                MONPROC  SET      1                   PICK-UP DCB DEFINITIONS
          00000001                UTSPROC  SET      1                   PICK-UP X560 PROC
          00000001                UFLAGS   SET      1                   PICK-UP UH:FLG BIT DEFINITIONS
                                           SYSTEM   UTS
                                  *        SYSTEM   RT:ICBTD            ICB TABLE DEFINITIONS
                                  ****************************************************************
                                  *        NOTE:  THE FOLLOWING SYMBOL DEFINITIONS APPEAR ALSO
                                  *               IN THE MODULE 'RTNR', ANY CHANGES TO THE ICB
                                  *               TABLE MUST BE MADE IN BOTH MODULES****************
                                  *****************************************************************
                                  *
                                           REF      YO6                 MASK: ARMED/ENABLED BITS IN ICBSTAT
                                  *
          00000001                D        EQU      1                   RESOLUTION DISPLACEMENT WITHIN TABLE
          00000002                W        EQU      2                   WORD DISPLACEMENT WITHIN TABLE
                                  *
                                  *
          LIST                    ICBSTAT  EQU      0,0                 HALFWORD
          LIST                    ICBLNK   EQU      0,0                 WORD
          LIST                    ICBXPSD  EQU      1,1                 WORD
          LIST                    ICBPSD1  EQU      1,2                 DOUBLE-WORD
          LIST                    ICBPSD2  EQU      2,4                 DOUBLE-WORD
          LIST                    ICBPRIO  EQU      24,6                BYTE
          LIST                    ICBINT   EQU      13,6                HALFWORD
          LIST                    ICBUN    EQU      28,7                BYTE
          LIST                    ICBDL    EQU      8,8                 WORD
          LIST                    ICBPRI   EQU      32,8                BYTE
          LIST                    ICBDLFLG EQU      33,8                BYTE
          LIST                    ICBENTPSD0  EQU   9,9                 WORD
          LIST                    ICBDLDATA   EQU   10,10               WORD
          LIST                    ICBICBADR   EQU   11,11               WORD
```

```
         LIST         ICBGJPRI EQU     24,6            BYTE
         LIST         ICBGUN   EQU     29,7            BYTE
         LIST         ICBGJNME EQU     4,8             DOUBLE-WORD
         LIST         ICBGJACN EQU     5,10            DOUBLE-WORD
         LIST         ICBTUN   EQU     1,1             WORD
         LIST         ICBCLK   EQU     2,2             WORD
         LIST         ICBBLNK  EQU     4,4             WORD
         LIST         ICBSYSEP EQU     3,3             WORD
                      *
         00000000     ICBTYP1  EQU     0               ICBSTATYP FOR TYPE-I ICB
         00000001     ICBTYP2  EQU     1               ICBSTATYP FOR TYPE-II ICB
         00000002     ICBTYP3  EQU     2               ICBSTATYP FOR TYPE-III ICB
                      *
         FR           STATAR   EQU     NB31T00+X'1A'   ICBSTAT MASK:ARMED BIT RESET
         EXT          STATAE   EQU     Y06                          ARMED AND ENABLED
         FR           STATA    EQU     BT31T00+26                   ARMED
         FR           STATE    EQU     BT31T00+27                   ENABLED
         FR           STATER   EQU     NB31T00+X'1B'                ENABLED BIT RESET
         FR           STATRIG  EQU     BT31T00+28                   TRIGGERED
         FR           STATRIGR EQU     NB31T00+X'1C'                TRIGGERED BIT RESET
         FR           STATO    EQU     BT31T00+29                   ONESHOT BIT
         FR           STATC    EQU     BT31T00+31                   CLEAR BIT
                      *
         FFFFFFE9     STATYPSHFT    EQU -23            SHIFT-COUNT TO RIGHT-JUSTIFY STATYP
         FFFFFFE7     STATINTSHFT   EQU -25            SHIFT-COUNT TO RIGHT-JUSTIFY STATIN
                      *        END
                      ******************************************************************
```

```
133                     PAGE
134                     DEF     RTALTCP         CAL1,5 DRIVER
135                     DEF     RTWD            SUBR TO FORMAT & ISSUE WD INSTR
136                     DEF     RTCHKPRIV       SUBR TO CHECK USER PRIVILEGE
137                     DEF     RTLOCICB        SUBR TO LOCATE A GIVEN ICB
138                     DEF     RTCNVTXT        SUBR TO CONVERT INT LBL TO INT ADR
139                     DEF     RTICBTYP        SUBR TO EXTRACT ICBSTATYP
140                     DEF     RTDCBCHK        SUBR TO VALIDATE IOEX DCB
141                     DEF     RTDEVCHK        SUBR TO VALIDATE IOEX DEVICE ADR
142                     DEF     RTVTP           SUBR TO CONVERT VIRT ADR TO PHY ADR
143                     DEF     RTLCT           SUBR TO ADJUST PB:LCT
144                     DEF     RTINTRTN        HANDLER FOR M:INTRTN CAL1,5
145                     DEF     RTCHKGUN        SUBR TO VALIDATE ICBGUN
146                     DEF     INTSTAT         SUBR FOR M:INTSTAT HANDLER
147                     DEF     RTSIZE          SUBR TO SIZE-UP USER
148                     DEF     RTIOSTRT        IOQ SUBR FOLLOWING IOEX SIO
149                     DEF     RTINT           IOQ SUBR FOR IOEX INTERRUPT
150                     DEF     RTCU            IOQ SUBR FOR IOEX CLEAN-UP
151                     DEF     RTTO            IOQ SUBR FOR IOEX TIME-OUT
152                     DEF     RT:GINT         INTERRUPT HANDLER (M:GJOBCON)
153                     DEF     RT:UINT         INTERRUPT HANDLER (M:CONNECT)
154                     DEF     RT:INTENTRY     ROUTINE TO PROCESS INTERRUPT DO-LIST
155                     DEF     UINTQ           SUBR TO QUE INTERRUPT DO-LIST ITEM
156                     *
157                     *
158                     *
159                     REF     INTLBSIZ,INTLB1,INTLB2,NINTS,ICB,ICBSIZE:
160                     ,CALBAD,T:REG,T:TOTS7,S:ACORE,S:RTCORE:
161                     ,MONORG,JB:PRIV,E:ART,E:QFI,SICUN,RTNRRTSEG:
162                     ,TRAPEXIT,EXU:MASK,WAIT:MASK,IOWAIT:MASK,BLCKD:MASK:
163                     ,UB:US,UH:FLG2,J:ICBHDR,RTICBHDR,MTRTNO:
164                     ,UH:FLG,S:BADFLG,DCT3,DCT12,DCT13,DCT15,NEWQNW:
165                     ,RTSTOPIO#,RTSTARTIO#,DCT1A,DCT1P,DCTSIZ,IOQ8:
166                     ,BT31TBO,NB31TBO,T:OVERLAY,T:SAVE:
167                     ,J:DCBLL,JX:CMAP,MASKS,CHKBIT,CHKBIT1,INTSIM:
168                     ,MAXG,SB:GJOBUN,S:GJOBTBL,S:GJOBACN,T:SSEM:
169                     ,UB:ASP,UB:APR,UB:APO,UB:OV,UB:ACP,UB:DB,PB:LCT:
```

```
                                                      ,INTLB3,RTRESDF#,S:STL#,SL:RSVP;
                                                      ,YF,X1FFFE,YFFFF,XF1FFFFFF;
                                                      ,YC,X3FFE00,RTRET1,RTRET2,DRIVEI0,DCT19;
                                                      ,ENBSR4,UB:PRIOB,UB:PRIO,IOSCU,RT:GINTP,T:GJOB;
                                                      ,T:SSE,RT:UINTP,YFF,UH:DL,XFO,S:CUP,S:RTIR,S:RTUN,
                                                      ,T:RUE,J:TCB,ALTERR,24BM18,24BM14,T:PULLF;
                                                      ,RTGJOBCON#,T:UTSXTS,RTCONNECT#,RTDISCON#,RTCLOCK#
                             *
                             *
                             *                                              SYMBOLIC 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
                             *
           0000001B          C15LOW     EQU     X'1B'                       LOWEST CAL1,5 FPT CODE, EXCEPT:
                             *                                              M:MASTER/M:SLAVE WHICH ARE HANDLED
                             *                                              IN ALTCP
           00000027          C15HIGH    EQU     X'27'                       HIGHEST CAL1,5 FPT CODE, EXCEPT:
                             *                                              M:EXU WHICH IS HANDLED IN ALTCP
                                        BOUND   8
 01 00000     0000001B A     RTCAL15CODES DATA C15LOW,C15HIGH
 01 00001     00000027 A
                             *
           FFFFFFF8          C19CS      EQU     -8                          SHIFT COUNT TO RIGHT-JUSTIFY CODE
```

```
                                       *
             00000001                  FPTF1     EQU      1                   ON/OFF BIT (M:HOLD)
             0000001F  S               FPTEA     EQU      BT31T00+31          'EA' PRESENCE BIT (M:IOEX)
             00008000                  FPTDCB    EQU      X'8000'             'DCB' PRESENCE BIT (M:IOEX)
             0000001E  S               Y2        EQU      BT31T00+30          'ON-DO-LIST' FLAG
             00000001  S               X1        EQU      BT31T00+1
                                       *
             00000001                  DEV       EQU      1                   WA(DCBDEV)
                                       *
             00000080                  STATEXU   EQU      X'80'               'EXECUTABLE' CODE (M:INTSTAT)
             00000040                  STATWAIT  EQU      X'40'               'QFI' CODE (M:INTSTAT)
             00000020                  STATIOW   EQU      X'20'               'IO/WAIT' CODE (M:INTSTAT)
             00000010                  STATBLK   EQU      X'10'               'BLOCKED' CODE (M:INTSTAT)
             00000001                  STATNA    EQU      1                   'NOT ACTIVE' CODE (M:INTSTAT)
                                       *
             EXT                       STATAETR EQU      XF1FFFFFF           'ARMD/ENBLD/TRGRD' BITS RESET
                                       *
             000000AE                  RTERR:BADCAL EQU  X'AE'
    01 00002     010000B8  A           RTERR:QFI     DATA X'010000B8'
    01 00003     020000B8  A           RTERR:INTRTN  DATA X'020000B8'
    01 00004     050000B8  A           RTERR:PARAM   DATA X'050000B8'
    01 00005     010000B9  A           RTERR:IOEX1   DATA X'010000B9'
    01 00006     020000B9  A           RTERR:IOEX2   DATA X'020000B9'
                                       *
             0000000C  S               FLG:LIC   EQU      BT31T00+12          UH:FLG2 MASK: LOCKED-IN-CORE BIT
             0000000C  S               FLG:LICR  EQU      NB31T00+12                        LIC BIT RESET
                                       *
             00000002  S               FLG:INH   EQU      BT31T00+2           UH:FLG MASK: SOFTWARE INHIBIT BIT
             00000002  S               FLG:INHR  EQU      NB31T00+2                        SOFTWARE INHIBIT-RESET
                                       *
             00000020                  DOWND     EQU      X'20'               DCT3 FLAG - 'DEVICE DOWN'(PRE-EMPTE
             00000004  S               SIOREJECT      EQU BT31T00+4           SIO REJECT BIT MASK OF DCT3
                                       *
             00000002                  ALLOCAT:UN     EQU 2                   ALLOCAT'S USER #
             00000003                  RBBAT:UN       EQU 3                   RBBAT'S USER #
                                       *
                                                 TITLE    'RT USER-SERVICE SUBROUTINES'
```

```
                    ***********************************************************************
                    *                                      S E C T I O N   III
                    *
                    *                                          SUBROUTINES
                    ***********************************************************************
                    *
      01 00007      RTWD      EQU       $ *******************************************************
                    *
                    *F*       NAME:     RTWD
                    *,*
                    *,*       PURPOSE: FORMAT AND ISSUE AN INTERRUPT CONTROL WD INSTRUCTION.
                    *,*
                    *,*       DESCRIPTION:  (SEE 'D' REPORT)
                    ************************************************************************
                    *
                    *D*       NAME:     RTWD
                    *,*
                    *,*       REGISTERS:  R3, R13, R14 ARE VULNERABLE.
                    *,*
                    *,*       CALL:     BAL,R0
                    *,*
                    *,*       INTERFACE:  NONE
                    *,*
                    *,*       ENVIRONMENT:  MASTER/MAPPED OR UNMAPPED.
                    *,*
                    *,*       INPUT:    R3 = EFFECTIVE ADDRESS OF 'WD' INSTRUCTION
                    *,*                      (E.G., X'1X00' WHERE X = WD CODE)
                    *,*                 R10= INTERRUPT ADDRESS
                    *,*
                    *,*       OUTPUT:  (HARDWARE INTERRUPT STATUS IS ALTERED)
                    *,*
                    *,*       DESCRIPTION:  INTERRUPT CONTROL SUBROUTINE -
                    *,*                 FROM THE INTERRUPT ADDRESS, THE GROUP CODE IS
                    *,*                 DERIVED AS WELL AS THE BIT MASK FOR THE 'WD'
                    *,*                 INSTRUCTION'S REGISTER.  FINALLY, A 'WD' INSTRUCTION
                    *,*                 IS EXECUTED TO CHANGE THE INTERRUPT'S STATUS.
                    ************************************************************************
```

```
280
281   01 00007   32D0000A A   LW,R13   R10          PICK UP INT. ADR.
282   01 00008   20DFFFC0 A   AI,R13   =X'40'       * DEVELOP *
283   01 00009   25D0007C A   SLS,R13  =4           *  GROUP  *
284   01 0000A   47D00003 A   STS,R13  R3           *   CODE  *
285   01 0000B   32D0000A A   LW,R13   R10          PICK UP INT. ADR. AGAIN
286   01 0000C   4BD00004 N   AND,R13  MASKS+4      MASK OFF LEVEL
287   01 0000D   22E08000 A   LI,R14   X'8000'      SET UP SHIFT INSTR. WITH R13 AS E.A.
288   01 0000E   3AD0000D A   LCW,R13  R13
289   01 0000F   4BD00007 N   AND,R13  MASKS+7      MASK OFF SHIFT COUNT
290   01 00010   A5E0000D A   S,R14    *R13         SHIFT IT
291   01 00011   FDE00003 A   WD,R14   *R3          **********************************
292   01 00012   F8000000 A   B        *R0          RETURN
```

```
                                         PAGE
          01 00013            RTCHKPRIV  EQU     $ ***************************************************
                              *
                              *F*        NAME:    RTCHKPRIV
                              *,*
                              *,*        PURPOSE: VALIDATE USER'S PRIVILEGE LEVEL.
                              *,*
                              *,*        DESCRIPTION:  (SEE 'D' REPORT)
                              ********************************************************************
                              *D*        NAME:    RTCHKPRIV
                              *,*
                              *,*        REGISTERS:  R15 IS VULNERABLE.
                              *,*
                              *,*        CALL:    BAL,R0
                              *,*
                              *,*        INTERFACE:  NONE
                              *,*
                              *,*        ENVIRONMENT:  MASTER/MAPPED
                              *,*
                              *,*        INPUT:   JB:PRIV
                              *,*
                              *,*        OUTPUT:  CONDITION CODE 1 IS SET = 0 (IF JB:PRIV >= X'E0')
                              *,*                                         1 (IF JB:PRIV <  X'E0')
                              *,*
                              *,*        DESCRIPTION:  JB:PRIV IS COMPARED AGAINST THE VALUE X'E0' AND
                              *,*                 CONDITION CODE 1 IS SET AS INDICATED ABOVE.
                              ********************************************************************
                              *
   01 00013    22F000E0 A                LI,R15   X'E0'             MINIMUM REAL-TIME PRIVILEGE
   01 00014    02200000 A                LCI      0                 SET NORMAL RETURN
   01 00015    71F00000 X                CB,R15   JB:PRIV           X'E0' : JB:PRIV
   01 00016    68200018                  BLE      CHK1              PRIV. OK
   01 00017    02200080 A                LCI      8                 SET ABNORMAL RETURN
   01 00018    F8000000 A     CHK1       B        *R0               RETURN
```

```
                                  PAGE
          01 00019      RTSETCC1 EQU      $ ***************************************************
                        *                 PASSES CC SETTING VIA R2 TO RTRETC
                        *
01 00019     32200020 N           LW,R2   BT31TO0+32
01 0001A     68000022             B       RTRETC
                                  SPACE   5

          01 0001B      RTSETCC2 EQU      $ ***************************************************
                        *                 PASSES CC SETTING VIA R2 TO RTRETC
                        *
01 0001B     3220001F N           LW,R2   BT31TO0+31
01 0001C     68000022             B       RTRETC
                                  SPACE   5

          01 0001D      RTSETCC3 EQU      $ ***************************************************
                        *                 PASSES CC SETTING VIA R2 TO RTRETC
                        *
01 0001D     3220001E N           LW,R2   BT31TO0+30
01 0001E     68000022             B       RTRETC
                                  SPACE   5

          01 0001F      RTSETCC0 EQU      $ ***************************************************
                        *                 PASSES CC SETTING VIA R2 TO RTRETC
                        *
```

```
349   01 0001F   32300020 N           LW,R3    BT31TB0+32
350   01 00020   47300000 X           STS,R3   S:BADFLG              SET 'RT-ACTIVITY' BIT
351   01 00021   22200000 A           LI,R2    0
352         01 00022         RTRETC   EQU      $ ***********************************************
353                                   *        STORES CONDITION CODE (PASSED IN R2) INTO USER PSD
354                                   *
355   01 00022   6D000027 A           ENABLE                         ***********************************
356   01 00023   32300000 X           LW,R3    YF                    CC MASK
357   01 00024   225FFFEF A           LI,R5    -17                   DISPL. BACK INTO TSTACK
358   01 00025   30500000 X           AW,R5    TSTACK
359   01 00026   4B500000 X           AND,R5   X1FFFE                INSURE DOUBLE-WORD BOUND
360   01 00027   472A0000 A           STS,R2   0,R5                  SET CC'S
361   01 00028   68000000 X           B        TRAPEXIT              EXIT CAL1 PROCESSING
```

```
                              PAGE
           01 00029  RTLOCICB EQU       $ *************************************************
                     *
                     *F*      NAME:    RTLOCICB
                     *,*
                     *,*      PURPOSE: FIND AN ACTIVE ICB ASSOCIATED WITH A GIVEN INTERRUPT
                     *,*               ADDRESS OR LABEL.
                     *,*
                     *,*      DESCRIPTION:  (SEE 'D' REPORT)
                     ***********************************************************************
                     *D*      NAME:    RTLOCICB
                     *,*
                     *,*      REGISTERS:  R1, R4, R5, R14, R15 ARE VULNERABLE.
                     *,*
                     *,*      CALL:    BAL,R0
                     *,*
                     *,*      INTERFACE:  RTCNVTXT
                     *,*
                     *,*      ENVIRONMENT:  MASTER/MAPPED OR UNMAPPED
                     *,*
                     *,*      INPUT:   R6 = INTERRUPT ADDRESS OR TEXT LABEL.
                     *,*               ICB TABLES
                     *,*
                     *,*      OUTPUT:  R2 = ADDRESS OF CORRESPONDING ICB (IF THERE IS ONE)
                     *,*                    CONDITION CODES 3/4 = 0 (IF THERE ISN'T AN ICB
                     *,*                                                ASSOCIATED)
                     *,*
                     *,*      DESCRIPTION:  WE ARE TRYING TO LOCATE THE ICB THAT IS
                     *,*               ASSOCIATED WITH THE SPECIFIED INTERRUPT ADDRESS OR
                     *,*               TEXT LABEL.  IF THE X'8000' BIT OF R6 IS SET THEN
                     *,*               RTCNVTXT IS CALLED TO CONVERT THE TEXT LABEL TO AN
                     *,*               INTERRUPT ADDRESS.  NEXT THE ICBINT AND ICBSTAT
                     *,*               FIELDS OF ALL ICBS ARE SCANNED TO FIND THE ACTIVE ICB
                     *,*               ASSOCIATED WITH THE SPECIFIED INTERRUPT AND R2 AND
                     *,*               CONDITION CODES 3/4 ARE SET ACCORDINGLY.
                     ***********************************************************************
                     *
```

