```
I-O PROCESSOR ERROR ROUTINES (IOPERR,3)  10/2/73  JGC/BPC

/CHANNEL 1 TAPE ERRORS (ALL IOT'S ARE RETURN 3)
1HLT,     LAC I DCONT     /CHECK WHICH DEVICE
          SMA
          JMP I 1HLTF     /FASTRAND TOT CRASH ERROR
          LAC (200000)
1TERR,    LIO I FTAPE1    /GET PROPER FLAGS FOR CH1
          RIL 6S
          LFI
          LRG
TERR,     IOR (400000)
          DAC I ERCOD1
TERR1,    LAW I 1
          ADD I PC
          LIA
          SZF I 6
          LAW IOPTSU
          SPI
          IOR (400000)
          DAC I PC
          CLA             /NOW SET FOR PROPER PC UNSTEP
          SZF I 1
          IDA             /WAS A THREE RETURN IOT
          SZF 6
          IDA             /WAS A TWO RETURN IOT
          CMA
          AAI
          DAC I TRAPPC
          JMP I SWAP

ILLSPC,   LAC (040000     /ILLEGAL SPECIFICATION ERROR
          JMP 1TERR

/CHANNEL 4 TAPE ERRORS (ALL IOT'S RETURN 2) FLAG 6 UNTOUCHED
TAPERR,   0
          LAW TAPER1      /GET CHANNEL 1 TO ERROR ROUTINE
          DAP I FTAPE1
          JMP TPRLS2
TAPER1,   LAC ERWRD2
          DAC I ERCOD2
          STF 1
          LAC TAPERR
          JMP TERR

ERWRD2,   0
```

FORM 6510 HQ PRINTED IN U.S.A.

```
THLT,       LAC (200000     /TOTAL CRASH
            JDA TAPERR

4LDPT,      LAC (20000
            IOR I UNPTR
            AND (-100000
            DAC I UNPTR
            LAW 400
            JDA TAPERR

4ILLSPC,    LAC (040000)
            JDA TAPERR

/CHANNEL 16 TAPE ERRORS
16ILLSPC,   LAC (40000
            IOR (400000
16TERR,     DAC I RERCD1
            LAC I RPC
            LIA
            DAC I RTRAPC
            LAW I 1
            ADD I (DCH 71)
            SZF I 6
            LAW IOPTSU
            SPI
            IOR (400000)
            DAC I (DCH 71)
            JMP I R0

NOTYOURS,   LAC (020000
            JMP 16ILLSPC+1

EMPTY,      LAC (010000
            JMP 16ILLSPC+1

WRING,      LAW 200
            JMP 16ILLSPC+1
F16ILLSPC,                  LAC (040000
            JMP 16TERR
FNOTYOURS,                  LAC (020000
            JMP 16TERR

FEMPTY,     LAC (010000
            JMP 16TERR
```

FORM 8551 HQ PRINTED IN U.S.A.

```
/END OF CHANNEL 1 SWAPPER
SWAPE2,   AND CONTR2      /MTCU WANTS TO FREE A GUY
          ADD (3)
          SAD (TTBL 6)
          LAC (TTBL)
          SAS END2
          IOR B1
          DAC CONTR2
SWAPE7,   DZM ERSTART     /FORGET OLD ERRORS
          LAC I AC        /REPACK ACTIVE REGISTERS
          DAC I (IOR 50)
          LAC I IO
          DAC I (IOR 51)
          LAC I FLAGS
          DAC I (IOR 52)
          RCK
          LAI
          SUB I TIME
          SPA
          ADD (60000,)
          LIA
          TAD I IOPRT1
          DAC I IOPRT1
          SZL"U"SCF"U"CLL"U"CML
          IDX I IOPRT
          ISB 400         /SIGNAL CHANNEL 4
          LAC I ICORE     /LOOK UP CORE STATUS OF THIS GUY
          DAP CORSTAT
          LAC I ISTAT     /RESET CORE PTRS
          DAC I CORSTAT
          ISB 1700        /TELL SYSTEM SWAPPER
          DZM I HOTFLG
          DAP STATP
          LAI
          AND (37)
          SIR 5S
          NOP             /SIR OR SIL?
          DIO CLKCNT
          ADD I PRIORITY
          AND (7777)
          LIA
          AND (37)
          DAP I PRIORITY
          SIR 5S
          LAI
          ADD CLKCNT
          SZA I           /ANY CLOCK TICKS TO BE CHARGED?
          JMP I SWAPE5    /NO, SO SAVE TROUBLE AND RELEASE HIM NOW
```