```
399  01 00029  21608000 A          CI,R6    X'8000'          IS IT A TEXT LBL
400  01 0002A  6840002D            BAZ      L0CICB1          NO
401  01 0002B  6AF0003A            BAL,R15  RTCNVTXT         CONVERT TEXT LBL,TO INT.ADR.(VIA R6
402  01 0002C  F8300000 A          BCR,3    *R0              NOT FOUND; RETURN WITH CC3/CC4=0
403  01 0002D  22F00000 N  L0CICB1 LI,R15   NINTS            SET UP LOOP THROUGH ICB'S
404  01 0002E  2240000D A          LI,R4    ICBINT(D)
405  01 0002F  22500000 N          LI,R5    ICB
406  01 00030  322A0000 A  LOOP    LW,R2    ICBSTAT(W),R5    ACTIVE BIT SET (BIT 0)
407  01 00031  68100034            BGEZ     L0CNA            NO
408  01 00032  D1680005 A          CH,R6    *R5,R4           COMPARE INT. ADR. IN ICB
409  01 00033  68300038            BE       L0CATE           YES
410  01 00034  20500000 N  L0CNA   AI,R5    ICBSIZE          INCREMENT TO NEXT ICB
411  01 00035  64F00030            BDR,R15  LOOP
412  01 00036  22200000 A          LI,R2    0                DIDN'T FIND IT
413  01 00037  F8000000 A          B        *R0              ABNORMAL RETURN
414  01 00038  32200005 A  L0CATE  LW,R2    R5               SET UP R2=ICB ADR. AND SET CC'S
415  01 00039  F8000000 A          B        *R0              RETURN
```

```
                                     PAGE
        01 0003A           RTCNVTXT EQU       $ *************************************************
                           *
                           *F*      NAME:    RTCNVTXT
                           *,*
                           *,*      PURPOSE: CONVERT AN INTERRUPT LABEL TO AN INTERRUPT ADDRESS
                           *,*               AND PROVIDE A DEFAULT EXECUTION PRIORITY.
                           *,*
                           *,*      DESCRIPTION:  (SEE 'D' REPORT)
                           ***********************************************************************
                           *D*      NAME:    RTCNVTXT
                           *,*
                           *,*      REGISTERS:  R1 IS VULNERABLE.
                           *,*
                           *,*      CALL:    BAL,R15
                           *,*
                           *,*      INTERFACE:  NONE
                           *,*
                           *,*      ENVIRONMENT:  MASTER/MAPPER OR UNMAPPED.
                           *,*
                           *,*      INPUT:   R6 = TEXT LABEL
                           *,*               INTLB1, INTLB2, INTLB3.
                           *,*
                           *,*      OUTPUT:  R6 = INTERRUPT ADDRESS ASSOCIATED WITH TEXT LABEL.
                           *,*               R14= DEFAULT EXECUTION PRIORITY ASSOCIATED WITH TEXT
                           *,*                    LABEL DEFINED BY SYSGEN.
                           *,*               CONDITION CODES 3/4 ARE SET = 0 (IF TEXT LABEL IS
                           *,*                                                UNKNOWN)
                           *,*
                           *,*      DESCRIPTION:  INTLB1 IS SCANNED FOR A MATCH WITH THE TEXT
                           *,*               LABEL; IF FOUND, INTLB2 AND INTLB3 ARE USED TO
                           *,*               SUPPLY THE INTERRUPT'S ADDRESS AND DEFAULT EXECUTION
                           *,*               PRIORITY.
                           ***********************************************************************
                           *
 01 0003A     49600000 X            OR,R6     YFFFF            SIGN-EXTEND THE TEXT LABEL
 01 0003B     221FFFFF N            LI,R1     INTLBSIZ-1       SYSGEN-DEFINED  SIZE OF TABLE
```

```
453   01 0003C   51620000 X   CNVL    CH,R6     INTLB1,R1        FIND TEXT LBL. IN TABLE
454   01 0003D   68300041             BE        CNVOK            FOUND IT
455   01 0003E   6410003C             BDR,R1    CNVL
456   01 0003F   22600000 A           LI,R6     0                DIDN'T FIND IT
457   01 00040   F800000F A           B         *R15             ABNORMAL RETURN WITH R2=0
458   01 00041   52620000 X   CNVOK   LH,R6     INTLB2,R1        PICK UP INT. ADR. FROM PARALLEL TABL
459   01 00042   72E20000 X           LB,R14    INTLB3,R1        PICK UP DEFAULT EXEC.PRIO.
460   01 00043   F800000F A           B         *R15             RETURN
```

```
                                   PAGE
         01 00044        RTICBTYP EQU      $ ***********************************************
                         *
                         *F*      NAME:    RTICBTYP
                         *,*
                         *,*      PURPOSE: DETERMINE ICB-TYPE.
                         *,*
                         *,*      DESCRIPTION:  (SEE 'D' REPORT)
                         *****************************************************************
                         *D*      NAME:    RTICBTYP
                         *,*
                         *,*      REGISTERS:  NONE
                         *,*
                         *,*      CALL:    BAL,R12
                         *,*
                         *,*      INTERFACE:  NONE
                         *,*
                         *,*      ENVIRONMENT:  MASTER/MAPPED OR UNMAPPED.
                         *,*
                         *,*      INPUT:   R2 = ICB ADDRESS
                         *,*               ASSOCIATED ICB.
                         *,*
                         *,*      OUTPUT:  R3 = RIGHT-JUSTIFIED VALUE FROM ICBSTATYP (ICB TYPE)
                         *,*
                         *,*      DESCRIPTION:  THE VALUE IN ICBTYP IS EXTRACTED FROM THE ICB
                         *,*               AND RIGHT-JUSTIFIED IN R3.
                         *****************************************************************
                         *
      01 00044  32340000 A            LW,R3    ICBSTAT(W),R2     PICK UP ICBSTAT WORD
      01 00045  25300069 A            SLS,R3   STATYPSHFT        RIGHT-JUSTIFY ICBSTATYP
      01 00046  4B300002 N            AND,R3   MASKS+2           MASK IT OFF
      01 00047  F800000C A            B        *R12              RETURN
```

```
                         PAGE
01 00048        RTINTCONTROL  EQU  $ ******************************************
                *
                *F*      NAME:    RTINTCONTROL
                *,*
                *,*      PURPOSE: CHANGE THE STATUS OF THE INTERRUPT ASSOCIATED WITH A
                *,*               GIVEN ICB.
                *,*
                *,*      DESCRIPTION:  (SEE 'D' REPORT)
                ****************************************************************
                *D*      NAME:    RTINTCONTROL
                *,*
                *,*      REGISTERS:  R0, R3, R6, R7, R10, R13, R14 ARE VULNERABLE.
                *,*
                *,*      CALL:    BAL,R15
                *,*
                *,*      INTERFACE:  RTWD
                *,*
                *,*      ENVIRONMENT:  MASTER/MAPPED OR UNMAPPED.
                *,*
                *,*      INPUT:   R2 = ICB ADDRESS
                *,*               R6 = 'WD' CODE (FOR CHANGING INTERRUPT'S STATUS)
                *,*               ASSOCIATED ICB, MONARG
                *,*
                *,*      OUTPUT:  ICBSTAT REFLECTS CURRENT STATUS OF INTERRUPT.
                *,*               (INTERRUPT'S STATUS IS CHANGED PER REQUEST).
                *,*
                *,*      DESCRIPTION:  INTERRUPT CONTROL SUBROUTINE -
                *,*               ICBSTAT FIELD OF THE ASSOCIATED ICB IS UPDATED
                *,*               TO REFLECT THE CURRENT REQUEST'S ACTIVITY.  THEN, IF
                *,*               A REAL INTERRUPT, ITS STATUS IS CHANGED VIA A CALL TO
                *,*               RTWD.  IF A PSEUDO INTERRUPT, THE CURRENT STATUS
                *,*               OF THE INTERRUPT (FROM ICBSTAT) IS CHECKED TO SEE IF
                *,*               FURTHER ACTION IS NECESSARY (E.G., A TRIGGER REQUEST
                *,*               MUST INSURE THAT THE PSEUDO INTERRUPT IS ARMED AND
                *,*               ENABLED FIRST BEFORE XPSD'ING INTO THE ASSOCIATED ICB
                ****************************************************************
```

```
                                 *
 01 00048    670C0059                    EXU        INTCONEXU1,R6     * SET UP *
 01 00049    670C0061                    EXU        INTCONEXU2,R6     *ICBSTATINT*
 01 0004A    2270000D A      INTCON3     LI,R7      ICBINT(D)
 01 0004B    D2AE0002 A                  LH,R10     *R2,R7            PICK UP INT. ADR. FROM ICB
 01 0004C    21A00000 N                  CI,R10     MONORG            IS IT REAL OR PSEUDO
 01 0004D    6920006E                    BG         INTCON2           MUST BE PSEUDO
 01 0004E    25600008 A                  SLS,R6     8                 SHIFT WD-CODE TO POSITION IN WD INST
 01 0004F    22301000 A                  LI,R3      X'1000'           SET UP EFFECTIVE ADR. OF WD
 01 00050    22700700 A                  LI,R7      X'0700'           WD-CODE MASK
 01 00051    47600003 A                  STS,R6     R3                SET CODE
 01 00052    6A000007                    BAL,R0     RTWD              ISSUE WD INSTR.
 01 00053    21600700 A                  CI,R6      X'700'            TRIGGER REQUEST
 01 00054    E930000F A                  BNE        *R15              NO
 01 00055    32740000 A                  LW,R7      ICBSTAT(W),R2
 01 00056    3170001A N                  CW,R7      STATA             IS INT. ARMED
 01 00057    E940000F A                  BANZ       *R15              YES, THEN LEAVE 'TRIG' BIT SET
 01 00058    68000078                    B          INTCON6           RESET 'TRIG' BIT IN ICBSTAT
                                 *
                                 *
                                 *
          01 00059               INTCONEXU1 EQU     $                 FPT-WD CODE
 01 00059    F800000F A                     B       *R15                 0
 01 0005A    32700000 X                     LW,R7   STATAETR             1
 01 0005B    32700000 X                     LW,R7   STATAE               2
 01 0005C    3270001A N                     LW,R7   STATA                3
 01 0005D    3270001B N                     LW,R7   STATE                4
 01 0005E    3270001B N                     LW,R7   STATER               5
 01 0005F    F800000F A                     B       *R15                 6
 01 00060    3270001C N                     LW,R7   STATRIG              7
                                 *
                                 *
                                 *
          01 00061               INTCONEXU2 EQU     $                 FPT-WD CODE
 01 00061    02000000 A                     NOP                          0
 01 00062    6800006B                       B       INTCONR              1
 01 00063    47740000 A                     STS,R7  ICBSTAT(W),R2        2
```

```
01 00064   68000069          B        INTCONAD         3
01 00065   47740000 A        STS,R7   ICBSTAT(W),R2    4
01 00066   6800006B          B        INTCONR          5
01 00067   02000000 A        NOP                       6
01 00068   47740000 A        STS,R7   ICBSTAT(W),R2    7
                    *
01 00069   47740000 A INTCONAD STS,R7 ICBSTAT(W),R2    SET 'ARMED BIT IN ICBSTAT
01 0006A   3270001B N          LW,R7  STATER           ICBSTAT MASK
01 0006B   48740000 A INTCONR  AND,R7 ICBSTAT(W),R2    RESET  VARIOUS BITS IN ICBSTAT
01 0006C   35740000 A          STW,R7 ICBSTAT(W),R2
01 0006D   6800004A            B      INTCON3          RETURN
                    *
                    *                                  SPECIAL PROCESSING FOR PSEUDO INTS.
                    *
01 0006E   32740000 A INTCON2  LW,R7  ICBSTAT(W),R2
01 0006F   21600007 A          CI,R6  7                IS THE REQUEST 'TRIGGER'
01 00070   68300076            BE     INTCON4          YES
01 00071   21600004 A          CI,R6  4                IS THE REQUEST 'ENABLE'
01 00072   F930000F A          BNE    *R15             NO
01 00073   3170001C N          CW,R7  STATRIG          IS THERE A TRIGGER PENDING
01 00074   6940007B            BANZ   INTCON5          YES
01 00075   F800000F A          B      *R15             RETURN
01 00076   3170001A N INTCON4  CW,R7  STATA            IS THE ICB ARMED
01 00077   6940007B            BANZ   INTCON5          YES
01 00078   4870001C N INTCON6  AND,R7 STATRIGR         RESET ICBSTAT TRIGGER BIT
01 00079   35740000 A          STW,R7 ICBSTAT(W),R2
01 0007A   F800000F A          B      *R15             RETURN
01 0007B   3170001B N INTCON5  CW,R7  STATE            IS THE ICB ENABLED
01 0007C   F840000F A          BAZ    *R15             NO
01 0007D   22600001 A          LI,R6  ICBPSD1(D)
01 0007E   8F2C0002 A          XPSD,2 *R2,R6           'TRIGGER' THE PSEUDO INTERRUPT
01 0007F   F800000F A          B      *R15
```

```
                                PAGE
          01 00080    RTCHKGUN EQU      $ ***********************************************
                      *
                      *F*       NAME:    RTCHKGUN
                      *,*
                      *,*       PURPOSE: DETERMINE IF ICBGUN CONTAINS A VALID USER # FOR A
                      *,*                GHOST JOB ASSOCIATED WITH A TYPE-2 ICB.
                      *,*
                      *,*       DESCRIPTION:  (SEE 'D' REPORT)
                      ****************************************************************
                      *D*       NAME:    RTCHKGUN
                      *,*
                      *,*       REGISTERS:  R1, R3, R6, R7 ARE VULNERABLE.
                      *,*
                      *,*       CALL:    BAL,R0
                      *,*
                      *,*       INTERFACE:  NONE
                      *,*
                      *,*       ENVIRONMENT:  MASTER/MAPPED OR UNMAPPED.
                      *,*
                      *,*       INPUT:   R2 = ICB ADDRESS
                      *,*                SB:GJOBUN, S:GJOBTBL, S:GJOBACN
                      *,*                ASSOCIATED ICB
                      *,*
                      *,*       OUTPUT:  R5 = USER # OF GHOST JOB ASSOCIATED WITH THE ICB
                      *,*                     (IF THE GHOST JOB IS, IN FACT ACTIVE).
                      *,*                     0 IF NOT ACTIVE AT THE TIME OF THE REQUEST.
                      *,*
                      *,*       DESCRIPTION:  VERIFIES THAT ICBGUN CONTAINS A VALID USER # FOR
                      *,*                AN ACTIVE (OR SLEEPING) GHOST JOB.
                      *,*                SB:GJOBUN IS SEARCHED TO FIND THE MATCHING USER
                      *,*                # OF ICBGUN; IF FOUND, S:GJOBTBL AND S:GJOBACN ARE
                      *,*                VERIFIED AGAINST ICBGJNME AND ICBGJACN; IF EVERYTHING
                      *,*                MATCHES, THE USER # OF THE ACTIVE (OR SLEEPING) GHOST
                      *,*                IS PASSED TO THE CALLER.
                      ****************************************************************
                      *
```

```
636  01 00080  2230001D A          LI,R3    ICBGUN(D)
637  01 00081  F2560002 A          LB,R5    *R2,R3          PICK UP GJOB USER #
638  01 00082  22300000 N          LI,R3    MAXG            SET UP LOOP THROUGH GJOB TABLES
639  01 00083  71560000 X  LOOP1   CB,R5    SB;GJOBUN,R3    IS THIS THE ONE
640  01 00084  68300088           BE       CHKG2           YES
641  01 00085  64300083    CHKG1   BDR,R3   LOOP1           NO
642  01 00086  22500000 A          LI,R5    0               SET UP 'NOT ACTIVE' RETURN
643  01 00087  F8000000 A          B        *R0             RETURN
644  01 00088  22100004 A  CHKG2   LI,R1    ICBGJNME(D)
645  01 00089  92620002 A          LD,R6    *R2,R1          PICK UP GJOB NAME
646  01 0008A  11660000 X          CD,R6    S:GJOBTBL,R3    IS THIS IT
647  01 0008B  69300085           BNE      CHKG1           NO
648  01 0008C  22100005 A          LI,R1    ICBGJACN(D)
649  01 0008D  92620002 A          LD,R6    *R2,R1          PICK UP GJOB ACCOUNT
650  01 0008E  11660000 X          CD,R6    S:GJOBACN,R3    IS THIS IT
651  01 0008F  69300085           BNE      CHKG1           NO
652  01 00090  F8000000 A          B        *R0             RETURN WITH R5=GJOB USER #
```

```
                                    PAGE
       01 00091          RTDCBCHK EQU      $ *****************************************************
                         *
                         *F*      NAME:    RTDCBCHK
                         *,*
                         *,*      PURPOSE: VALIDATE THE DCB PASSED VIA STOPIO/STARTIO/IOEX
                         *,*               CAL1,5'S.
                         *,*
                         *,*      DESCRIPTION:  (SEE 'D' REPORT)
                         ******************************************************************
                         *D*      NAME:    RTDCBCHK
                         *,*
                         *,*      REGISTERS:  R3 IS VULNERABLE.
                         *,*
                         *,*      CALL:    BAL,R5
                         *,*
                         *,*      INTERFACE:  NONE
                         *,*
                         *,*      ENVIRONMENT:  MASTER/MAPPED
                         *,*
                         *,*      INPUT:   R6 = DCB ADDRESS
                         *,*               ASSOCIATED DCB, DCT1P, J:DCBLL
                         *,*
                         *,*      OUTPUT:  CONDITION CODES SET = 0 (IF DCB IS OK FOR AN IOEX CAL
                         *,*               R2 = DCT INDEX ASSOCIATED WITH DEVICE DCB
                         *,*               R6 = DEVICE ADDRESS ASSOCIATED WITH DCB
                         *,*
                         *,*      DESCRIPTION:  VERIFIES THAT THE DCB PASSED VIA AN M:STOPIO/
                         *,*               STARTIO/IOEX REQUEST IS A VALID, OPEN, DEVICE-ASSIGNE
                         *,*               DCB.
                         ******************************************************************
                         *
 01 00091   32200006 A            LW,R2    R6               PICK UP DCB ADR.
 01 00092   25200077 A            SLS,R2   -9               CONVERT TO PAGE #
 01 00093   19200000 X            CLM,R2   J:DCBLL          IS IT A DCB
 01 00094   699A0000 A            BCS,9    0,R5             NO
 01 00095   322C0000 A            LW,R2    FCD,R6           ASSUME IT'S OK
```

```
690   01 000096   31200016 N   CW,R2    BT31T80+22        IS IT OPEN
691   01 000097   684A0000 A   BAZ      0,R5              NO
692   01 000098   4B200004 N   AND,R2   MASKS+4           PICK UP DCBASN
693   01 000099   21200003 A   CI,R2    3                 IS IT DEVICE-TYPE
694   01 00009A   693A0000 A   BNE      0,R5              NO
695   01 00009B   322C0001 A   LW,R2    DEV,R6
696   01 00009C   4B200008 N   AND,R2   MASKS+8           DCBDEV
697   01 00009D   21200000 N   CI,R2    DCTSIZ            VALID DCT INDEX
698   01 00009E   692A0000 A   BG       0,R5              NO
699   01 00009F   52640000 X   LH,R6    DCT1P,R2          PICK UP DEVICE ADDRESS
700   01 0000A0   02200000 A   LCI      0
701   01 0000A1   680A0000 A   B        0,R5              RETURN
```

```
                                     PAGE
         01 000A2       RTDEVCHK EQU       $ *********************************************
                        *
                        *F*      NAME:     RTDEVCHK
                        *,*
                        *,*      PURPOSE: VALIDATE THE DEVICE ADDRESS PASSED VIA STOPIO/
                        *,*               STARTIO/IOEX CAL1,5'S.
                        *,*
                        *,*      DESCRIPTION:  (SEE 'D' REPORT)
                        *************************************************************************
                        *D*      NAME:     RTDEVCHK
                        *,*
                        *,*      REGISTERS:  NONE
                        *,*
                        *,*      CALL:     BAL,R5
                        *,*
                        *,*      INTERFACE:  NONE
                        *,*
                        *,*      ENVIRONMENT:  MASTER/MAPPED OR UNMAPPED
                        *,*
                        *,*      INPUT:    R6 = DEVICE ADDRESS
                        *,*                DCT1P, DCT1A
                        *,*
                        *,*      OUTPUT:   CONDITION CODES 3/4 SET = 0 (IF DEVICE ADDRESS IS
                        *,*                                               VALID)
                        *,*                R2 = DCT INDEX ASSOCIATED WITH DEVICE ADDRESS.
                        *,*                R6 = DEVICE ADDRESS (UNCHANGED)
                        *,*
                        *,*      DESCRIPTION:  THE DEVICE ADDRESS PASSED BY THE CALLER IS
                        *,*                VERIFIED AGAINST DCT1P/DCT1A.
                        *************************************************************************
                        *
01 000A2  22200000 N             LI,R2     DCTSIZ
01 000A3  51640000 X    NXTDCT   CH,R6     DCT1P,R2          IS THIS THE ONE
01 000A4  683A0000 A             BE        0,R5              YES-RETURN WITH CC3/4 = 0
01 000A5  51640000 X             CH,R6     DCT1A,R2          NO-TRY ALTERNATE
01 000A6  683A0000 A             BE        0,R5              YES-RETURN WITH CC3/4 = 0
```

```
739   01 000A7   642000A3        BDR,R2   NXTDCT          LOOP
740   01 000A8   680A0000 A      B        0,R5            RETURN WITH CC3 OR CC4 SET
```

```
                                  PAGE
         01 000A9         RTVTP   EQU       $ ****************************************************
                          *
                          *F*     NAME:     RTVTP
                          *,*
                          *,*     PURPOSE: CONVERT A GIVEN VIRTUAL ADDRESS TO A PHYSICAL ADDRESS.
                          *,*
                          *,*     DESCRIPTION:  (SEE 'D' REPORT)
                          ****************************************************************************
                          *D*     NAME:     RTVTP
                          *,*
                          *,*     REGISTERS:  R4 AND R5 ARE VULNERABLE.
                          *,*
                          *,*     CALL:     BAL,R3
                          *,*
                          *,*     INTERFACE:  NONE
                          *,*
                          *,*     ENVIRONMENT:  MASTER/MAPPED
                          *,*
                          *,*     INPUT:    R6 = VIRTUAL ADDRESS
                          *,*               JX:CMAP
                          *,*
                          *,*     OUTPUT:   R6 = PHYSICAL ADDRESS
                          *,*
                          *,*     DESCRIPTION:  CONVERTS A GIVEN VIRTUAL ADDRESS TO A PHYSICAL
                          *,*               ADDRESS BY FILTERING THE ADDRESS THRU JX:CMAP IN
                          *,*               THE USER'S JIT.
                          ****************************************************************************
                          *
01 000A9   32400006 A             LW,R4     R6                  USE R4 TO CONVERT TO VIRT PG #
01 000AA   25400077 A             SLS,R4    -9
01 000AB   72480000 N             LOAD,R4   JX:CMAP,R4          PICK UP PHYSICAL PG #
01 000AC   25400009 A             SLS,R4    9                   CONVERT IT TO PG ADDRESS
01 000AD   32500000 X             LW,R5     X3FFE00             PAGE MASK
01 000AE   47400006 A             STS,R4    R6                  CONVERT R6 TO A PHYSICAL ADR
01 000AF   2161FFFF A             CI,R6     X'1FFFF'            IS PHY ADR < 128K
01 000B0   68060000 A             B         0,R3                LET CALLER DECIDE
```

```
778
TITLE    'RT CAL1 SERVICE ENTRY POINTS'
```

```
                                  ****************************************************************
                                  *                                    S E C T I O N    IIII
                                  *
                                  *                                    CAL1 ENTRY POINTS
                                  ****************************************************************
                                  *
           01 000B1               RTALTCP  EQU      $ ***********************************************
                                  *
                                  *F*      NAME:    RTALTCP
                                  *,*
                                  *,*      PURPOSE: TO CHANNEL ALL CAL1,5 REQUESTS (EXCEPT M:EXU, M:MASTER
                                  *,*               & M:SLAVE) TO THE APPROPRIATE RECEIVER.
                                  *,*
                                  *,*      DESCRIPTION:   ALL CAL1,5'S (EXCEPT AS NOTED ABOVE) ARE PASSED
                                  *,*               HERE VIA CALPROC AND ALTCP FOR DISPATCHING.
                                  ****************************************************************
                                  *D*      NAME:    RTALTCP
                                  *,*
                                  *,*      REGISTERS:   STANDARD CAL1 REGISTER SETUP
                                  *,*
                                  *,*      CALL:    BAL,R11 (FROM ALTCP, IF SYSTEM IS REAL-TIME)
                                  *,*               RETURN IS TO TRAPEXIT
                                  *,*
                                  *,*      INTERFACE:   TRANSFERS TO APPROPRIATE CAL1,5 RECEIVER IN
                                  *,*               EITHER RTROOT (RESIDENT)  OR RTNR (RTOV OVERLAY).
                                  *,*               IF FPT CODE IS ILLEGAL, USER IS ABORTED VIA
                                  *,*               CALBAD (IN ALTCP).
                                  *,*
                                  *,*      ENVIRONMENT:   MAPPED/MASTER;  CAL1,5 RECEIVERS REQUIRE REAL-
                                  *,*               TIME PRIVILEGE LEVEL (X'E0') FOR ALL CAL1,5'S
                                  *,*               EXCEPT M:CLOCK (X'80') AND M:INTSTAT.
                                  *,*
                                  *,*      INPUT:   R6 = WORD 0 OF CAL1,5 FPT
                                  *,*               R7 = POINTER TO WORD 1 OF FPT
                                  *,*               R8 = FPT CODE (BYTE 0 OF WORD 0 OF FPT)
                                  *,*               R11= RETURN ADDRESS (TRAPEXIT)
                                  *,*
```

```
816                    *,*      DESCRIPTION:  R8 IS VERIFIED AS BEING A LEGAL FPT CODE FOR A
817                    *,*            CAL1,5 (ABORT CODE OF X'AE' IF ILLEGAL).
818                    *,*            CONTROL IS THEN PASSED TO APPROPRIATE RECEIVER
819                    *,*            IN RTROOT OR RTNR (RTOV OVERLAY) VIA C15TV (TRANS-
820                    *,*            FER VECTOR.
821                    ********************************************************************
822                    *
823  01 000B1  19800000        CLM,R8   RTCAL15CODES     IS THIS A VALID FPT CODE
824  01 000B2  689000B5        BCR,9    RTCALOK          YES
825                    ********************************************************************
826                    *E*      ERROR:   AE=00
827                    *,*
828                    *,*      DESCRIPTION:  THE USER HAS ISSUED A CAL1,5 WITH AN INVALID
829                    *,*            FPT CODE.
830                    *,*
831                    *,*      REGISTERS:  R8 = THE INVALID FPT CODE
832                    ********************************************************************
833  01 000B3  22E000AE A      LI,R14   RTERR:BADCAL
834  01 000B4  68000000 X      B        CALBAD           ERROR EXIT
835  01 000B5  2210009E        RTCALOK  LI,R1    C15TV-C15LOW     SET UP TRANSFER VECTOR
836  01 000B6  F7020008 A      EXU      *R8,R1           GO TO APPROPRIATE ROUTINE OR:
837  01 000B7  22200000 N      LI,R2    RTNRRTSEG              LOAD OVERLAY SEGMENT
838  01 000B8  68000000 X      B        T:OVERLAY                    *******
839                    *
840                    *
841                    *
842       01 000B9             C15TV    EQU      $
843  01 000B9  22000000 N      LI,R0    RTRESDF#         X'1B' RESDP PAGES CAL
844  01 000BA  22000000 N      LI,R0    RTSTOP10#        X'1C' M:STOP10
845  01 000BB  22000000 N      LI,R0    RTSTART10#       X'1D' M:START10
846  01 000BC  680001B5        B        RT10EX1          X'1E' M:10EX (S10)
847  01 000BD  680001FF        B        RT10EX2          X'1F' M:10EX (T10/TDV/H10)
848  01 000BE  22000000 N      LI,R0    RTGJOBCON#       X'20' M:GJOBCON
849  01 000BF  22000000 N      LI,R0    RTCONNECT#       X'21' M:CONNECT
850  01 000C0  22000000 N      LI,R0    RTDISCON#        X'22' M:DISCONNECT
851  01 000C1  680000C6        B        RTINTCON         X'23' M:INTCON
852  01 000C2  680000D9        B        RTQFI            X'24' M:QFI
```

```
853   01 000C3   68000016D          B       RTHOLD          X'25' MIHOLD
854   01 000C4   22000000 N        L1,R0    RTCLOCK#        X'26' MICLOCK
855   01 000C5   680000FB           B       RTINTSTAT       X'27' MIINTSTAT
```

```
                                   PAGE
         01 00006        RTINTCON EQU      $ ***********************************************
                         *
                         *F*      NAME:    RTINTCON
                         *,*
                         *,*      PURPOSE: TO PROCESS THE M:INTCON & M:INHIBIT CAL1,5'S
                         *,*
                         *,*      DESCRIPTION:  ALLOWS ANY USER WITH REAL-TIME PRIVILEGES TO
                         *,*               CONTROL THE STATE OF A REAL OR PSEUDO INTERRUPT.
                         *,*               PERMISSABLE REQUESTS:
                         *,*                         ARM & ENABLE
                         *,*                         ARM & DISABLE
                         *,*                         DISARM
                         *,*                         ENABLE
                         *,*                         DISABLE
                         *,*                         TRIGGER
                         *,*                         INHIBIT (VIA SOFTWARE)
                         *,*
                         *,*      REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL
                         *******************************************************************
                         *D*      NAME:    RTINTCON
                         *,*
                         *,*      REGISTERS:  STANDARD CAL1 REGISTER SETUP
                         *,*
                         *,*      CALL:    VIA RTALTCP (NOT CALLABLE EXTERNALLY)
                         *,*
                         *,*      INTERFACE:  RTCHKPRIV, RTLOCICB, RTINTCONTROL
                         *,*
                         *,*      ENVIRONMENT:  MAPPED/MASTER; PRIVILEGE LEVEL MUST = X'E0'.
                         *,*               THERE MUST BE A CURRENTLY ACTIVE ICB ASSOCIATED WITH
                         *,*               THE INTERRUPT TO BE CONTROLLED (IF M:INTCON)
                         *,*
                         *,*
                         *,*      INPUT:   R6 = WORD 0 OF CAL1,5 FPT
                         *,*               R7 = POINTER TO WORD 1 OF FPT
                         *,*               R11= RETURN ADDRESS (TRAPEXIT)
                         *,*               ASSOCIATED ICB
```

```
                                *,*
                                *,*      OUTPUT:   IF M:INTCON - ICB (ICBSTAT)
                                *,*                IF M:INHIBIT - UH:FLG
                                *,*                S:BADFLG
                                *,*
                                *,*      DESCRIPTION: IF M:INTCON - THE ICB (ICBSTAT) WILL BE MARKED PE
                                *,*                                 THE REQUEST AND THE SPECIFIED
                                *,*                                 INTERRUPT'S STATE WILL BE MODIFIED
                                *,*                                 A 'WD' INSTRUCTION (IF REAL).
                                *,*                  IF M:INHIBIT - THE 'REAL-TIME INHIBIT' BIT OF
                                *,*                                 UH:FLG WILL BE SET/RESET DEPENDING
                                *,*                                 UPON THE REQUEST.
                                ************************************************************************
                                *
 01 000C6     6A000013                   BAL,R0      RTCHKPRIV          JB:PRIV >= X'E0'
 01 000C7     69800019                   BCS,8       RTSETCC1           NO
 01 000C8     32600006 A                 LW,R6       R6                 M:INHIBIT
 01 000C9     683000D0                   BEZ         INHIBIT            YES
 01 000CA     6A000029                   BAL,R0      RTLOCICB           RETURNS ICB ADR. IN R2
 01 000CB     6830001B                   BCR,3       RTSETCC2           NOT FOUND; ABNORMAL RETURN
 01 000CC     326E0000 A                 LW,R6       0,R7               PICK UP      WD-CODE FROM FPT
 01 000CD     4B600003 N                 AND,R6      MASKS+3            MASK IT
 01 000CE     6AF00048                   BAL,R15     RTINTCONTROL       SET UP ICBSTAT; SET INTERRUPT STATE
 01 000CF     6800001F                   B           RTSETCC0           RETURN
                                *
                                *
                                *
       01 000D0                 INHIBIT  EQU         $                  M:INHIBIT (SOFTWARE INT. INHIBIT)
 01 000D0     32400000 X                 LW,R4       S:CUN
 01 000D1     52580000 X                 LH,R5       UH:FLG,R4
 01 000D2     326E0000 A                 LW,R6       0,R7               ON/OFF SPECIFIED
 01 000D3     683000D7                   BEZ         INHOFF             OFF
 01 000D4     49500002 N                 OR,R5       FLG:INH            SET 'INHIBIT' BIT IN UH:FLG
 01 000D5     55580000 X        INHRET   STH,R5      UH:FLG,R4          PUT IT AWAY
 01 000D6     6800001F                   B           RTSETCC0           RETURN TO USER
 01 000D7     4B500002 N        INHOFF   AND,R5      FLG:INHR           RESET 'INHIBIT' BIT IN UH:FLG
 01 000D8     680000D5                   B           INHRET
```

```
                           PAGE
          01 000D9  RTQFI  EQU      $ ***************************************************
                    *
                    *F*    NAME:    RTQFI
                    *,*
                    *,*    PURPOSE: TO PROCESS THE M:QFI CAL1,5
                    *,*
                    *,*    DESCRIPTION:  ALLOWS ANY REAL-TIME USER WHO IS CENTRALLY
                    *,*             CONNECTED TO ONE OR MORE INTERRUPTS TO BE PLACED IN
                    *,*             THE 'SQFI' STATE TO AWAIT AN INTERRUPT.
                    *,*
                    *,*    REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL
                    ************************************************************************
                    *D*    NAME:    RTQFI
                    *,*
                    *,*    REGISTERS:  STANDARD CAL1 REGISTER SETUP
                    *,*
                    *,*    CALL:    VIA RTALTCP (NOT CALLABLE EXTERNALLY)
                    *,*
                    *,*    INTERFACE:  T:REG, CALBAD (IF NO ICB IS ASSOCIATED WITH THE
                    *,*             USER), RTICBTYP.
                    *,*
                    *,*    ENVIRONMENT:  MAPPED/MASTER, USER MUST BE CENTRALLY CONNECTED
                    *,*             TO ONE OR MORE INTERRUPTS PRIOR TO CAL1,5.
                    *,*
                    *,*    INPUT:   R6 = WORD 0 OF CAL1,5 FPT.
                    *,*             R7 = POINTER TO WORD 1 OF FPT.
                    *,*             R11= RETURN ADDRESS (TRAPEXIT)
                    *,*             ICB TABLES
                    *,*
                    *,*    OUTPUT:  UH:FLG
                    *,*
                    *,*    DESCRIPTION:  ALL ICBS ARE SCANNED TO INSURE THAT THE
                    *,*             USER IS CENTRALLY CONNECTED TO AT LEAST ONE INTERRUPT.
                    *,*             IF NO ACTIVE ICB BELONGING TO THE USER IS FOUND, HE
                    *,*             IS ABORTED (B8/01); OTHERWISE THE 'INHIBIT' BIT OF
                    *,*             UH:FLG IS RESET AND THE USER'S UH:DL IS CHECKED TO SEE
```

```
                                *,*             IF ANY INTERRUPT IS PENDING.  IF NONE IS PENDING
                                *,*             AN E:QFI EVENT IS REPORTED ON THE USER (VIA T:REG),
                                *,*             OTHERWISE RETURN IS MADE DIRECTLY TO TRAPEXIT TO
                                *,*             WHERE THE UHIDL ITEM WILL BE SERVICED.
                                ************************************************************************
                                *
01 000D9   32100000 X                   LW,R1     S:CUN               SET UP LOOP THROUGH ICB'S
01 000DA   22200000 N                   LI,R2     ICB
01 000DB   2240001C A                   LI,R4     ICBUN(D)
01 000DC   22500020 A                   LI,R5     ICBPRI(D)
01 000DD   22A00000 N                   LI,R10    NINTS
01 000DE   32940000 A       LOOP2       LW,R9     ICBSTAT(W),R2       FIND AN ACTIVE ICB BELONGING TO USER
01 000DF   681000E2                     BGEZ      QFINA               NOT ACTIVE IF BIT 0 IS RESET
01 000E0   F1180002 A                   CB,R1     *R2,R4              BELONG TO THIS USER
01 000E1   683000E6                     BE        QFI1                YES
01 000E2   20200000 N       QFINA       AI,R2     ICBSIZE             INCREMENT TO NEXT ICB
01 000E3   64A000DE                     BDR,R10   LOOP2               GO LOOK AT NEXT ONE
                                ************************************************************************
                                *E*             ERROR!    B8=01
                                *,*
                                *,*             DESCRIPTION:  AN M:QFI HAS BEEN ISSUED WHEN NO ICBS WERE
                                *,*                       ASSOCIATED WITH THE USER.
                                *,*
                                *,*             REGISTERS:  (NOTHING RELEVANT)
                                ************************************************************************
01 000E4   32E00002                     LW,R14    RTERR:QFI           DIDN'T FIND ONE
01 000E5   68000000 X                   B         CALBAD              ABORT USER
01 000E6   6AC00044         QFI1        BAL,R12   RTICBTYP            RETURNS ICBTYP IN R3
01 000E7   21300001 A                   CI,R3     ICBTYP2             IS IT A GJOB ICB
01 000E8   683000EC                     BE        QFIOK               NO NEED TO CHECK PRIORITY
01 000E9   F29A0002 A                   LB,R9     *R2,R5              ICBPRI
01 000EA   71920000 X                   CB,R9     UB:PRIOB,R1         ICBPRI < UB:PRIOB
01 000EB   692000E2                     BG        QFINA               NO - GO CHECK NEXT ONE
01 000EC   22200000 A       QFIOK       LI,R2     0                   SET CONDITION CODE FOR EVENTUAL RET
01 000ED   32300000 X                   LW,R3     YF                  CC MASK
01 000EE   225FFFEF A                   LI,R5     -17
01 000EF   30500000 X                   AW,R5     TSTACK              DEVELOP PSD ADR. IN TSTACK
```

```
1004  01 000F0  4B500000 X   AND,R5   X1FFFE          MASK OFF ADR.
1005  01 000F1  472A0000 A   STS,R2   0,R5            USER'S PSD IN TSTACK
1006  01 000F2  32600000 X   LW,R6    S!CUN
1007  01 000F3  525C0000 X   LH,R5    UH!FLG,R6
1008  01 000F4  4B500002 N   AND,R5   FLG!INHR        RESET 'INHIBIT' BIT IN UH!FLG
1009  01 000F5  555C0000 X   STH,R5   UH!FLG,R6       PUT IT AWAY
1010  01 000F6  526C0000 X   LH,R6    UH!DL,R6        ANYTHING TO DO
1011  01 000F7  F930000B A   BNEZ     *R11            YES, EXIT TO TRAPEXIT
1012  01 000F8  22600000 N   LI,R6    E!QFI           'QUEUE FOR INTERRUPT' EVENT
1013  01 000F9  6AB00000 X   BAL,R11  T!REG           REPORT EVENT & GIVE UP CONTROL
1014  01 000FA  68000000 X   B        TRAPEXIT        RETURN FOR INTERRUPT PROCESSING
```

```
                                        PAGE
          01 000FB            RTINTSTAT  EQU     $ ************************************************
                              *
                              *F*       NAME:    RTINTSTAT
                              *,*
                              *,*       PURPOSE: TO PROCESS THE M:INTSTAT CAL1,5.
                              *,*
                              *,*       DESCRIPTION:  ALLOWS ANY USER IN A REAL-TIME SYSTEM TO QUERY
                              *,*                THE STATUS OF ANY CENTRALLY CONNECTED REAL OR PSEUDO
                              *,*                INTERRUPT.  INFORMATION RETURNED TO THE USER:
                              *,*                                   ARM/ENABLE/TRIGGER STATUS
                              *,*                                   USER # AND CURRENT STATE OF CENTRAL-
                              *,*                                       LY CONNECTED USER OF THAT
                              *,*                                       INTERRUPT
                              *,*                                   GJOB USER # (IF M:GJOBCON)
                              *,*
                              *,*       REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL
                              ****************************************************************************
                              *D*       NAME:    RTINTSTAT
                              *,*
                              *,*       ENTRY:   INTSTAT
                              *,*
                              *,*       REGISTERS:  IF RTINTSTAT:  STANDARD CAL1 REGISTER SETUP
                              *,*                   IF INTSTAT:    ALL REGISTERS ARE VULNERABLE.
                              *,*
                              *,*       CALL:    IF RTINTSTAT:  VIA RTALTCP (NOT CALLABLE EXTERNALLY)
                              *,*                IF INTSTAT:    BAL,R11
                              *,*
                              *,*       INTERFACE:  RTLOCICB, RTICBTYP, RTCHKGUN
                              *,*
                              *,*       ENVIRONMENT:  IF RTINTSTAT:  MAPPED/MASTER.
                              *,*                     IF INTSTAT:    MAPPED OR UNMAPPED; MASTER.
                              *,*
                              *,*       DATA:    WAIT:MASK, EXU:MASK, IOWAIT:MASK, BLCKD:MASK.
                              *,*
                              *,*       INPUT:   R6 = INTERRUPT ADDRESS
                              *,*                R11= RETURN ADDRESS (TRAPEXIT IF RTINTSTAT)
```