FORM 5510 HO PRINTED IN U.S.A.

```
            DAC CLKCNT
            LAW 7777
            AND I STATP
            CMA
            DAC RUNTM
            LAC I PRIORITY
            SAR 6S
            SAR 6S
            SZA I           /PROIRITY 0?
            JMP LOOP        /YES, CHARGE TICKS*1
            SPA
            JMP SWAPE8      /NEG. PRI. GO CHARGE EXTRA TICKS
            DAC SWAPE9      /POS. PRI. = HAS HE RUN LONG ENOUGH?
            LAW 1
            MUL CLKCNT
            DIV SWAPE9
SWAPE9,     0
            SWP
            RAL 5S
            ADD I PRIORITY /UPDATE FRACTION LEFT OVER
            DAP I PRIORITY
            SNI             /IS HE TO GET CHARGED ANYTHING?
            JMP I SWAPE5    /NO
            JMP LOOPA

SWAPE8,     SCM             /THE LINK IS SET
            MUL CLKCNT      /CALCULATE HOW BADLY THE GUY LOSES
            RIR 1S
LOOPA,      DIO CLKCNT
```

FORM 8510 HO PRINTED IN U.S.A.

```
LOOP,     LIO RUNTM       /FIND OUT HOW MANY CLOCK TICKS IT TOOK TO GET HER
          FBC
          LAI
          XOR RUNTM
          LIA
          SAL 1S
          ADD RUNTM
          AAI
          ADD CLKCNT      /ADD IN THE CURRENT CHARGES
          CMA
          DAC SWAPE9
          LIA             /NOW CONVERT BACK TO A QUEUE LEVEL
          FBC
          LAI
          XOR SWAPE9
          SAL 1S
          AAI
          LIA
          AND (777400)
          SZA I           /WE PUTTING THE GUY ON LOW QUEUE?
          JMP LOOP1       /NO, SO HIS QUEUE IS OK
          AND (777000)    /DID THE GUY GO OFF THE END OF LOW QUEUE?
          SZA
          JMP LOOP2       /YES, SO HE STAYS AT THE BOTTOM OF LOW QUEUE
          LAW 400         /GUY IS IN THE MIDDLE OF LOW QUEUE...
          AND RUNTM       /DID HE START IOT ON LOW QUEUE?
          SZA
LOOP2,    LAW 777         /NO, SO HE MUST BEGIN AT THE BOTTOM
LOOP1,    IAI
          AND (777)
          DAP I STATP     /PUT UPDATED QUEUE BACK
          LAC STATP
          SAS NETHND      /DID WE JUST CHARGE "NCP" ?
          JMP I SWAPE5
          LAW 7777
          AND I STATP
          SUB (200)
          SPA
          JMP I SWAPE5
          LAW 40          /GOOSE "NCP"
          DAP I STATP
          JMP I SWAPE5

STATP,    DCH .
CLKCNT,   0
RUNTM,    0
CORSTAT,  DCH .
```