```
1052                    *,*             ASSOCIATED ICB, UB:US
1053                    *,*
1054                    *,*     OUTPUT:  R8 = STATUS INFORMATION.
1055                    *,*
1056                    *,*     DESCRIPTION:  RTINTSTAT IS THE CAL1,5 RECEIVER FOR M:INTSTAT.
1057                    *,*             INTSTAT IS THE EXTERNALLY CALLABLE ROUTINE WHICH
1058                    *,*             GATHERS AND FORMATS INFORMATION ABOUT THE SPECIFIED
1059                    *,*             INTERRUPT.  IF AN INTERRUPT IS CENTRALLY CONNECTED
1060                    *,*             IT WILL HAVE AN ICB ASSOCIATED WITH IT FROM WHICH
1061                    *,*             VARIOUS INFORMATION MAY BE EXTRACTED (E.G., THE
1062                    *,*             OWNER:S USER #, THE USER # OF THE GHOST JOB IF
1063                    *,*             M:GJOBCON WAS USED TO CONNECT THE INTERRUPT, ITS
1064                    *,*             ARM/ENABLE/TRIGGER STATUS).  UB:US IS USED TO
1065                    *,*             DETERMINE THE OWNER:S CURRENT STATE.
1066                    ********************************************************************
1067                    *
1068  01 000FB  6AB00101            BAL,R11 INTSTAT         MAKE IT CALLABLE EXTERNALLY
1069  01 000FC  32300000 X          LW,R3   TSTACK
1070  01 000FD  3587FFF9 A          STW,R8  -7,R3           PUT R8 IN TSTACK FOR RET TO USER
1071  01 000FE  21900001 A          CI,R9   STATNA          WAS INT. NOT ACTIVE
1072  01 000FF  68300018            BE      RTSETCC2        ABNORMAL RETURN
1073  01 00100  68000001F           B       RTSETCC0        NORMAL RETURN
1074                    *
1075                    *
1076                    *
1077  01 00101  6A000029    INTSTAT BAL,R0  RTLOCICB        RETURNS ICB ADR. IN R2
1078  01 00102  69300106            BCS,3   INTSTAT2        FOUND IT
1079  01 00103  22800000 A          LI,R8   0               INITIALIZE R8
1080  01 00104  22900001 A          LI,R9   STATNA          'NOT ACTIVE' CODE FOR R8 RETURN
1081  01 00105  68000125            B       INTSTATX        EXIT
1082  01 00106  32840000 A  INTSTAT2 LW,R8   ICBSTAT(W),R2   PICK UP ICBSTAT WORD OF ICB
1083  01 00107  25800067 A          SLS,R8  STATINTSHFT     RIGHT-JUSTIFY ICBSTATINT
1084  01 00108  48800003 N          AND,R8  MASKS+3         MASK IT
1085  01 00109  6AC00044            BAL,R12 RTICBTYP        DETERMINE ICB TYPE (RETURNED IN R3)
1086  01 0010A  21300001 A          CI,R3   ICBTYP2         IS IT TYPE=II (GHOST JOB)
1087  01 0010B  6930010F            BNE     INTSTAT3        NO
1088  01 0010C  6A000080            BAL,R0  RTCHKGUN        RETURNS GJOB # IN R5
```

```
1089   01 0010D   22300002 A          LI,R3   2
1090   01 0010E   75560008 A          STB,R5  R8,R3              PUT IT AWAY
1091   01 0010F   2230001C A  INTSTAT3 LI,R3   ICBUN(D)
1092   01 00110   F2560002 A          LB,R5   *R2,R3             PICK UP USER #
1093   01 00111   22100001 A          LI,R1   1
1094   01 00112   75520008 A          STB,R5  R8,R1              PUT IT AWAY
1095   01 00113   725A0000 X          LB,R5   UBIUS,R5           PICK UP USER'S CURRENT STATE
1096   01 00114   22900040 A          LI,R9   STATWAIT           INITIALIZE R9 WITH 'QFI' CODE
1097   01 00115   325A0001 N          LW,R5   X1,R5              PICK UP ONE-BIT MASK CORRESPONDING
1098                         *                                  TO USER'S STATE
1099   01 00116   31500000 X          CW,R5   WAIT!MASK          IS THE STATE 'WAIT' OR 'QFI'
1100   01 00117   69400125            BANZ    INTSTATX           YES
1101   01 00118   31500000 X          CW,R5   EXU!MASK           IS THE STATE 'EXECUTABLE'
1102   01 00119   69400122            BANZ    INTSTAT4           YES
1103   01 0011A   31500000 X          CW,R5   IOWAIT!MASK        IS THE STATE 'IO-WAIT'
1104   01 0011B   69400124            BANZ    INTSTAT5           YES
1105   01 0011C   31500000 X          CW,R5   BLCKD!MASK         IS THE STATE 'BLOCKED'
1106   01 0011D   69400120            BANZ    INTSTAT1           YES
1107                         ********************************************************************
1108                         *S*     SCREECH CODE:  41-01
1109                         *,*
1110                         *,*     REPORTED BY:  RTROOT
1111                         *,*
1112                         *,*     MESSAGE: FAILED TO FIND USER'S STATE (M!INTSTAT)
1113                         *,*
1114                         *,*     TYPE:    SCREECH
1115                         *,*
1116                         *,*     REGISTERS:  R2 = ADDRESS OF ICB BEING CHECKED
1117                         *,*
1118                         *,*     REMARKS: PROBABLY RESULTS FROM A STATE HAVING BEEN ADDED TO
1119                         *,*              SCHED WITHOUT UPDATING THE FOUR MASKS USED BY THE
1120                         *,*              M!INTSTAT ROUTINE (WAIT!MASK, EXU!MASK, IOWAIT!MASK,
1121                         *,*              BLCKD!MASK).
1122                         ********************************************************************
1123   01 0011E   0F000000 X          SCREECH X'41',1
       01 0011F   00410001 A
1124                         INTSTAT1 ;
```

```
1125   01 00120   22900010 A          LI,R9    STATBLK      'BLOCKED' CODE FOR R8 RETURN
1126   01 00121   68000125            B        INTSTATX
1127   01 00122   22900080 A  INTSTAT4 LI,R9    STATEXU      'EXECUTABLE' CODE FOR R8 RETURN
1128   01 00123   68000125            B        INTSTATX
1129   01 00124   22900020 A  INTSTAT5 LI,R9    STATIOW      'IO-WAIT' CODE FOR R8 RETURN
1130   01 00125   75900008 A  INTSTATX STB,R9   R8           PUT CODE AWAY
1131   01 00126   F800000B A          B        *R11         RETURN TO CALLER
```

```
1132                    PAGE
1133         01 00127 RTINTRTN EQU     * ************************************************
1134                  *
1135                  *F*     NAME:     RTINTRTN
1136                  *,*
1137                  *,*     PURPOSE: TO PROCESS THE M:INTRTN CAL1,5.
1138                  *,*
1139                  *,*     DESCRIPTION:  THE REAL-TIME USER'S CURRENT INTERRUPT PROCESSIN
1140                  *,*             ROUTINE IS EXITED, THE INTERRUPT STATUS IS SET PER THE
1141                  *,*             USER'S REQUEST, AND CONTROL OF THE USER'S PROGRAM
1142                  *,*             IS PASSED TO THE ENVIRONMENT IN THE USER'S TCB STACK
1143                  *,*             (THIS WOULD USUALLY BE THE POINT OF INTERRUPTION).
1144                  *,*
1145                  *,*     REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL
1146                  ************************************************************************
1147                  *D*     NAME:     RTINTRTN
1148                  *,*
1149                  *,*     REGISTERS:  STANDARD CAL1 REGISTER SETUP
1150                  *,*
1151                  *,*     CALL:     VIA RTALTCP (NOT CALLABLE EXTERNALLY)
1152                  *,*
1153                  *,*     INTERFACE:  RTICBTYP, RTINTCNTRL, CALBAD (IF THERE IS NO
1154                  *,*             CURRENTLY ACTIVE ICB); EXITS VIA MTRTNO & T:SSEM.
1155                  *,*
1156                  *,*     ENVIRONMENT:  MAPPED/MASTER.
1157                  *,*
1158                  *,*     INPUT:    R4(BITS 22-23) = INTERRUPT CONTROL CODE FROM CAL1,9:
1159                  *,*                WHERE:
1160                  *,*                ------------------------
1161                  *,*                  0     LEAVE
1162                  *,*                  1     DISARM
1163                  *,*                  2     ARM & ENABLE
1164                  *,*                  3     ARM & DISABLE
1165                  *,*
1166                  *,*             J:ICBHDR, UH:DL
1167                  *,*             ASSOCIATED ICB
1168                  *,*
```

```
1169                    *,*     OUTPUT:  UB:PRIO, UB:PRIOB, S:CUP, UH:FLG, RTICBHDR.
1170                    *,*
1171                    *,*     DESCRIPTION:  THE USER IS EXITING AN INTERRUPT PROCESSING
1172                    *,*           ROUTINE.  THE CURRENTLY ACTIVE ROUTINE'S ICB IS
1173                    *,*           POINTED TO BY THE ADDRESS IN J:ICBHDR (IF THIS POINTE
1174                    *,*           IS ZERO THE USER WILL BE ABORTED - B8/02).  THE USER'S
1175                    *,*           INTERRUPTED ENVIRONMENT IS IN HIS TCB STACK
1176                    *,*           (THIS ENVIRONMENT MAY IN FACT HAVE BEEN ALTERED BY
1177                    *,*           THE USER PRIOR TO ISSUING THE M:INTRTN).  IN ANY CASE,
1178                    *,*           THE PRIORITY SAVED IN THE ICB (ICBPRIO) MUST BE RE-
1179                    *,*           STORED TO UB:PRIO/UB:PRIOB/S:CUP AND THE NEXT ICB IN
1180                    *,*           THE J:ICBHDR CHAIN (CHAINED THRU ICBDL) MUST BE
1181                    *,*           PROMOTED.  NEXT, UH:DL MUST BE SCANNED TO SEE IF
1182                    *,*           THERE MIGHT BE A RECENTLY-ARRIVED HIGHER PRIORITY
1183                    *,*           INTERRUPT WAITING (HIGHER THAN THE 'JUST RESTORED'
1184                    *,*           UB:PRIOB PRIORITY).  IF THERE IS, THEN UB:PRIOB IS
1185                    *,*           COMPARED WITH THE PREVIOUSLY SAVED PRIORITY (IN THE
1186                    *,*           ICB CHAINED INTO UH:DL) AND THE LOWER PRIORITY
1187                    *,*           (HIGHER VALUE) IS SAVED IN THIS HIGH-PRIORITY ICB
1188                    *,*           (ICBPRIO), AND UB:PRIO/UB:PRIOB/S:CUP ARE SET TO
1189                    *,*           REFLECT THE PRIORITY OF THIS NEW, HIGH-PRIORITY ICB.
1190                    *,*           FINALLY, THE CURRENT ICB:S INTERRUPT STATUS IS SET PE
1191                    *,*           THE USER'S REQUEST AND, IF A 'ONESHOT' M:CLOCK ICB,
1192                    *,*           THE ICB IS RETURNED TO THE FREE POOL OF ICBS
1193                    *,*           (RT:ICBHDR).  EXIT IS THRU MTRTNO (IN ALTCP) AND
1194                    *,*           T:SSEM (IN SCHED).
1195                    ********************************************************************
1196                    *
1197  01 00127  32600004 A          LW,R6   R4                      PICK UP CODE BITS
1198  01 00128  2250FFFF A          LI,R5   X'FFFF'
1199  01 00129  6D000037 A          DISABLE                         ************************************
1200  01 0012A  32200000 X          LW,R2   J:ICBHDR                HEAD OF ICB'S ASSOCIATED WITH USER'S
1201                    *                                       CURRENTLY ACTIVE INTERRUPTS
1202  01 0012B  4B200005 A          AND,R2  R5                      MASK OFF ADR. FIELD...DA(ICBDL)
1203  01 0012C  68300168            BEZ     INTRTNERR               THERE ISN'T ONE; ABORT USER
1204  01 0012D  25200001 A          SLS,R2  1                       CONVERT TO WA(ICBDL)
1205  01 0012E  202FFFF8 A          AI,R2   -ICBDL(W)               R2=WA(ICB)
```

```
01 0012F  32440008 A            LW,R4     ICBDL(W),R2      FIND NEXT ICB IN ACTIVE CHAIN
01 00130  47400000 X            STS,R4    J:ICBHDR         ICBDL BECOMES HEAD;PRESERVE BIT 0
01 00131  32300000 X            LW,R3     S:CUN            GET CURRENT USER NUMBER
01 00132  22500018 A            LI,R5     ICBPRIO(D)       DISP TO OLD PRIORITY
01 00133  F20A0002 A            LB,R0     *R2,R5           GET IT FROM ICB
01 00134  75060000 X            STB,R0    UB:PRIOB,R3      STORE IT IN BASE PRIO
01 00135  75060000 X            STB,R0    UB:PRIO,R3       AND WORKING PRIO
01 00136  35000000 X            STW,R0    S:CUP            ANNOUNCE IT
01 00137  32C40000 A            LW,R12    ICBSTAT(W),R2    PICK UP ICB STATUS
01 00138  4BC0001E N            AND,R12   NB31TO0+30       TURN OFF 'ON-DL' FLAG
01 00139  4BC0001C N            AND,R12   NB31TO0+28       TURN OFF 'TRIGGERED' BIT
01 0013A  35C40000 A            STW,R12   ICBSTAT(W),R2    PUT ICB STATUS BACK
01 0013B  52C60000 X            LH,R12    UH:FLG,R3
01 0013C  4BC00002 N            AND,R12   FLG:INHR         RESET 'INHIBIT' BIT IN UH:FLG
01 0013D  55C60000 X            STH,R12   UH:FLG,R3        PUT IT AWAY
01 0013E  52C60000 X            LH,R12    UH:DL,R3         GET DO LIST
01 0013F  22500FFF A   INTRTNB  LI,R5     X'FFF'           MASK FOR FLINK
01 00140  4B50000C A            AND,R5    R12              GET POINTER
01 00141  68300154              BEZ       INTRTNA          NONE
01 00142  25500001 A            SLS,R5    1                WORD ADDRESS
01 00143  32CA0000 A            LW,R12    0,R5             FLINK ON
01 00144  5200000C A            LH,R0     R12              GET TYPE
01 00145  4B000007 N            AND,R0    MASKS+7          SCRUB
01 00146  21000002 A            CI,R0     2                TEST FOR INTENTRY
01 00147  6930013F              BNE       INTRTNB          NO
01 00148  7200000C A            LB,R0     R12              GET DO LIST PRIO
01 00149  71060000 X            CB,R0     UB:PRIOB,R3      COMPARE WITH CURRENT
01 0014A  69200154              BG        INTRTNA          LESS, IGNORE IT
01 0014B  205FFFF8 A            AI,R5     -ICBPRI(W)       GET BASE OF DO LIST
01 0014C  22100018 A            LI,R1     ICBPRIO(D)       DISP TO ICB OLD PRIO
01 0014D  72D60000 X            LB,R13    UB:PRIOB,R3      GET USERS CURRENT PRIO
01 0014E  F1D20005 A            CB,R13    *R5,R1           CHECK FOR PREVIOUS SAVED PRIORITY
01 0014F  69100151              BL        $+2              REMEMBER LOWEST PRIORITY(HIGHEST NU
01 00150  F5D20005 A            STB,R13   *R5,R1           SAVE IN TOP ICB
01 00151  75060000 X            STB,R0    UB:PRIO,R3       SET AS CURRENT
01 00152  75060000 X            STB,R0    UB:PRIOB,R3      FOR USER
01 00153  35000000 X            STW,R0    S:CUP            AND ANNOUNCE IT TO WORLD
```

```
1243  01 00154  6D000027 A  INTRTNA  ENABLE                    ************************************
1244  01 00155  6AC00044             BAL,R12  RTICBTYP         RETURNS ICB.TYPE IN R3
1245  01 00156  21300002 A           CI,R3    ICBTYP3          IS IT A CLOCK-TYPE ICB
1246  01 00157  69300161             BNE      INTRTN1          NO
1247  01 00158  32440000 A           LW,R4    ICBSTAT(W),R2
1248  01 00159  4B40001D N           AND,R4   STATO            'ONESHOT' BIT IN ICBSTAT SET
1249  01 0015A  68300169             BEZ      INTRTNX          NO;
1250  01 0015B  6D000037 A           DISABLE                   ************************************
1251  01 0015C  32500000 X           LW,R5    RTICBHDR         HEAD OF FREE ICB'S
1252  01 0015D  35540000 A           STW,R5   ICBLNK(W),R2     INITIALIZE ICBSTAT & ICBLNK
1253  01 0015E  35200000 X           STW,R2   RTICBHDR         FREED ICB BECOMES NEW HEAD OF CHAIN
1254  01 0015F  6D000027 A           ENABLE                    ************************************
1255  01 00160  68000169             B        INTRTNX
1256  01 00161  25600078 A  INTRTN1  SLS,R6    C19CS            RIGHT.JUSTIFY WD.CODE FROM CAL1
1257  01 00162  4B600002 N           AND,R6   MASKS+2          MASK OFF LEGAL CODES
1258  01 00163  21600001 A           CI,R6    1                IS THE REQUEST 'DISARM'
1259  01 00164  69300168             BNE      INTRTN2          NO
1260  01 00165  22600003 A           LI,R6    3                ARM & DISABLE THE INT. FIRST
1261  01 00166  6AF00048             BAL,R15  RTINTCONTROL     CLEAR INTERRUPT
1262  01 00167  22600001 A           LI,R6    1                NOW WE CAN DISARM IT
1263  01 00168  6AF00048  INTRTN2    BAL,R15  RTINTCONTROL     SET ICBSTAT;
1264  01 00169  22600000 N  INTRTNX  LI,R6    TISSEM           SET UP RETURN ADR, FOR MTRTNO ROUTI
1265  01 0016A  68000000 X           B        MTRTNO           MITRTN PROCESSING IN ALTCP
1266              ************************************************************************************
1267              *E*       ERROR!   BB=02
1268              *,*
1269              *,*       DESCRIPTION:  AN M:INTRTN HAS BEEN ISSUED AND THERE WERE NO
1270              *,*                 ACTIVE INTERRUPTS ASSOCIATED WITH THE USER (IE.,
1271              *,*                 J:ICBHDR CHAIN WAS EMPTY).
1272              *,*
1273              *,*       REGISTERS:  (NOTHING RELEVANT)
1274              ************************************************************************************
1275  01 0016B  32E00003  INTRTNERR  LW,R14 RTERR:INTRTN       ERROR CODE
1276  01 0016C  68000000 X           B        CALBAD           RETURN TO ALTCP TO ABORT USER
```

```
                                PAGE
        01 0016D        RTHOLD  EQU      $ ***********************************************
                        *
                        *F*      NAME:    RTHOLD
                        *,*
                        *,*      PURPOSE: TO PROCESS THE MIHOLD CAL1,5.
                        *,*
                        *,*      DESCRIPTION:   ALLOWS ANY USER WITH REAL-TIME PRIVILEGES TO
                        *,*               UNCONDITIONALLY LOCK HIMSELF IN CORE.
                        *,*
                        *,*      REFERENCE:   CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL.
                        *,*******************************************************************
                        *D*      NAME:    RTHOLD
                        *,*
                        *,*      REGISTERS:   STANDARD CAL1 REGISTER SETUP.
                        *,*
                        *,*      CALL:    VIA RTALTCP (NOT CALLABLE EXTERNALLY)
                        *,*
                        *,*      INTERFACE:  RTCHKPRIV, RTLCT, RTSIZE, T:TOTSZ
                        *,*
                        *,*      ENVIRONMENT:   MAPPED/MASTER; PRIVILEGE LEVEL MUST = X'E0'.
                        *,*
                        *,*      INPUT:   R6 = WORD 0 OF CAL1,5 FPT.
                        *,*               R7 = POINTER TO WORD 1 OF FPT.
                        *,*               R11= RETURN ADDRESS (TRAPEXIT)
                        *,*
                        *,*      OUTPUT:  UH:FLG2, PB:LCT, S:RTCORE, J:JCBHDR, S:BADFLG.
                        *,*
                        *,*      DESCRIPTION:
                        *,*               IF HOLD(ON) - THE USER IS SIZED (VIA T:TOTSZ), THE
                        *,*                             RTHOLD-BIT OF UH:FLG2 IS SET, PB:LCT IS
                        *,*                             INCREMENTED FOR ALL SHARED PROCEDURE
                        *,*                             CURRENTLY ASSOCIATED WITH THE USER, AND
                        *,*                             S:RTCORE IS INCREMENTED BY THE NUMBER OF
                        *,*                             PAGES THAT THIS USER IS CAUSING TO BE
                        *,*                             LOCKED.  CONDITION CODES ARE PASSED BACK
                        *,*                             TO THE USER TO REFLECT WHETHER OR NOT
```

```
1314                    *,*                     ALLYCAT &/OR RBBAT WILL STILL FIT IN THI
1315                    *,*                     REMAINING FLUID CORE.  J:ICBHDR IS SET
1316                    *,*                     TO !NDICATE WHETHER OR NOT TO PURGE THE
1317                    *,*                     USER'S DATA/PROCEDURE PAGES SHOULD HE
1318                    *,*                     EXIT WITHOUT UNILOCKING.
1319                    *,*             IF HOLD(0FF)= UN=DU7 ALL OF THE ABOVE.
1320                    ********************************************************************
1321                    *
1322  01 0016D  6A000013        BAL,R0  RTCHKPRIV       JB!PRIV >= X'E0'
1323  01 0016E  69800019        BCS,8   RTSETCC1        NO
1324  01 0016F  32400000 X      LW,R4   S!CUN           USER #
1325  01 00170  6D000037 A      DISABLE                 **********************************
1326  01 00171  52780000 X      LW,R7   UH!FLG2,R4
1327  01 00172  21600001 A      CI,R6   FPTF1           'OFF' SPECIFIED
1328  01 00173  6840017E        BAZ     HOLDON          NO
1329  01 00174  3170000C N      CW,R7   FLG;LIC         'LOCKED-IN-CORE' BIT SET
1330  01 00175  6840001F        BAZ     RTSETCC0        NO
1331  01 00176  4B70000C N      AND,R7  FLG:L;CR        UH!FLG2 MASK! LIC BIT RESET
1332  01 00177  55780000 X      STH,R7  UH!FLG2,R4      RESET UH!FLG2 BITS
1333  01 00178  22500001 A      LI,R5   1               SET 'DECREMENT' FLAG
1334  01 00179  6A700196        BAL,R7  RTLCT           DECREMENT PB;LCT
1335  01 0017A  6A700000 X      BAL,R7  TITBTSZ         RETURNS USER'S 'UNLOCKABLE' SIZE(R0
1336  01 0017B  3A000000 A      LCW,R0  R0
1337  01 0017C  66000000 X      AWM,R0  S!RTCORE        DECREMENT COUNTER
1338  01 0017D  6800001F        B       RTSETCC0        RETURN TO USER
1339                    *
1340                    *
1341                    *
1342       01 001,7E            HOLDON  EQU     $
1343  01 0017E  25600010 A      SLS,R6  28              SHIFT 'PURGE' BIT
1344  01 0017F  32800006 A      LW,R8   R6              MOVE IT TO R8
1345  01 00180  32900010 N      LW,R9   BT3,TBO+3O      MASK
1346  01 00181  47800000 X      STS,R8  J!ICBHDR        SET/RESET FLAG
1347  01 00182  3170000C N      CW,R7   FLG!LIC         'LOCKED-IN-CORE' BIT SET
1348  01 00183  6940018E        BANZ    HOLD2           YES
1349  01 00184  4970000C N      OR,R7   FLG!LIC         UH!FLG2 MASK! LIC BIT SET
1350  01 00185  55780000 X      STH,R7  UH;FLG2,R4      TURN ON 'LOCKED IN CORE' BIT
```

```
1351  01 00186  32300020 N        LW,R3   BIT31T80+32
1352  01 00187  47300000 X        STS,R3  JICBHDR          SET RT.CAL1.ISSUED BIT
1353  01 00188  3230001F N        LW,R3   BIT31T80+31
1354  01 00189  47300000 X        STS,R3  SIBADFLG         SET 'RT.LOCK.CORE' BIT
1355  01 0018A  6A700000 X        BAL,R7  TITBTSZ          RETURNS USER'S 'LOCKABLE' SIZE(R0)
1356  01 0018B  22500000 A        LI,R5   0                SET 'INCREMENT' FLAG
1357  01 0018C  6A700196          BAL,R7  RTLCT            INCREMENT PBILCT
1358  01 0018D  66000000 X        AWM,R0  SIRTCORE         REFLECT USER'S 'LOCKABLE' SIZE
1359  01 0018E  6D000027 A  HOLD2 ENABLE                   **********************************
1360  01 0018F  22400002 A        LI,R4   ALLOCATION       ALLY'S USER #
1361  01 00190  6A6001AB          BAL,R6  RTSIZE           SIZE HIM
1362  01 00191  6910001B          BCS,1   RTSETCC2         IF HE WON'T FIT
1363  01 00192  22400003 A        LI,R4   RBBATIUN         RBBAT'S USER #
1364  01 00193  6A6001AB          BAL,R6  RTSIZE           SIZE HIM
1365  01 00194  6910001B          BCS,1   RTSETCC2         IF HE WON'T FIT
1366  01 00195  6800001F          B       RTSETCC0         RETURN TO USER
```

```
                                   PAGE
        01 00196          RTLCT    EQU      $ ****************************************************
                          *
                          *F*      NAME:    RTLCT
                          *,*
                          *,*      PURPOSE: TO PROVIDE A SUBROUTINE FOR RTROOT AND RTNR FOR KEEP-
                          *,*               ING TRACK OF COMMON SHARED PROCEDURE THAT IS LOCKED-I
                          *,*               -CORE BY ALL REAL-TIME USERS.
                          *,*
                          *,*      DESCRIPTION:   INCREMENTS OR DECREMENTS PB:LCT FOR EVERY PIECE
                          *,*               OF SHARED PROCEDURE ASSOCIATED WITH THE USER.
                          ************************************************************************
                          *D*      NAME:    RTLCT
                          *,*
                          *,*      REGISTERS:   R1 AND R15 ARE VULNERABLE.
                          *,*
                          *,*      CALL:    BAL,R7
                          *,*
                          *,*      INTERFACE:  NONE.
                          *,*
                          *,*      ENVIRONMENT:   MASTER MODE; MAPPED/UNMAPPED.
                          *,*
                          *,*      INPUT:   R4 = USER #
                          *,*               R5 = 0 (IF PB:LCT IS TO BE INCREMENTED)
                          *,*                    1 (IF PB:LCT IS TO BE DECREMENTED)
                          *,*               UH:FLG, UB:APR, UB:APO, UB:ASP, UB:OV, UB:ACP, UB:DB.
                          *,*
                          *,*      OUTPUT:  PB:LCT (MODIFIED PER REQUEST).
                          *,*
                          *,*      DESCRIPTION:   PB:LCT IS INCREMENTED OR DECREMENTED FOR EVERY
                          *,*               PIECE OF SHARED PROCEDURE ASSOCIATED WITH THE USER.
                          *,*               THIS IS NECESSARY IN ORDER TO KEEP FROM MULTIPLY.
                          *,*               ACCOUNTING FOR SHARED PROCEDURE ASSOCIATED WITH USERS
                          *,*               WHO ISSUE M:HOLD CAL1S.
                          ************************************************************************
                          *
  01 00196    52F80000 X           LH,R15   UH:FLG,R4
```

```
1404  01 00197  21F00080 A          C1,R15   TIC      TEL IN CONTROL
1405  01 00198  694001A5            BANZ     LCT1     YES
1406  01 00199  21F00040 A          C1,R15   DIC      DELTA IN CONTROL
1407  01 0019A  694001A7            BANZ     LCT2     YES
1408  01 0019B  72180000 X          LB,R1    UB!APR,R4
1409  01 0019C  670A01A9            EXU      MTBINST,R5   ACCOUNT FOR SHRD PROC ROOT
1410  01 0019D  72180000 X          LB,R1    UB!APB,R4
1411  01 0019E  670A01A9            EXU      MTBINST,R5   ACCOUNT FOR SHRD PROC OVERLY
1412  01 0019F  72180000 X          LB,R1    UB!ASP,R4    ANY SPECIAL SHRD PROCESSOR
1413  01 001A0  683001A7            BEZ      LCT2     NO...GO ACCOUNT FOR DELTA(MAYBE)
1414  01 001A1  670A01A9     LCT3   EXU      MTBINST,R5   ACCOUNT FOR IT
1415  01 001A2  72180000 X          LB,R1    UB!OV,R4
1416  01 001A3  670A01A9            EXU      MTBINST,5    ACCOUNT FOR SHRD MON OVERLY
1417  01 001A4  680E0000 A          B        0,R7     RETURN
1418  01 001A5  72180000 X   LCT1   LB,R1    UB!ACP,R4    COMMAND PROCESSOR
1419  01 001A6  680001A1            B        LCT3
1420  01 001A7  72180000 X   LCT2   LB,R1    UB!DB,R4     DEBUGGER
1421  01 001A8  680001A1            B        LCT3
1422                         *
1423                         *
1424  01 001A9  73120000 X   MTBINST MTB,1    PB!LCT,R1    COUNT IT UP
1425  01 001AA  73F20000 X          MTB,-1   PB!LCT,R1    COUNT IT DOWN
```

```
                                         PAGE
        01 001AB              RTSIZE     EQU       $ ********************************************************
                              *
                              *F*        NAME:     RTSIZE
                              *,*
                              *,*        PURPOSE: TO PROVIDE A SUBROUTINE FOR CHECKING IF A USER WILL
                              *,*                  FIT IN 'UNLOCKED' CORE.
                              *,*
                              *,*        DESCRIPTION:  THE TOTAL AVAILABLE 'UNLOCKED' CORE SIZE IS
                              *,*                  COMPARED WITH THE USER'S CURRENT SIZE AND CONDITION
                              *,*                  CODES ARE SET TO REFLECT WHETHER HE WILL FIT.
                              ***********************************************************************************
                              *D*        NAME:     RTSIZE
                              *,*
                              *,*        REGISTERS:   R15 THRU R7 ARE VULNERABLE.
                              *,*
                              *,*        CALL:     BAL,R6
                              *,*
                              *,*        INTERFACE:   T:TOTSZ
                              *,*
                              *,*        ENVIRONMENT:   MASTER MODE; MAPPED/UNMAPPED.
                              *,*
                              *,*        INPUT:    R4 = USER # OF USER TO BE SIZED.
                              *,*                  S:ACORE, S:RTCORE, S:STL#, SL:RSVP.
                              *,*
                              *,*        OUTPUT:   CONDITION CODE 4 = 0 (IF THE USER FITS).
                              *,*                                     1 (IF HE DOESN'T).
                              *,*
                              *,*        DESCRIPTION:  T:TOTSZ IS CALLED TO SIZE UP THE USER; THEN HIS
                              *,*                  SIZE IS COMPARED AGAINST:
                              *,*                  S:ACORE - S:RTCORE + (S:STL# - SL:RSVP)
                              *,*                                          -------|--------
                              *,*                                                 |
                              *,*                                                 > IF POSITIVE
                              ***********************************************************************************
                              *
        01 001AB    6A700000 X           BAL,R7    T:TOTSZ          RETURNS USER'S SIZE IN R0
```

```
1463  01 001AC  32200000 X          LW,R2   S:ACORE
1464  01 001AD  38200000 X          SW,R2   S:RTCORE        YIELDS !UNLOCKED! AVAILABLE CORE
1465  01 001AE  38200000 A          SW,R2   R0              AVAILABLE CORE=USER SIZE
1466  01 001AF  32100000 X          LW,R1   S:STL#
1467  01 001B0  38100000 X          SW,R1   SL:RSVP         ARE THERE ANY STOLEN PAGES AROUND
1468  01 001B1  68200183             BLEZ   RTS1            NO
1469  01 001B2  30200001 A          AW,R2   R1              YES...ADD THEM IN
1470  01 001B3  32200002 A  RTS1    LW,R2   R2              SET CC:S
1471  01 001B4  680C0000 A          B       0,R6            RETURN
```

```
                                          PAGE
           01 001B5          RTIOEX1      EQU       $ ********************************************************
                             *
                             *F*          NAME:     RTIOEX1
                             *,*
                             *,*          PURPOSE: TO PROCESS THE M:IOEX(SIO) CAL1,5.
                             *,*
                             *,*          DESCRIPTION:  PROVIDES A CAL1 INTERFACE TO QUEUE AN I/O REQUEST
                             *,*                    FOR A PRE-EMPTED DEVICE FROM A REAL-TIME USER.
                             *,*
                             *,*          REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL.
                             ****************************************************************************
                             *D*          NAME:     RTIOEX1
                             *,*
                             *,*          REGISTERS:  STANDARD CAL1 REGISTER SETUP.
                             *,*
                             *,*          CALL:     VIA RTALTCP (NOT CALLABLE EXTERNALLY).
                             *,*
                             *,*          INTERFACE:  CHKBIT1, CHKBIT, NEWQNW, CALBAD, RTCHKPRIV,
                             *,*                    RTDEVCHK, RTDCBCHK, RTVTP.
                             *,*
                             *,*          ENVIRONMENT:  MAPPED/MASTER; PRIVILEGE LEVEL MUST = X'E0'.
                             *,*
                             *,*          INPUT:    R6 = WORD 0 OF CAL1,5 FPT.
                             *,*                    R7 = POINTER TO WORD 1 OF FPT.
                             *,*                    R11= RETURN ADDRESS (TRAPEXIT).
                             *,*                    DCT3, DCT12, DCT15, UB:PRIO.
                             *,*
                             *,*          OUTPUT:   J:ICBHDR, DCT15.
                             *,*
                             *,*          DESCRIPTION:  THE FOLLOWING SECURITY CHECKS ARE MADE:  USER'S
                             *,*                    PRIVILEGE LEVEL MUST = X'E0'; 'CLIST' MUST HAVE BEEN
                             *,*                    SPECIFIED; DCB/DEVICE VALIDATION; THE DEVICE MUST BE
                             *,*                    PRE-EMPTED BY THIS USER; AND AN END-ACTION ADDRESS
                             *,*                    MUST HAVE BEEN PROVIDED (THIS ADDRESS MUST BE IN THE
                             *,*                    FIRST 128K OF MEMORY IF RUNNING ON A XEROX 560).
                             *,*                    THE FPT PARAMETERS ARE THEN FORMATTED FOR A CALL TO
```

```
1509                    *,*                 NEWQNW TO QUEUE THE I/O REQUEST.
1510                    ********************************************************************
1511                    *
1512  01 001B5  6A000013           BAL,R0    RTCHKPRIV           JB:PRIV >= X'E0'
1513  01 001B6  69800019           BCS,8     RTSETCC1            NO; ABNORMAL RETURN
1514  01 001B7  32EE0000 A         LW,R14    0,R7                FPT(WORD 1)
1515  01 001B8  691001BB           BLZ       EX12                IF PRESENCE BIT IS OK
1516                    ********************************************************************
1517                    *E*         ERROR:    B8=05
1518                    *,*
1519                    *,*         DESCRIPTION:  'CLIST' WAS NOT SPECIFIED IN AN M:IOEX (SIO) FPT
1520                    *,*
1521                    *,*         REGISTERS:  R14 = FPT PRESENCE BITS (WORD 1)
1522                    ********************************************************************
1523  01 001B9  32E00004           LW,R14    RTERR:PARAM         'CLIST' IS MISSING
1524  01 001BA  68000000 X         B         CALBAD              ABORT USER
1525  01 001BB  225001C0   EX12    LI,R5     EX11                SET POSSIBLE RETURN FROM RTDEVCHK
1526  01 001BC  21E08000 A         CI,R14    FPTDCB              'DEV' OR 'DCB' SPECIFIED
1527  01 001BD  684000A2           BAZ       RTDEVCHK            'DEV'= RETURNS VIA R5 WITH DCTX(R2)
1528  01 001BE  6A500091           BAL,R5    RTDCBCHK            VALIDATE DCB=RETURNS DCTX IN R2
1529  01 001BF  69F0001D           BCS,15    RTSETCC3            BAD DCB; ABNORMAL RETURN
1530  01 001C0  69300001D  EX11    BCS,3     RTSETCC3            BAD DEVICE ADR; ABN RETURN
1531  01 001C1  72540000 X         LB,R5     DCT3,R2
1532  01 001C2  21500020 A         CI,R5     DOWND               IS DEVICE PRE-EMPTED
1533  01 001C3  68400019           BAZ       RTSETCC1            NO
1534  01 001C4  72540000 X         LB,R5     DCT15,R2            DOES DEVICE BELONG TO THIS USER
1535  01 001C5  683001F7           BEZ       EX18                IF NO USER IS ASSOCIATED WITH DEVICE
1536  01 001C6  31500000 X         CW,R5     SICUN
1537  01 001C7  69300019           BNE       RTSETCC1            NO
1538  01 001C8  09200000 N  EX14   PUSH      R2                  SAVE DCTX
1539  01 001C9  6A200000 X         BAL,R2    CHKBIT1             RETURNS 'CLIST' ADR IN R12
1540  01 001CA  3260000C A         LW,R6     R12                 CLIST ADR
1541  01 001CB  6A3000A9           BAL,R3    RTVTP               RETURNS PHYSICAL ADR IN R6
1542  01 001CC  2560007F A         SLS,R6    =1                  CONVET TO DA(CLIST)
1543  01 001CD  3560000D A         STW,R6    R13                 SET UP FOR NEWQ
1544  01 001CE  49D0001F N         OR,R13    BIT31TO0*31         SET 'C' BIT OF IOQ8
1545  01 001CF  6A200000 X         BAL,R2    CHKBIT              'EA' SPECIFIED
```

```
1546  01 001D0  680001D7          B       EX15        YES
1547  01 001D1  82200000 X        LW,R2   *TSTACK     NO...GET DCTX
1548  01 001D2  32C40000 X        LW,R12  DCT12,R2    WAS 'EA' ADDRESS SPECIFIED AT
1549  01 001D3  4BC00016 N        AND,R12 MASKS+22    TIME OF STOPIO REQUEST
1550  01 001D4  693001E1          BNEZ    EX17        YES...CONTINUE
1551  01 001D5  08200000 N  EXIT  PULL    R2          NO....RESTORE STACK
1552  01 001D6  6800001B          B       RTSETCC2    ABNORMAL RETURN
1553  01 001D7  326 0000C A  EX15  LW,R6    R12
1554  01 001D8  6A3000A9          BAL,R3  RTVTP       RETURNS PHYSICAL ADR IN R6
1555  01 001D9  682001DC          BLE     EX19        PHY ADR < 128K
1556  01 001DA  70200000 X        BIF,X560 EXIT       CAN'T ALLOW EXECUTION ADR > 128K
      01 001DB  692001D5
1557  01 001DC  82200000 X  EX19  LW,R2   *TSTACK     GET     DCTX
1558  01 001DD  09700000 N        PUSH    R7          SAVE CHKBIT REGISTER
1559  01 001DE  32700016 N        LW,R7   MASKS,22    MASK FOR STS
1560  01 001DF  47640000 X        STS,R6  DCT12,R2    SAVE 'EA' ADR; PRESERVE BIT 0
1561  01 001E0  08700000 N        PULL    R7
1562  01 001E1  6A200000 X  EX17  BAL,R2  CHKBIT      WAS 'TO' SPECIFIED
1563  01 001E2  680001E4          B       EX16        YES
1564  01 001E3  22C00000 A        LI,R12  0           NO, DEFAULT IS ZERO
1565  01 001E4  09C00000 N  EX16  PUSH    R12         SAVE 'TO' VALUE
1566  01 001E5  22000000 A        LI,R0   0           NO END-ACTION FROM REQCOM
1567  01 001E6  6A200000 X        BAL,R2  CHKBIT      RETURNS 'PRI' IN R12
1568  01 001E7  680001FD          B       EX1A        IF 'PRI' WAS SPECIFIED
1569  01 001E8  32500000 X        LW,R5   S:CUN
1570  01 001E9  725A0000 X        LB,R5   UB:PRIO,R5  CURRENT EXECUTION PRIORITY
1571  01 001EA  25E00019 A  EX1B  SLS,R14 25          R14 HAS BEEN SET UP BY CHKBIT
1572  01 001EB  49D0000E A        OR,R13  R14         SET 'REL' BIT IF SPECIFIED IN FPT
1573  01 001EC  08E00000 N        PULL    R14         GET 'TO' VALUE FROM STACK
1574  01 001ED  08C00000 N        PULL    R12         RESTORE DCTX TO R12 FROM STACK
1575  01 001EE  8550000C A        STH,R5  R12         SET UP FOR NEWQ
1576  01 001EF  22F00000 A        LI,R15  0           SET UP FOR NEWQ
1577  01 001F0  6AB00000 X        BAL,R11 NEWQNW      ************************************
1578  01 001F1  680001F5          B       EXSC        BAD RETURN FROM NEWQ
1579  01 001F2  32300000 X        LW,R3   YC          SET 'RT-ACTIVITY' BIT &
1580  01 001F3  47300000 X        STS,R3  JIICBHDR        'IOEX-ACTIVITY' BIT IN JIT
1581  01 001F4  6800001F          B       RTSETCC0    RETURN TO USER
```