FORM 5510 HD PRINTED IN U.S.A.

```
/CHANNEL 1 ABNORMAL ROUTINE
/CH1XE=0␣NO PREVIOUS ERRORS UNRECOVERED
/CH1XE=-0␣PREVIOUS UNRECOVERED ERROR

ABNORMAL, CLA              /ARE THERE ANY PREVIOUS UNRECOVERED ERRORS
          SAS I CH1XE
          JMP I CH1A       /YES=IGNORE ERROR STATUS
          RRI              /GET STATUS OF CHANNEL
          RIL 2S           /IS IT A DEVICE ERROR
          SPI
          JMP DEVICE
          RIL 2S           /WAS DATA LATE
          SPI
          JMP DATA         /RE-EXECUTE COMMANDS (HANDLE AS DATA ERROR)
          RIL 8S
          LFI              /LOAD FLAGS WITH STATE OF COMPARISON BITS
          RIL 2S
          SPI
          JMP 1HLT         /COMMAND REJECTED
          SZF 5
          JMP .+4
          SZF 2
          SZF I 6
          JMP DATA
          CLC              /COMPARISON ERROR=RESET SWITCH
          DAC I CH1XE      /SET AS PREVIOUS UNRECOVERED ERROR
          LIO I CHNFLG     /RESTORE THE FLAGS
          LAC ERSTART      /CHECK IF IN PROCESS OF PROCESSING AN ERROR
          SZA
          LIO SCHFLG       /YES=GET FLAGS FROM SAVED REGISTER
          LFI
          DZM ERSTART
          JMP I COMPX      /EXIT TO COMPARISON ERROR ROUTINE
```

FORM 5510 H-0 PRINTED IN U.S.A.

```
/DEVICE PROBLEMS
DEVICE,    RRI
           LAI
           AND (3          /WHICH CONTROLLER
           SAS (1
           JMP ATAPE       /TAPE ERROR
           RRI 100         /CHECK FOR A DEAD FASTRAND
           RIR 7S
           SPI
           HLT             /UNIT UNAVAILABLE = HUH?
           CLA
           SAS I OVERFLOW  /WAS OVERFLOW CHECK REQUESTED
           JMP FASDAT      /DATA ERROR
           RIR 2S
           SPI I
           JMP FASDAT      /DATA ERROR=NOT OVERFLOW
           CLC
           DAC I CH1XE
           LIO I CHNFLG
           LAC ERSTART     /CHECK IF IN PROCESS OF PROCESSING AN ERROR
           SZA
           LIO SCHFLG      /YES=GET FLAGS FROM SAVED REGISTER
           LFI
           DZM ERSTART
           JMP I OVFX

/TAPE PROBLEMS
ATAPE,     RRI 200
           RIR 9S
           LAW 2000
           SPI
           JMP 1TERR
           RRI 1200        /WAS IT AN EOT
           AND (-0
           RIR 9S
           LAW 1000        /EOT ?
           SPI
           JMP 1TERR
           JSP 1HLT        /ERROR (?????)
```

FORM 8510 HO PRINTED IN U.S.A.

```
FASERR,   REPEAT 4,0      /DATA ON LAST FASTRAND ERROR

FASDAT,   IDX FASERR
          RRI 100
          DIO FASERR+1
          RRI+1000
          DIO FASERR+2
          RRI+1100
          DIO FASERR+3


/DATA ERRORS-ENTRY ALSO FOR DATA LATE
DATA,     CLA             /WAS THERE PREVIOUS DATA ERROR
          SAD ERSTART
          JMP DATA1
          CLA             /WAS THIS CORRECTIVE MEASURE
          SAS ERGO
          JSP 1HLT        /WHAT CAN WE DO
          ISP ERRCNT
          JMP DATA2       /NOT COMPLETED THE COUNT YET
          CLC
          DAC I CH1XE     /MARK AS NOT-HANDLED ERROR
          JSP 1HLT        /NON-RECOVERABLE ERROR

DATA1,    LIO I CHNFLG    /SAVE FLAGS
          DIO SCHFLG
          LIO I CH1X
          DIO SCH1X       /SAVE DEBREAK REGISTER
          LAW I 4
          DAC ERRCNT
          IDX ERSTART     /MARK ERSTART NOT ZERO-I,E,PROCESSING AN ERROR

DATA2,    RRI             /TAPE OR FASTRAND
          LAI
          AND (3
          SAS (1
          HLT             /TAPE ERROR - CAN'T GET HERE!!(??)
```