```
                                       ************************************************************************
                                       *S*        SCREECH CODE:  41-10
                                       *,*
                                       *,*        REPORTED BY:  RTROOT
                                       *,*
                                       *,*        MESSAGE: BAD IOEX CALL TO NEWQ
                                       *,*
                                       *,*        TYPE:     SCREECH
                                       *,*
                                       *,*        REGISTERS:  SET-UP FOR BAL,11 NEWQNW
                                       *,*
                                       *,*        REMARKS: NEWQNW RETURNED TO BAL+1.
                                       ************************************************************************
01 001F5    0F000000 X     EXSC       SCREECH  X'41',X'10'
01 001F6    00410010 A
                           EX18       ;                              SYSCON WAS USED TO PRE-EMPT DEVICE
01 001F7    35540000 X                STW,R5     DCT12,R2            ZERO DCT12
01 001F8    31E0001F N                CW,R14     FPTEA               WAS 'EA' SPECIFIED
01 001F9    6840001B                  BAZ        RTSETCC2            NO; ABNORMAL RETURN
01 001FA    32500000 X                LW,R5      S:CUN
01 001FB    75540000 X                STB,R5     DCT15,R2            SINCE SYSCON DOESN'T SET DCT15
01 001FC    680001C8                  B          EX14                CONTINUE
                           *
01 001FD    3250000C A     EX1A       LW,R5      R12                 MOVE PRI TO R5
01 001FE    680001EA                  B          EX1B                CONTINUE
```

```
                                   PAGE
          01 001FF       RTIOEX2   EQU      $ ***************************************************
                         *
                         *F*       NAME:    RTIOEX2
                         *,*
                         *,*       PURPOSE: TO PROCESS THE M:IOEX(TIO/TDV/HIO) CAL1,5.
                         *,*
                         *,*       DESCRIPTION:  PROVIDES A CAL1 INTERFACE TO ISSUE AN I/O
                         *,*                INSTRUCTION (TIO/TDV/HIO) TO A PRE-EMPTED DEVICE FOR
                         *,*                A REAL-TIME USER.
                         *,*
                         *,*       REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL.
                         ***********************************************************************
                         *D*       NAME:    RTIOEX2
                         *,*
                         *,*       REGISTERS:  STANDARD CAL1 REGISTER SETUP.
                         *,*
                         *,*       CALL:    VIA RTALTCP (NOT CALLABLE EXTERNALLY).
                         *,*
                         *,*       INTERFACE:  INTSIM AND DRIVEIO (IN IOQ) ARE CALLED (ON AN HIO
                         *,*                REQUEST); CALBAD (ON AN ABNORMAL CONDITION);
                         *,*                RTCHKPRIV, RTDEVCHK, RTDCBCHK, ENBSR4.
                         *,*
                         *,*       ENVIRONMENT:  MAPPED/MASTER; PRIVILEGE LEVEL MUST = X'E0'.
                         *,*
                         *,*       INPUT:   R6 = WORD 0 OF CAL1,5 FPT.
                         *,*                R7 = POINTER TO WORD 1 OF FPT.
                         *,*                R11= RETURN ADDRESS (TRAPEXIT).
                         *,*                DCT3, DCT12, DCT15.
                         *,*
                         *,*       OUTPUT:  J:ICBHDR, DCT12.
                         *,*
                         *,*       DESCRIPTION:  THE FOLLOWING SECURITY CHECKS ARE MADE:  USER'S
                         *,*                PRIVILEGE LEVEL MUST = X'E0'; DCB/DEVICE VALIDATION;
                         *,*                AND THE DEVICE MUST HAVE BEEN PRE-EMPTED BY THIS USER
                         *,*                (SINCE THE CONDITION CODES RETURNED TO THE USER
                         *,*                (VIA THE STACK) ARE THOSE OF THE EXECUTED INSTRUCTION,
```

```
1643                    *,*             ABNORMAL CONDITIONS ARE REPORTED TO THE USER VIA
1644                    *,*             PROGRAM ABORTS).
1645                    *,*             NEXT THE SPECIFIED INSTRUCTION IS EXECUTED, THE STATUS
1646                    *,*             REGISTERS AND CONDITION CODES ARE PASSED TO THE USER
1647                    *,*             VIA THE STACK, AND, IF HIO, THE DEVICE IS CHECKED AND
1648                    *,*             IF BUSY, INTSIM AND DRIVEIO ARE CALLED (IN IOQ) TO
1649                    *,*             'UN-BUSY' THE DEVICE AND CLEANUP THE OPERATION.
1650                    ********************************************************************
1651                    *
1652  01 001FF  6A000013            BAL,R0  RTCHKPRIV       JB!PRIV >= X'E0'
1653  01 00200  68800203            BCR,8   EX21            YES
1654                    ********************************************************************
1655                    *E*     ERROR!  B9=01
1656                    *,*
1657                    *,*     DESCRIPTION!  THE USER HAS INSUFFICIENT PRIVILEGE TO ISSUE
1658                    *,*             AN M!IOEX (TIO/TDV/HIO)! X'E0' REQUIRED.
1659                    *,*
1660                    *,*     REGISTERS!  (NOTHING RELEVANT)
1661                    ********************************************************************
1662  01 00201  32E00005            LW,R14  RTERR!IOEX1     NO! ABORT USER
1663  01 00202  68000000 X          B       CALBAD
1664  01 00203  22500208    EX21    LI,R5   EX22            SET UP POSSIBLE RETURN FROM RTDEVCH
1665  01 00204  324E0000 A          LW,R4   0,R7            FPT(WORD 1)
1666  01 00205  21408000 A          CI,R4   FPTDCB          !DEV! OR !DCB! SPECIFIED
1667  01 00206  684000A2            BAZ     RTDEVCHK        'DEV'! RETURNS VIA R5 WITH DCTX(R2)
1668  01 00207  6A500091            BAL,R5  RTDCBCHK        'DCB'=RET! DCTX(R2)! DEV.ADR(R6)
1669  01 00208  68F0020C            BCR,15  EX24            OK
1670                    ********************************************************************
1671                    *E*     ERROR!  B9=02
1672                    *,*
1673                    *,*     DESCRIPTION!  THE SPECIFIED DEVICE DOESN'T EXIST OR IS NOT
1674                    *,*             PRE-EMPTED, OR THE SPECIFIED DCB IS NOT OPENED
1675                    *,*             PROPERLY.
1676                    *,*
1677                    *,*     REGISTERS!  R6 = DEVICE OR DCB ADDRESS.
1678                    ********************************************************************
1679  01 00209  32E00006    EX23    LW,R14  RTERR!IOEX2     NO! ABORT USER
```

```
1680   01 0020A   68000000 X          B       CALBAD
1681   01 0020B   69300209      EX22   BCS,3   EX23            RETURN HERE FROM RTDEVCHK
1682   01 0020C   72540000 X   EX24   LB,R5    DCT3,R2
1683   01 0020D   21500020 A          CI,R5    DOWND           IS DEVICE PRE-EMPTED
1684   01 0020E   68400209          BAZ     EX23            NO, ABORT USER
1685   01 0020F   32500000 X          LW,R5    $ICUN
1686   01 00210   71540000 X          CB,R5    DCT15,R2        DOES IT BELONG TO THIS USER
1687   01 00211   69300209          BNE     EX23            NO, ABORT
1688   01 00212   4B400002 N          AND,R4   MASKS+2         MASK OFF CODE
1689   01 00213   67080021F          EXU     IOINST,R4       EXECUTE INSTRUCTION
1690        01 00214          EX25   EQU     $
1691   01 00214   74000002 A          STCF    R2              SAVE CONDITION CODES
1692   01 00215   32500000 X          LW,R5    TSTACK
1693   01 00216   358BFFF9 A          STW,R8   -7,R5           SAVE R8 IN USER'S R8 IN STACK
1694   01 00217   359BFFFA A          STW,R9   -6,R5           SAVE R9 IN USER'S R9 IN STACK
1695   01 00218   205FFFEF A          AI,R5    -17             POINT TO PSD IN STACK
1696   01 00219   4B500000 X          AND,R5   X1FFFF          INSURE DBL-WD BOUND
1697   01 0021A   32300000 X          LW,R3    YF              CC MASK
1698   01 0021B   472A0000 A          STS,R2   0,R5            PUT CC'S IN USER'S PSD
1699   01 0021C   32300000 X          LW,R3    YC              SET 'RT-ACTIVITY' BIT &
1700   01 0021D   47300000 X          STS,R3   J;ICBHDR            'IOEX-ACTIVITY' BIT IN JIT
1701   01 0021E   F8000008 A          B       *R11            RETURN
1702                              *
1703                              *
1704                              *
1705        01 0021F          IOINST EQU     $ ************************************************
1706   01 0021F   CD800006 A          TIO,R8   *R6
1707   01 00220   CE800006 A          TDV,R8   *R6
1708   01 00221   68000222          B       EXHIO           HIO LOGIC REQUIRES IOQ MANIPULATION
1709                              *
1710                              *
1711                              *
1712        01 00222          EXHIO  EQU     $
1713   01 00222   6D000037 A          DISABLE                 ***********************************
1714   01 00223   CF800006 A          HIO,R8   *R6
1715   01 00224   6AB00214          BAL,R11  EX25            SAVE STATUS
1716   01 00225   22B00000 N          LI,R11   TRAPEXIT       SET RETURN ADR
```

```
1717   01 00226   72440000 X          LB,R4    DCT15,R2        PRE-EMPTED DEVICE
1718   01 00227   68300000 X          BEZ      ENBSR4          NO, EXIT CAL1 PROCESSING
1719   01 00228   32440000 X          LW,R4    DCT12,R2        INTERRUPT PENDING
1720   01 00229   68100000 X          BGEZ     ENBSR4          NO, EXIT CAL1 PROCESSING
1721   01 0022A   4B400020 N          AND,R4   NB31T00+32      YES...RESET 'INT PEND' FLAG
1722   01 0022B   35440000 X          STW,R4   DCT12,R2        PUT IT AWAY
1723   01 0022C   32100002 A          LW,R1    R2              SET UP R1(DCTX) FOR INTSIM(IOQ)
1724   01 0022D   22500230            LI,R5    HIORET          SET RETURN FROM INTSIM
1725   01 0022E   49500020 N          OR,R5    BT31T00+32      SET FLAG IN LINK REGISTER
1726   01 0022F   68000000 X          B        INTSIM          SETS 'CLEANUP PENDING'
1727   01 00230   6A200000 X  HIORET  BAL,R2   DRIVEIO          DO CLEANUP; RETURNS ENABLED
1728   01 00231   68000000 X          B        TRAPEXIT        EXIT
1729                                  TITLE    'I O Q     S U B R O U T I N E S'
```

```
          01 00232      RTIØSTRT EQU      * ***************************************************
                        *
                        *F*      NAME:    RTIØSTRT
                        *,*
                        *,*      PURPØSE: PRØVIDES AN EXTENSIØN ØF IØQ FØR IØEX REQUESTS FØLLØW-
                        *,*               ING A SUCCESSFUL 'SIØ'.
                        *,*
                        *,*      DESCRIPTIØN:  PERFØRMS THE SPECIAL PRØCESSING REQUIRED ØF IØQ
                        *,*               FØLLØWING A SUCCESSFUL 'SIØ' IN ØRDER TØ MAKE THE
                        *,*               DEVICE LØØK 'NØT BUSY' TØ THE 'REGULAR' I/Ø SYSTEM.
                        *,*****************************************************************
                        *D*      NAME:    RTIØSTRT
                        *,*
                        *,*      REGISTERS:  R0 AND R15 ARE VULNERABLE.
                        *,*
                        *,*      CALL:    BAL,R7 (FRØM IØSTRT IN IØQ)
                        *,*
                        *,*      INTERFACE:  NØNE
                        *,*
                        *,*      ENVIRØNMENT:  MASTER/UNMAPPED.
                        *,*
                        *,*      INPUT:   R1 = DCT INDEX
                        *,*               R3 = IØQ INDEX
                        *,*               R9 = FUTURE CØNTENTS ØF DCT5
                        *,*               IØQ8 (HAS CHANNEL STATUS FLAG FRØM IØEX REQUEST)
                        *,*
                        *,*      ØUTPUT:  R4 = HANDLER FLAGS
                        *,*               R9 = DCT5
                        *,*               DCT12, DCT13
                        *,*
                        *,*      DESCRIPTIØN:  THE SIØ STATUS REGISTERS ARE STØRED INTØ DCT13;
                        *,*               THE HIGH-ØRDER BIT ØF DCT12 IS SET (INDICATING THAT A
                        *,*               R/T I/Ø INTERRUPT IS EXPECTED); THE HIGH-ØRDER BIT
                        *,*               ØF R4 IS SET IF THE USER HAS REQUESTED THAT THE
                        *,*               CHANNEL BE FREED IMMEDIATELY, AND FINALLY, R9 IS SET-
                        *,*               UP SØ THE DEVICE WILL APPEAR TØ BE 'NØT BUSY' AFTER
                        *,*               IØSTRT3 (IN IØQ) MØDIFIES R9 PRIØR TØ STØRING IT AWAY
```

```
                                  *,*                 IN DCT5.
                                  ***************************************************************************
                                  *
01 00232   15C20000 X                      STD,R12   DCT13,R1          SAVE SIO REGISTERS
01 00233   32020000 X                      LW,R0     DCT12,R1
01 00234   49000020 N                      OR,R0     BT31T00+32        SET 'INTERRUPT PENDING' BIT
01 00235   35020000 X                      STW,R0    DCT12,R1          PUT IT AWAY
01 00236   6BF60000 X                      INT,R15   IOQ8,R3           'REL' SPECIFIED ON CALL
01 00237   68200239                        BCR,2     IOS1              NO
01 00238   49400020 N                      OR,R4     BT31T00+32        SET SUBCHANNEL-RELEASE BIT
01 00239   20900080 A             IOS1     AI,R9     X'80'             SET-UP R9 AS DCT5
01 0023A   680E0000 A                      B         0,R7              RETURN TO IOQ AT IOSTRT3
```

```
1779                    PAGE
1780        01 00238    RTINT   EQU     * ************************************************
1781                    *
1782                    *F*     NAME:   RTINT
1783                    *,*
1784                    *,*     PURPOSE: PROVIDES THE INTERFACE BETWEEN I8Q (AT I/O INTERRUPT-
1785                    *,*             TIME) AND THE REAL-TIME USER'S END ACTION ROUTINE.
1786                    *,*
1787                    *,*     DESCRIPTION:  'NOT-BUSY' DEVICE INTERRUPTS ARE PASSED TO RTINT
1788                    *,*             (IF DCT15 IS NON-ZERO AND BIT 0 OF DCT12 IS SET) WHERE
1789                    *,*             CONTROL IS PASSED TO THE REAL-TIME USER'S END-ACTION
1790                    *,*             ROUTINE (WHOSE ADDRESS IS CONTAINED IN DCT12).
1791                    *,*
1792                    *,*     REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL (USER
1793                    *,*             INTERFACE IS DESCRIBED HERE).
1794                    ************************************************************
1795                    *D*     NAME:   RTINT
1796                    *,*
1797                    *,*     REGISTERS:  NONE.
1798                    *,*
1799                    *,*     CALL:   DIRECT BRANCH FROM I8INT (IN I8Q); NOT CALLABLE
1800                    *,*             EXTERNALLY.
1801                    *,*
1802                    *,*     INTERFACE:  CALLS THE REAL-TIME USER'S END-ACTION ROUTINE
1803                    *,*
1804                    *,*     ENVIRONMENT:  MASTER/UNMAPPED.
1805                    *,*
1806                    *,*     INPUT:  R6 = CONTENTS OF DCT12 (USER'S END-ACTION RECEIVER).
1807                    *,*             R7 = DCT INDEX.
1808                    *,*             R2 = DEVICE ADDRESS.
1809                    *,*             R3 = AIO STATUS.
1810                    *,*
1811                    *,*     OUTPUT:  R4/R5 = TIO STATUS REGISTERS
1812                    *,*             DCT12
1813                    *,*
1814                    *,*     DESCRIPTION:  I/O INTERRUPTS RESULTING FROM MYIOFX REQUESTS
1815                    *,*             ARE PASSED TO RTINT.  THE TIO STATUS IS PUT IN R4/R5
```

```
1816                    *,*             AND CONTROL IS PASSED TO THE USER'S END-ACTION ROUTINE
1817                    *,*             (FROM DCT12) VIA A BAL ON R11.  UPON RETURN, ANOTHER
1818                    *,*             TIO IS ISSUED TO OBTAIN THE DEVICE/CHANNEL STATUS.
1819                    *,*             IF THE DEVICE/CHANNEL IS STILL ACTIVE, RETURN IS TO
1820                    *,*             RTRET2 (IN IOQ); IF NOT ACTIVE, RETURN IS TO RTRET1
1821                    *,*             (IN IOQ) AFTER FIRST RE-SETING THE HIGH-ORDER BIT OF
1822                    *,*             DCT12 (IOEX DEVICE BUSY BIT).
1823                    ********************************************************************
1824                    *
1825  01 0023B 4D440000 A               TIO,R4    0,R2            TIO STATUS TO R4/R5
1826  01 0023C 74000004 A               STCF      R4              CC'S TOO
1827  01 0023D 02200060 A               PUSH      6,R2            SAVE R2, R3, & R7
       01 0023E 0B200000 N
1828  01 0023F 6ABC0000 A               BAL,R11   0,R6            GOTO USER'S END ACTION ADDRESS
1829  01 00240 02200060 A               PULL      6,R2            RESTORE REGS
       01 00241 0A200000 N
1830  01 00242 4D440000 A               TIO,R4    0,R2            GET LATEST TIO STATUS
1831  01 00243 69800000 X               BCS,8     RTRET2          NO...LEAVE CHANNEL BUSY
1832  01 00244 31500000 X               CW,R5     YC              CHECK TIO STATUS FOR DEVICE STATUS
1833                    *                                         INT PENDING OR DEVICE UNAVAILABLE
1834  01 00245 69400000 X               BANZ      RTRET2          DEVICE/CHANNEL IS BUSY
1835  01 00246 4B600020 N               AND,R6    NB31TB0+32      RESET 'INT PEND' FLAG
1836  01 00247 356E0000 X               STW,R6    DCT12,R7        PUT IT BACK
1837  01 00248 68000000 X               B         RTRET1          RETURN TO IOQ ... CLEAR CHANNEL
```

```
                                   PAGE
        01 00249        RTCU      EQU     $ ****************************************************
                        *
                        *F*       NAME:   RTCU
                        *,*
                        *,*       PURPOSE: PROVIDES THE INTERFACE BETWEEN IOQ (AT SIOREJECT-TIME)
                        *,*                AND THE REAL-TIME USER'S END ACTION ROUTINE.
                        *,*
                        *,*       DESCRIPTION:  CLEANUP (IN IOQ) PASSES CONTROL TO THE REAL-TIME
                        *,*                USER'S END-ACTION ROUTINE WHEN AN IOEX-DEVICE EXPER-
                        *,*                IENCES AN 'SIOREJECT' AT IOSTRT.
                        *,*
                        *,*       REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL (USER
                        *,*                INTERFACE IS DESCRIBED HERE).
                        ********************************************************************
                        *D*       NAME:   RTCU
                        *,*
                        *,*       REGISTERS:  NONE
                        *,*
                        *,*       CALL:    DIRECT BRANCH FROM CLEANUP (IN IOQ), NOT CALLABLE
                        *,*                EXTERNALLY.
                        *,*
                        *,*       INTERFACE:  CALLS THE REAL-TIME USER'S END-ACTION ROUTINE.
                        *,*
                        *,*       ENVIRONMENT:  MASTER/UNMAPPED.
                        *,*
                        *,*       INPUT:   R1 = DCT INDEX
                        *,*                DCT12, DCT13, DCT19.
                        *,*
                        *,*       OUTPUT:  R12 = 0 (PSEUDO HANDLER POST-PROCESSOR CODES)
                        *,*
                        *,*       DESCRIPTION:  IOQ CLEANUP OPERATIONS FOR M:IOEX REQUESTS ARE
                        *,*                PASSED TO RTCU WHERE DCT3 IS CHECKED FOR AN 'SIO-
                        *,*                REJECT' STATUS.  IF SET, CONTROL IS PASSED TO THE
                        *,*                USER'S END-ACTION ROUTINE (VIA DCT12).  CONTROL IS
                        *,*                EVENTUALLY RETURNED TO IOSCU (IN IOQ) WITH R12 SET
                        *,*                TO 0 (PSEUDO POST-PROCESSOR HANDLER CODE INDICATING
```