FORM 510 HC PRINTED IN U.S.A.

```
            RRI 500
            LAI
            AND (177777
            IOR (140000     /RELOCATE
            DAC REDO2
            SUB (1
            DAC REDO1

REDO4,      LAC I REDO2     /LOOK FOR 0 OR ADD
            SZA I
            JMP REDO3       /FOUND HALT
            AND (700000
            SAD (400000
            JMP REDO3       /FOUND JMP
            IDX REDO2
            JMP REDO4

REDO3,      LAC (REDOH
            DAC REDO5       /SET POINTER TO COPY BACKWARDS
            CLF 1

REDO8,      LIO I REDO2
            DIO I REDO5     /MOVE COMMAND
            LAI
            AND (700000
            SAD (500000
            JMP REDO6
            SAS (100000
            SZA I           /WAS IT A WORD COUNT COMMAND
            JMP REDO7
REDO9,      LAW I 1         /DECREMENT COUNTS
            ADD REDO5
            DAC REDO5
            LAW I 1
            ADD REDO2
            DAC REDO2
            SUB REDO1
            SPA
            STF 1           /IF STRICTLY BEFORE WORD BEFORE ERROR SET FLAG
            JMP REDO8
```

FORM 8510 HO PRINTED IN U.S.A.

```
REDO7,      LAI
            RIL 55
            SPI I           /DID WE REQUEST AN ERROR
            JMP REDO9       /NO
            AND (-10000
            SZF 1           /DO WE WANT TO REMOVE BREAKS
            DAC I REDO5     /REMOVE BREAK BIT
            JMP REDO9

REDO6,      LAC REDO5       /MAKE INTO A PHSYICAL ADDRESS
            AND (37777
~~TDATA2,~~     DAC REDO5
~~REDO10,~~     JSP I GO        /RE-EXECUTE THE COMMANDS
REDO5,      0
            LIO SCHFLG
            LFI
            DZM ERSTART
            ~~DZM ERGO~~
            CLC
            DAC I CH1XE
            JMP I SCH1X

~~ERGO,~~       0

REDOC,      REPEAT 103,,0
REDOH;      0

ERSTART,    0
ERRCNT,     0
SCH1X,      0
SCHFLG,     0
REDO2,      0
REDO1,      0


CON,        CONSTANTS
FOO,        FLEXO FOO
```

```
/TABLES FOR IOP III

16224/     TTBL:
16232/     FTBL:
16400/     BITTB1,
16500/     BITTB2,
16600/     BITTB3,
16700/     BITTB4,

17000/
FRELST:    REPEAT 4,240000
           REPEAT 174,200001          /MARK FIRST THIRD HELD BY USER 1
           REPEAT 4,300000            /MARK FIRST TRACK HELD BY SWAPPER
           REPEAT 164,200001
           REPEAT 10,400000
           REPEAT 4,240000
           REPEAT 174,200001
17600/
HLDHT0,    DCH I .
           REPEAT 15.,0
FREBL0,    400000
           REPEAT 15.,-0
/CORE 17 ADDRESSES TO ADDRESS
157700/
TUSER,     0
DCONT,     0
WAIT4,     0
SWAP,      0
.SETUP,    0
RPC,       0
SCORE,     0
GO,        0
WAIT,      0
CH1X,      0
CHNFLG,    0
CH1XE,     0
16USER,    0
RELEASE,   0
CH1A,      0
COMPX,     0
OVFX,      0
OVERFLOW,  0
THIRD,     0
READ,      0
READ+1,    0
WAIT2,     0
1EMPTY,    0
FILLSPC,   0
1HLTF,     0
TIME,      0
C16FIN,    0
C16FOU,    0
C16FSW,    0
SWAPE5,    0
```

FORM 8510 HO PRINTED IN U.S.A.

```
/CORE 4,0 REFERRENCES
ERCOD1,     IOR 102
ERCOD2,     IOR 103
RERCD1,     102
RERCD2,     103
AC,         JDA 7775
PC,         IOR 35
IO,         JDA 7776
FLAGS,      JDA 7777
IOPRT,      IOR 4
IOPRT1,     IOR 5
TRAPPC,     IOR 77
RTRAPC,     77
IOPMAX,     IOR 74
BOUND,      36
PRIORI,     IOR 15

IOPTSU=106

START HLT=JMP
```

FORM 4510 HO PRINTED IN U.S.A.