```
                                    *,*                 'NORMAL' COMPLETION.
                                    ************************************************************************
                                    *
01 00249   72C20000 X                       LB,R12    DCT3,R1            PICK UP FLAGS
01 0024A   4BC00004 N                       AND,R12   SIOREJECT          ABNORMAL CLEANUP
01 0024B   68300000 X                       BEZ       IOSCU              NO
                                    *                                    YES...GO TO USER'S END-ACTION ADR.
01 0024C   02200070 A                       PUSH      7,R13
01 0024D   0BD00000 N
01 0024E   32700001 A                       LW,R7     R1                 DCT INDEX
01 0024F   221FFFFF A                       LI,R1     -1                 'SIOREJECT' FLAG
01 00250   22200000 A                       LI,R2     0                  FLAG REGISTER TO EA ROUTINE
01 00251   723E0000 X                       LB,R3     DCT19,R7           SIO CONDITION CODES AT FAILURE
01 00252   75300003 A                       STB,R3    R3                 POSITION THEM
01 00253   124E0000 X                       LD,R4     DCT13,R7           SIO STATUS REGS AT FAILURE
01 00254   326E0000 X                       LW,R6     DCT12,R7           USER'S END-ACTION ADR.
01 00255   6ABC0000 A                       BAL,R11   0,R6               GO TO HIM
01 00256   02200070 A                       PULL      7,R13
01 00257   0AD00000 N
01 00258   22C00000 A                       LI,R12    0                  HANDLER FLAG
01 00259   68000000 X                       B         IOSCU              RETURN TO IOQ
```

```
                                     PAGE
          01 0025A         RTTO      EQU       $ ***************************************************
                           *
                           *F*       NAME:     RTTO
                           *,*
                           *,*       PURPOSE;  PROVIDES THE INTERFACE BETWEEN IOQ (AT DEVICE TIME-
                           *,*                 OUT TIME) AND THE REAL-TIME USER'S END ACTION ROUTINE
                           *,*
                           *,*       DESCRIPTION:  DETECTION OF A TIME-OUT OF A PRE-EMPTED DEVICE
                           *,*                 CAUSES CONTROL TO BE PASSED TO RTTO WHERE CONTROL IS,
                           *,*                 IN TURN, PASSED TO THE REAL-TIME USER'S END-ACTION
                           *,*                 ROUTINE.
                           *,*
                           *,*       REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL (USER
                           *,*                 INTERFACE IS DESCRIBED HERE).
                           ************************************************************************
                           *D*       NAME:     RTTO
                           *,*
                           *,*       REGISTERS:  R2 THRU R7 ARE VULNERABLE.
                           *,*
                           *,*       CALL:     BAL ON R11 FROM TIME-OUT PROCESSING IN IOQ; NOT
                           *,*                 CALLABLE EXTERNALLY.
                           *,*
                           *,*       INTERFACE:  CALLS THE REAL-TIME USER'S END-ACTION ROUTINE.
                           *,*
                           *,*       ENVIRONMENT:  MASTER/UNMAPPED.
                           *,*
                           *,*       INPUT:    R1 = DCT INDEX.
                           *,*                 R6 = USER'S END-ACTION ROUTINE ADDRESS.
                           *,*                 DCT19, DCT13
                           *,*
                           *,*       OUTPUT:   NONE
                           *,*
                           *,*       DESCRIPTION:  UPON DETECTING AN OVER DUE INTERRUPT FROM AN
                           *,*                 M:IOEX REQUEST, IOQ CALLS RTTO WHICH IN TURN PASSES
                           *,*                 CONTROL TO THE USER'S END-ACTION ROUTINE (VIA DCT12).
                           ************************************************************************
```

```
                                   *
01 0025A   22200000 A                        LI,R2     0                     SET 'TIME-OUT' FLAG
01 0025B   72320000 X                        LB,R3     DCT19,R1              PICK UP SIO CC'S
01 0025C   75300003 A                        STB,R3    R3                    POSITION THEM
01 0025D   12420000 X                        LD,R4     DCT13,R1              SIO STATUS REGISTERS TO R4/R5
01 0025E   09100000 N                        PUSH      R1                    SAVE DCTX
01 0025F   09B00000 N                        PUSH      R11                   SAVE RETURN
01 00260   32700001 A                        LW,R7     R1                    DCT INDEX TO R7
01 00261   22100000 A                        LI,R1     0                     SET 'TIME-OUT' FLAG(#2)
01 00262   6ABC0000 A                        BAL,R11   0,R6                  GO TO USER'S EA ROUTINE
01 00263   08B00000 N                        PULL      R11
01 00264   08100000 N                        PULL      R1
01 00265   F800000B A                        B         *R11                  RETURN TO IOQ
```

```
         PAGE
*****************************************************************
*                              S E C T I O N   IV:
*
*                           INTERRUPT PROCESSING ROUTINES
*****************************************************************
*
         PCC       0
```

```
1953          01 00266          RT:GINT  EQU     $
1954                            *
1955                            *F*      NAME:    RT:GINT
1956                            *,*
1957                            *,*      PURPOSE: TO HANDLE INTERRUPTS FROM INTERRUPTS WHICH HAVE BEEN
1958                            *,*               CENTRALLY CONNECTED TO REAL-TIME USERS VIA M:GJOBCON.
1959                            *,*
1960                            *,*      DESCRIPTION: PLACES A SPECIFIED GHOST JOB INTO EXECUTION AS
1961                            *,*               THE RESULT OF THE OCCURRENCE OF A REAL OR PSEUDO
1962                            *,*               INTERRUPT WHICH HAS BEEN CENTRALLY-CONNECTED VIA
1963                            *,*               M:GJOBCON.
1964                            ********************************************************************
1965                            *D*      NAME:    RT:GINT
1966                            *,*
1967                            *,*      REGISTERS: NONE
1968                            *,*
1969                            *,*      CALL:    INTERRUPT DRIVEN (REAL OR PSEUDO)
1970                            *,*
1971                            *,*      INTERFACE: T:SAVE, T:GJOB, T:SSE
1972                            *,*
1973                            *,*      ENVIRONMENT: MASTER/UNMAPPED.
1974                            *,*
1975                            *,*      INPUT:   ENTRY IS MADE VIA AN XPSD WHICH POINTS AT THE INTERRUP
1976                            *,*               CONTROL BLOCK (ICB) FOR THIS INTERRUPT.
1977                            *,*
1978                            *,*      OUTPUT:  T:GJOB INITIATES THE SPECIFIED GHOST JOB.
1979                            *,*
1980                            *,*      DESCRIPTION: A STANDARD ENVIRONMENT IS SAVED IN THE UNMAPPED
1981                            *,*               STACK; INFORMATION ABOUT THE INTERRUPT IS OBTAINED
1982                            *,*               FROM THE ASSOCIATED ICB AND, IF REAL, THE
1983                            *,*               INTERRUPT IS CLEARED (ARMED/ENABLED); THE SPECIFIED
1984                            *,*               GHOST JOB (FROM INFORMATION IN THE ICB) IS THEN ACT-
1985                            *,*               IVATED VIA A BAL TO T:GJOB, THE GHOST JOB'S USER
1986                            *,*               # IS SAVED IN THE ICB AND EXIT IS TAKEN THROUGH T:SSE.
1987                            *,*
1988                            ********************************************************************
1989    01 00266    02200060 A          PUSH     6,13              SAVE SOME WORKING REGISTERS
```

```
                01 00267   08D00000 N
1990            01 00268   6B100000 X                 INT,1    RT!GINTP          GET P0INTER T0 ICB
1991            01 00269   92000001 A                 LD,0     *1                GET REAL PSD AT INTERRUPT
1992                                        *                                     SINCE WE ARE HERE AS THE RESULT
1993                                        *                                     0F TW0 C0NSECUTIVE XPSD EXECUTI0NS
1994            01 0026A   6A200000 X                 BAL,2    T!SAVE            SAVE A STADARD ENVIR0NMENT
1995            01 0026B   6B100000 X                 INT,1    RT!GINTP          REC0NSTRUCT P0INTER T0 ICB
1996            01 0026C   201FFFFE A                 AI,1     *ICBPSD1(W)       P0INT T0 BASE 0F ICB
1997            01 0026D   6B720006 A                 INT,7    ICBINT(W),1       GET INTERRUPT ADDRESS
1998            01 0026E   21701000 A                 CI,7     X'1000'           CHECK F0R PSEUD0 INTERRUPT
1999            01 0026F   68100273                   BGE      GINT1             YES
2000            01 00270   32A00007 A                 LW,R10   R7                GET INTERRUPT ADDRESS
2001            01 00271   22301200 A                 LI,R3    X'1200'           ARM AND ENABLE (CLEAR)
2002            01 00272   6A000007                   BAL,R0   RTWD              D0 WRITE DIREC T
2003            01 00273   22200018 A        GINT1    LI,R2    ICBGJpRI(D)       P0INT T0 pRI0RITY F0R GH0ST
2004            01 00274   F2F40001 A                 LB,R15   *R1,R2             GET IT F0R GJ0B START
2005            01 00275   09100000 N                 PUSH     R1                SAVE ICB ADDRESS
2006            01 00276   02200020 A                 LCI      2                 SET T0 M0VE TW0 W0RDS
2007            01 00277   2A82000A A                 LM,8     ICBGJACN(W),1     GET ACC0UNT
2008            01 00278   2A020008 A                 LM,0     ICBGJNME(W),1     GET NAME F0R GH0ST
2009            01 00279   6AA00000 X                 BAL,10   T!GJ0B            INITIATE THAT GH0ST
2010            01 0027A   08100000 N                 PULL     R1                RESTORE ICB ADDRESS
2011            01 0027B   2220001D A                 LI,R2    ICBGUN(D)         DISPLACEMENT T0 USER NUMBER 0F GH0S'
2012            01 0027C   F5440001 A                 STB,R4   *R1,R2            SAVE USER NUMBER ASSIGNED
2013            01 0027D   68000000 X                 B        T!SSE             G0 SCHE0ULE
2014                                        *
```

```
       01 0027E                 RT:UINT  EQU      $ *****************************************************
                                *
                                *F*      NAME:    RT:UINT
                                *,*
                                *,*      PURPOSE: TO HANDLE INTERRUPTS FROM INTERRUPTS WHICH HAVE BEEN
                                *,*               CENTRALLY CONNECTED TO REAL-TIME USERS VIA M:CONNECT.
                                *,*
                                *,*      DESCRIPTION:  SAVES A STANDARD ENVIRONMENT AND THEN CALLS
                                *,*               UINTQ TO PROCESS THE INTERRUPT; EXITS THRU T:SSE.
                                ***************************************************************************
                                *D*      NAME:    RT:UINT
                                *,*
                                *,*      REGISTERS:  NONE
                                *,*
                                *,*      CALL:    INTERRUPT DRIVEN (REAL OR PSEUDO)
                                *,*
                                *,*      INTERFACE:  T:SAVE, UINTQ, T:SSE
                                *,*
                                *,*      ENVIRONMENT:  MASTER/UNMAPPED
                                *,*
                                *,*      INPUT:   ENTRY IS MADE VIA AN XPSD WHICH POINTS AT THE
                                *,*               INTERRUPT CONTROL BLOCK (ICB) FOR THE INTERRUPT.
                                *,*
                                *,*      OUTPUT:  A STANDARD ENVIRONMENT IS SAVED AND UINTQ IS CALLED.
                                *,*
                                *,*      DESCRIPTION:  SAVES A STANDARD ENVIRONMENT AND THEN CALLS UINTQ
                                *,*               TO PROCESS THE INTERRUPT; EXITS THRU T:SSE.
                                ***************************************************************************
                                *
01 0027E   02200060 A                    PUSH     6,13
01 0027F   0BD00000 N
01 00280   6B100000 X                    INT,1    RT:UINTP          GET ICB POINTER
01 00281   92000001 A                    LD,0     *1                GET PSD
01 00282   6A200000 X                    BAL,2    T:SAVE            SAVE A STANDARD ENVIRONMENT
01 00283   6B100000 X                    INT,1    RT:UINTP          RESTORE ICB POINTER
01 00284   201FFFFE A                    AI,1     -ICBPSD1(W)       POINT TO BASE OF ICB
01 00285   6AB00287                      BAL,R11  UINTQ             QUEUE INTERRUPT FOR USER
```

```
2052                              *                          AND REPORT TO SCHEDULER
2053   01 00286    68000000 X        B        T;SSE          EXIT TO SWAPSCHEDULER
```

```
              01 00287        UINTQ    EQU      $ ***************************************************
                              *
                              *F*      NAME:    UINTQ
                              *,*
                              *,*      PURPOSE: PROVIDES A SUBROUTINE FOR RT:UINT & CLOCK4 TO PROCESS
                              *,*               A CENTRALLY-CONNECTED REAL OR PSEUDO INTERRUPT
                              *,*               (M:CONNECT/M:CLOCK)
                              *,*
                              *,*      DESCRIPTION: PROVIDES A SUBROUTINE TO QUEUE 'DO' LIST ENTRY FO
                              *,*               A USER RESULTING FROM A CENTRALLY CONNECTED INTERRUPT
                              *,*               AND TO REPORT IT TO THE SCHEDULER.
                              ***********************************************************************
                              *D*      NAME:    UINTQ
                              *,*
                              *,*      REGISTERS:  ALL VOLATILE.
                              *,*
                              *,*      CALL:    BAL,R11
                              *,*
                              *,*      INTERFACE:  T:RUE, ENBSR4
                              *,*
                              *,*      ENVIRONMENT:  MASTER/UNMAPPED; CALLED DISABLED, ENABLES ON EXI
                              *,*
                              *,*      INPUT:   R1 = ADDRESS OF ASSOCIATED ICB.
                              *,*               ASSOCIATED ICB, UB:PRIOB, UH:DL, S:CUP
                              *,*
                              *,*      OUTPUT:  ASSOCIATED ICB, UH:DL, S:RTIR, S:RTUN, UB:PRIOB.
                              *,*
                              *,*      DESCRIPTION:  THE ICBDL PORTION OF THE ASSOCIATED ICB IS
                              *,*               CHAINED INTO UH:DL BASED UPON PRIORITY (ICBPRI).  IF
                              *,*               THE CURRENT ICB'S PRIORITY IS HIGHER THAN THE USER'S
                              *,*               UB:PRIOB, THEN UB:PRIOB IS SAVED IN ICBPRIO (OLD
                              *,*               PRIORITY) AND ICBPRI BECOMES UB:PRIOB.  OTHERWISE
                              *,*               UB:PRIOB REMAINS AS IS, AND ZERO IS SAVED IN ICBPRIO.
                              *,*               FINALLY, THE 'ON-DO-LIST' FLAG IS SET IN THE ICB (TO
                              *,*               PREVENT CIRCULAR CHAINS); ICBPRI IS COMPARED AGAINST
                              *,*               S:CUP (CURRENT USER'S PRIORITY), AND IF GREATER,
                              *,*               S:RTIR AND S:RTUN ARE SET TO FORCE A RE-SCHEDULE (TO
```

```
2092                    *,*                 BY-PASS QMIN).  IN EITHER CASE, AN E!ART EVENT IS
2093                    *,*                 REPORTED (VIA T!RUE) AND UINTQ EXITS TO THE CALLER.
2094                    *********************************************************************
2095                    *
2096  01 00287 2220001C A          LI,2     ICBUN(D)           INDEX TO ASSOCIATED USER NUMBER
2097  01 00288 F2540001 A          LB,5     *1,2               GET USER NUMBER
2098  01 00289 32820008 A UINT01   LW,8     ICBPRI(W),1        GET ICB PRIORITY
2099  01 0028A 32900000 X          LW,9     YFF                MASK FOR PRIO
2100  01 0028B 44C00289            ANLZ,12  UINT01             WA OF ICB DQ LIST BLOCK
2101  01 0028C F0200001 A          LC       *R1                CHECK FOR ALREADY ON DQ LIST
2102  01 0028D 692002C7            BCS,2    UINT8              YES...GET OUT SMARTLY
2103  01 0028E 25C0007F A          SLS,12   =1                 CONVERT TO DOUBLE WORD ADDRESS
2104  01 0028F 522A0000 X          LH,2     UHIDL,5            GET USERS DQ LIST ENTRY
2105  01 00290 4B20000C N          AND,2    MASKS+12           EXTRACT CHAIN POINTER
2106  01 00291 683002C1            BEZ      UINT4              NULL
2107  01 00292 32300002 A          LW,3     2                  REMEMBER CURRENT ENTRY
2108  01 00293 12640000 A          LD,6     0,2                GET HEADER OF FIRST BLOCK
2109  01 00294 458C0006 A          CS,8     6                  CHECK PRIORITY
2110  01 00295 691002C1            BL       UINT4              CHAIN AT HEAD
2111                    *
2112  01 00296 4B60000C N UINT1    AND,6    MASKS+12           MASK FLINK TO NEXT BLOCK
2113  01 00297 6830029E            BEZ      UINT2              AT END, QUEUE TO TAIL
2114  01 00298 32200006 A          LW,2     6                  SAVE CURRENT ENTRY
2115  01 00299 126C0000 A          LD,6     0,6                FLINK
2116  01 0029A 458C0006 A          CS,8     6                  CHECK PRIO
2117  01 0029B 6910029E            BL       UINT2              THIS IS THE PLACE
2118  01 0029C 32300002 A          LW,3     2                  REMEMBER CURRENT ENTRY
2119  01 0029D 68000296            B        UINT1              KEEP GOING
2120                    *
2121  01 0029E 22D00FFF A UINT2    LI,13    X!FFF!             MASK FOR ACTIVE POINTER BITS
2122  01 0029F 12660000 A          LD,6     0,3                PICK UP FORWARD LINK FROM PREVIOUS
2123  01 002A0 25300001 A          SLS,3    1                  CONVERT TO WORD ADDRESS
2124  01 002A1 47C60000 A          STS,12   0,3                MAKE PREVIOUS POINT TO US
2125  01 002A2 22700FFF A          LI,7     X!FFF!             MASK
2126  01 002A3 47620008 A          STS,6    ICBPRI(W),1        AND MAKE US POINT TO FLINK
2127                    *
2128                    *
```

```
2129  01 002A4  F0200001 A  UINT3   LC     *1          GET CLEAR FLAG
2130  01 002A5  684002AF           BCR,4   UINT6       EITHER: NO !CLEAR! OR CLK-TYPE ICB
2131  01 002A6  32A20006 A        LW,R10  ICBINT(W),R1  GET INTERRUPT ADDRESS
2132  01 002A7  21A0F000 A        CI,R10  X'F000'       CHECK FOR PSEUDO
2133  01 002A8  694002AB          BANZ    UINT5        YES
2134  01 002A9  22301200 A        LI,R3   X'1200'       ARM AND ENABLE (CLEAR)
2135  01 002AA  6A000007           BAL,R0  RTWD          DO WRITE DIRECT
2136  01 002AB  F2400001 A  UINT5   LB,4    *1          GET INTERRUPT STATUS
2137  01 002AC  4B400000 X         AND,4   XF0           RESET
2138  01 002AD  20400006 A         AI,4    6           SET ARM AND ENABLE
2139  01 002AE  F5400001 A         STB,4   *1          RESTORE
2140                         *
2141  01 002AF  72000008 A  UINT6   LB,0    8           GET CURRENT INTERRUPT PRIO
2142  01 002B0  22400000 A         LI,R4   0           ZAPPER FOR OLD PRIO
2143  01 002B1  710A0000 X         CB,R0   UB!PRIOB,R5   CHECK FOR CURRENT USER PRIO
2144  01 002B2  692002B5           BG      UINT65      LOWER
2145  01 002B3  724A0000 X         LB,R4   UB!PRIOB,R5   GET OLD VALUE
2146  01 002B4  750A0000 X         STB,R0  UB!PRIOB,R5   RAISE HIS PRIO
2147  01 002B5  22600018 A  UINT65  LI,R6   ICBPRIO(U)   DISP TO OLD PRIO
2148  01 002B6  F54C0001 A         STB,R4  *R1,R6        SAVE OLD PRIO
2149  01 002B7  3230001E N         LW,R3   Y2            SET ON-DO-LIST FLAG
2150  01 002B8  47320000 A         STS,R3  ICBSTAT(W),R1 TO PREVENT CIRCULAR CHAINS
2151  01 002B9  31000000 X         CW,0    $ICUP         CHECK AGAINST CURRENT USER
2152  01 002BA  692002BE           BG      UINT7       LOWER
2153  01 002BB  22900000 A         LI,9    0           SET FLAG
2154  01 002BC  35900000 X         STW,9   $IRTIR       IN SIRTIR TO BYPASS QMIN
2155  01 002BD  35500000 X         STW,5   $IRTUN       AND REMEMBER REAL TIME USER
2156  01 002BE  6D000027 A  UINT7   ENABLE
2157  01 002BF  22600000 N         LI,6    E!ART         ADD REAL TIME TASK
2158  01 002C0  68000000 X         B       T!RUE         REPORT USER EVENT
2159                         *
2160                         *
2161  01 002C1  522A0000 X  UINT4   LH,2    UH!DL,5     GET DO LIST POINTER
2162  01 002C2  22300FFF A         LI,3    X'FFF'      MASK FOR POINTER BITS
2163  01 002C3  47220008 A         STS,2   ICBPRI(W),1   REMEBER FLINK
2164  01 002C4  4A20000C A         LS,2    12          GET NEW HEAD
2165  01 002C5  552A0000 X         STH,2   UH!DL,5     STORE NEW HEAD
```

```
2166   01 002C6   680002A4          B       UINT3
2167                          *
2168                          *
2169                          *
2170   01 002C7   32A20006 A  UINT8  LW,10    ICBINT(W),1     GET INT ADR
2171   01 002C8   21A0F000 A        CI,10    X'F000'         CHECK FOR PSEUDO
2172   01 002C9   69400000 X        BANZ     ENBSR4          IF PSEUDO
2173   01 002CA   21A0005A A        CI,10    X'5A'           CHECK FOR CLOCK
2174   01 002CB   68300000 X        BE       ENBSR4          IF CLOCK
2175   01 002CC   22301200 A        LI,3     X'1200'
2176   01 002CD   6A000007          BAL,0    RTWD            CLEAR THE INTERRUPT(ARM & ENABLE)
2177   01 002CE   68000000 X        B        T:PULLE         GET OUT QUICKLY
```

```
2179                    *
2180        01 002CF    RT:INTENTRY EQU   $
2181                    *
2182                    *F*       NAME:     RT:INTENTRY
2183                    *,*
2184                    *,*       PURPOSE: TO RESCHEDULE A USER BASED ON INFORMATION IN THE
2185                    *,*                 DO-LIST CHAINED INTO THE HEAD OF UH:DL.
2186                    *,*
2187                    *,*       DESCRIPTION: UPON DETECTING THAT AN ICB DO-LIST HAS BEEN
2188                    *,*                 CHAINED ONTO THE HEAD OF A USER'S UH:DL, SCHED
2189                    *,*                 EXITS TO RT:INTENTRY WHERE THE USER'S INTERRUPT
2190                    *,*                 PROCESSING ROUTINE ENVIRONMENT IS MOVED INTO HIS STAC
2191                    *,*                 AND CONTROL IS PASSED TO HIM.
2192                    ********************************************************************
2193                    *D*       NAME:     RT:INTENTRY
2194                    *,*
2195                    *,*       REGISTERS: NOT RELEVANT
2196                    *,*
2197                    *,*       CALL:     DIRECT BRANCH FROM DO-LIST PROCESSING IN SCHED.
2198                    *,*
2199                    *,*       INTERFACE: ALTERR, T:UTSXTS, T:PULLE.
2200                    *,*
2201                    *,*       ENVIRONMENT: MASTER/MAPPED; CALLED DISABLED.
2202                    *,*
2203                    *,*       INPUT:    R4 = USER #
2204                    *,*                 R5 = DOUBLEWORD ADDRESS OF DO-LIST BLOCK
2205                    *,*                 ASSOCIATED ICB
2206                    *,*                 J:ICBHDR
2207                    *,*
2208                    *,*       OUTPUT:   J:ICBHDR
2209                    *,*
2210                    *,*       DESCRIPTION: ICBDL OF THE HIGHEST PRIORITY ICB IS UPDATED
2211                    *,*                 WITH THE CURRENT CONTENTS OF J:ICBHDR (IN CASE WE
2212                    *,*                 ARE INTERRUPTING AN INTERRUPT PROCESSING ROUTINE),
2213                    *,*                 THE CURRENT ENVIRONMENT IS MOVED INTO THE USER'S ICB
2214                    *,*                 STACK AND THE PSD OF THAT ENVIRONMENT IS UPDATED TO
2215                    *,*                 REFLECT THE ADDRESS OF THE USER'S INTERRUPT PROCESSIN
```

```
2216                    *,*             ROUTINE (FROM ICBENTPSDO).  THE ADDRESS OF THE
2217                    *,*             INTERRUPTING INTERRUPT IS STORED IN THE TOP OF THE
2218                    *,*             STACK AND WE EXIT TO THE USER VIA T:PULLE.
2219                    ****************************************************************
2220                    *
2221  01 002CF 32600005 A       LW,R6   R5              R5=DA(ICBDL)
2222  01 002D0 25500001 A       SLS,R5   1              CONVERT TO WA(ICBDL)
2223  01 002D1 2270FFFF A       LI,R7   X'FFFF'         MASK
2224  01 002D2 205FFFF8 A       AI,R5   -ICBDL(W)       POINT TO BASE OF ICB
2225  01 002D3 32800000 X       LW,R8   J:ICBHDR        GET HEAD OF CURRENT CHAIN
2226  01 002D4 2290FFFF A       LI,R9   X'FFFF'         MASK
2227  01 002D5 478A0008 A       STS,R8  ICBDL(W),R5     POINT TO REST OF CHAIN
2228  01 002D6 47600000 X       STS,R6  J:ICBHDR        SET NEW HEAD (DA(ICBDL))
2229  01 002D7 32100000 X       LW,R1   J:TCB           GET USERS TCB POINTER
2230  01 002D8 68300000 X       BEZ     ALTERR          NONE
2231  01 002D9 6A400000 X       BAL,R4  T:UTSXTS        MOVE ENVIRONMENT TO STACK
2232  01 002DA 68000000 X       B       ALTERR          SOME KIND OF PROBLEM
2233  01 002DB 32500000 X       LW,R5   J:ICBHDR        PICK UP DA(ICBDL) OF 1ST ICB
2234  01 002DC 25500001 A       SLS,R5  1               CONVERT TO WA(ICBDL)
2235  01 002DD 205FFFF8 A       AI,R5   -ICBDL(W)       POINT TO TOP OF ICB
2236  01 002DE 32AA0009 A       LW,R10  ICBENTPSDO(W),R5 GET PSD
2237  01 002DF 32600000 X       LW,R6   TSTACK
2238  01 002E0 21600001 A       CI,R6   1               CHECK FOR ODD
2239  01 002E1 684002E3         BAZ     *+2             NO
2240  01 002E2 20600001 A       AI,R6   1
2241  01 002E3 B5AC0000 X       STW,R10 *24BM18,R6      SET NEW PSD
2242  01 002E4 6BBA0006 A       INT,R11 ICBINT(W),R5    GET INTERRUPT
2243  01 002E5 32200000 X       LW,R2   J:TCB
2244  01 002E6 32340000 A       LW,R3   0,R2            GET TOP OF TCB STACK
2245  01 002E7 35B60000 A       STW,R11 0,R3            REMEMBER ADDRESS OF CURRENT INT
2246  01 002E8 203FFFEE A       AI,R3   -18
2247  01 002E9 32200000 X       LW,R2   TSTACK
2248  01 002EA B5340000 X       STW,R3  *24BM14,R2      SET PSD POINTER
2249  01 002EB 68000000 X       B       T:PULLE         GO TO HIM
```

2251 END

CONTROL SECTION SUMMARY: 01 002EC PT 0

* SYMBOL VALUES

ABA/00000004
ACD/00000015
ACNDISP/00000009
ACNMAX/0000000C
ACS/00000005
AGV/00000000
ALLOCATION/00000002
ANSPROC/00000000
ARS/00000004
ASN/00000000
ATNVAT/00000005
ATCYLBIT/00008000
ATPRIVBIT/00004000
BAATNGC/00000007
BAAVRNOU/00000005
BACIS/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
BAPROG/00000017
BAVC/0000002D
BARAX/00000015
BARNDEV/00000016
BASCR/00000044
BASLIDES/00000003
BASPARE/0000004F
BASVA/0000004D
BAT/00000100
BAVDCTX/00000028
BAVNO/0000002C
BAVSND/00000024
BBUD/00000010
BCDA/0000000F
BFL/00000010
BITS/00000000
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
CCBD/00000004
CDA/00000008
CDAM/00000002
CFU/00000001
CFUPRIVBIT/00010000
CHKG1/01 00085
CHKG2/01 00088
CHK1/01 00018
CIS/0000000B
CLK/0000000C
CMD/00000014
CNVL/01 0003C
CNVOK/01 00041
COS/0000000B
CSC/0000000E
CVA/00000014
CVI/00000009
CVO/00000009
CYL/00000000
C15HIGH/00000027
C15LOW/0000001B
C15TV/01 000B9
C19CS/FFFFFFF8
D/00000001
DCBCDAM/00000015
DCBCYLBIT/00020000
DCBNOSEPBIT/00000200
DCBPRIVBIT/00000800
DCBPROC/00000000
DCBS/00002000
DCBSWXVBIT/00008000
DELA/00000400
DEV/00000001
DIC/00000040
DIR/00000000
DISCBPROC/00000000
DOWND/00000020
DPADFDA/00010002
DPFDFDA/00010004
DSC/00000013
DSI/00000001
EGV/00000000
EOP/00000000
ERA/00000003
EXHIO/01 00222
EXIT/01 001D5
EXSC/01 001F5
EXT/00000000
EX1A/01 001FD
EX1B/01 001EA
EX11/01 001C0
EX12/01 001BB
EX14/01 001C8
EX15/01 001D7
EX16/01 001E4
EX17/01 001E1
EX18/01 001F7
EX19/01 001DC
EX21/01 00203
EX22/01 0020B
EX23/01 00209
EX24/01 0020C
EX25/01 00214
FCD/00000000
FCN/00000007
FCON/00000000
FDA/00000001
FILDISP/0000000B
FIL1/00000005
FLD/00000015
FLGINH/00000002 S
FLGINHR/00000002 S
FLGLIC/0000000C S
FLGLICR/0000000C S
FLINK/00000001
FLP/00000006
FNEMAX/00000020
FPARAM/0000000B
FPTDCB/00008000
FPTEA/0000001F S
FPTF1/00000001
FRM/00000000
FSP/00000007

FUN/00000001
HAACD/0000002A
HAPBD/00000029
HOLDON/01 0017F
ICBBLNK/LIST
ICBDLFLG/LIST
ICBGJPRI/LIST
ICBLNK/LIST
ICBPSD2/LIST
ICBTYP1/00000000
ICBXPSD/LIST
INHRET/01 000D5
INTCONEXU2/01 00061
INTCON4/01 00076
INTRTNB/01 0013F
INTRTN2/01 00168
INTSTAT3/01 0010F
IOS1/01 00239
KEYM/0000000C
LDA/00000007
LOOP/01 00030
LSLIDES/0000004D
MIDIS/0000000C
MPBITS/00000000
NLR/00000005
NVA/00000008
NXTF/00000005
PAT/00000011
PRIV/00000000
QFI1/01 000E6
RLIM/00000015
RSZ/00000003
RTERR:BADCAL/00000AE
RTERR:IOEX1/01 00005
RTERR:PARAM/01 00004
RTINTCON/01 000C6
RTIOEX1/01 001B5

FVA/00000014
HACCBD/00000008
HASND/00000019
HOLD2/01 0018E
ICBCLK/LIST
ICBENTPSDO/LIST
ICBGUN/LIST
ICBPRI/LIST
ICBSTAT/LIST
ICBTYP2/00000001
IMT/0000000E
INIT/00000800
INTCONR/01 0006B
INTCON5/01 0007B
INTRTNERR/01 0016B
INTSTATX/01 00125
INTSTAT4/01 00122
JIC/00000200
LCT1/01 001A5
LOCATE/01 00038
LOOP1/01 00083
LVA/0000000A
MIUD/00000010
MTBINST/01 001A9
NOSEP/00000000
NWK/00000005
ONWK/00000005
PBD/00000014
QBUF/00000007
RAX/00000005
RNDEV/00000005
RTCALOK/01 000B5

RTINTCONTROL/01 00048
RTIOEX2/01 001FF

GAVAL/00000003
HACMD/00000028
HIBRET/01 00230
HSC/00000014
ICBDL/LIST
ICBGJACN/LIST
ICBICBADR/LIST
ICBPRIO/LIST
ICBSYSEP/LIST
ICBTYP3/00000002
INHIBIT/01 000D0
INTCONAD/01 00069
INTCON2/01 0006E
INTCON6/01 00078
INTRTNX/01 00169
INTSTAT1/01 00120
INTSTAT5/01 00124
KAD/00000012
LCT2/01 001A7
LOCICB1/01 0002D
LOOP2/01 000DE
MAXACN/00000010
MOD/00000000
NAV/00000004
NOU/00000000
NXTA/00000010
ORG/00000005
PCK/00000000
QFINA/01 000E2
RBBATIUN/00000003
RNR/00000010
RTCAL15CODES/01 00000
RTERR:INTRTN/01 00003
RTERR:IOEX2/01 00006
RTERR:QFI/01 00002

RTQFI/01 000D9

GINT1/01 00273
HAFLD/0000002B
HLC/00000013
HWDSI/00000003
ICBDLDATA/LIST
ICBGJNME/LIST
ICBINT/LIST
ICBPSD1/LIST
ICBTUN/LIST
ICBUN/LIST
INHOFF/01 000D7
INTCONEXU1/01 00059
INTCON3/01 0004A
INTRTNA/01 00154
INTRTN1/01 00161
INTSTAT2/01 00106
IOINST/01 0021F
KBUF/0000000A
LCT3/01 001A1
LOCNA/01 00034
LRDLO/0000004E
MBG/00000000
MONPROC/00000001
NAVX/00000002
NRA/00000002
NXTDCT/01 000A3
OVC/0000000B
PPSWP/00000010
QFIOK/01 000EC
RDLO/0000004C
RSTORE/00000014

RTHOLD/01 0016D
RTINTSTAT/01 000FB
RTR/00000001

```
RTRETC/01 00029          RTSETCC0/01 0001F        RTSETCC1/01 00019        RTSETCC2/01 0001B
RTSETCC3/01 0001D        RTS1/01 001B3            RW$/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              SCFU/00000004
SCR/00000011             SEQ/00000005             SID/00000015             SIOREJECT/00000004  S
SJAC/00001000            SND/0000000C             SQS/00000014             SREC/00000006
STATA/0000001A  S        STATAE/EXT               STATAETR/EXT             STATAR/0000001A  S
STATBLK/00000010         STATC/0000001F  S        STATE/0000001B  S        STATER/0000001B  S
STATEXU/00000080         STATINTSHFT/FFFFFFE7                              STATIOW/00000020
STATNA/00000001          STATO/0000001D  S        STATRIG/0000001C  S      STATRIGR/0000001C  S
STATWAIT/00000040        STATYPSHFT/FFFFFFE9      SVA/00000013             SWXV/00000000
S69PROC/00000001         TAB1/0000000F            TCFU/0000000F            TDA/00000005
TIC/00000080             TLB/0000000E             TOF/00000000             TOPMSK/00007C00
TRN/00000005             TTL/00000000             TYC/00000002             UFLAGS/00000001
UINT01/01 00289          UINT1/01 00296           UINT2/01 0029E           UINT3/01 002A4
UINT4/01 002C1           UINT5/01 002AB           UINT6/01 002AF           UINT65/01 002B5
UINT7/01 002BE           UINT8/01 002C7           ULB/0000000C             USR/00000000
UTSPROC/00000001         VDCTX/0000000A           VFC/00000000             VNO/0000000B
VSND/00000009            VTOC:BITMAP/00000007                              VTOC:MAPWL/00000004
VTOC:NVAT/00000005       VTOC:SNTD/00000003       W/00000002               WAT/00000000
WFNEMAX/00000008         WRDLO/00000013           WXBUFSIZ/00000100        XBUFSIZ/00000400
X1/00000001  S           Y2/0000001E  S
```

* EXTERNAL DEFINITIONS

```
INTSTAT/01 00101         RT:GINT/01 00266         RT:INTENTRY/01 002CF
RT:UINT/01 0027E         RTALTCP/01 000B1         RTCHKGUN/01 00080        RTCHKPRIV/01 00013
RTCNVTXT/01 0003A        RTCU/01 00249            RTDCBCHK/01 00091        RTDEVCHK/01 000A2
RTICBTYP/01 00044        RTINT/01 00238           RTINTRTN/01 00127        RTIOSTRT/01 00232
RTLCT/01 00196           RTLOCICB/01 00029        RTROOT/01 00000          RTSIZE/01 001AB
RTTO/01 0025A            RTVTP/01 000A9           RTWD/01 00007            UINTQ/01 00287
```

* PRIMARY REFERENCES

```
ALTERR          BLCKD:MASK      BT31TO          C$CPU           CALBAD          CHKBIT          CHKBIT1
DCTSIZ          DCT1A           DCT1P           DCT12           DCT13           DCT15           DCT19
DCT3            DRIVEIO         E:ART           E:QFI           ENBSR4          EXU:MASK        ICB
ICBSIZE         INTLBSIZ        INTLB1          INTLB2          INTLB3          INTSIM          IOQ8
IOSCU           IOWAIT:MASK     J:DCBLL         J:ICBHDR        J:TCB           JB:PRIV         JX:CMAP
```

```
        MASKS           MAXG            MONORG          MTRTNO          NB31T00         NEWQNW          NINTS
        PB:LCT          RCVPSD          RT:GINTP        RT:UINTP        RTCLOCK#        RTCONNECT#      RTDISCONN
        RTGJOBCON#      RTICBHDR        RTNRRTSEG       RTRESDF#        RTRET1          RTRET2          RTSTARTI
        RTSTOPIO#       S:ACORE         S:BADFLG        S:CUN           S:CUP           S:GJOBACN       S:GJOBTB
        S:RTCORE        S:RTIR          S:RTUN          S:STL#          SB:GJOBUN       SL:RSVP         T:GJOB
        T:OVERLAY       T:PULLE         T:REG           T:RUE           T:SAVE          T:SSE           T:SSEM
        T:TOTSZ         T:UTSXTS        TRAPEXIT        TSTACK          UB:ACP          UB:APO          UB:APR
        UB:ASP          UB:DB           UB:OV           UB:PRIO         UB:PRIOB        UB:US           UH:DL
        UH:FLG          UH:FLG2         WAIT:MASK       XFO             XF1FFFFFF       X1FFFE          X3FFE00
        YC              YF              YFF             YFFFF           YO6             24BM14          24BM18
        :BIG
* NO SECONDARY REFERENCES
* NO UNDEFINED SYMBOLS
*    ERROR SEVERITY LEVEL: 0
* NO ERROR LINES
```

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```
13:56 SEP 08,'75 ID=00E6
ELAPSED JOB TIME                        :12
PARTITION NUMBER                         12
TOTAL CPU TIME                       2.1224
  PROCESSOR EXECUTION TIME           1.9607
  PROCESSOR SERVICE TIME              .1618
CARDS:  CARDS READ                       11
PAGES:  PROCESSOR PAGES                 137
CORE:   PEAK CORE(PAGES)                 21
        PAGE.MINUTES                59.5424
I/O:    OPERATIONS                     1142
        CALS                           6069
FILE SPACE
  PEAK RAD TEMPORARY                    128
  AVLBL DISK PERMANENT                  607
NUMBER OF SWAPS                          74
RESOURCES ALLOCATED
  CO= 32(PAGES)
```