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ASM8C :f1:rqproc.m80


ISIS-II 8C80/8085 MACRO ASSEMBLER, V4.0         RQPROC   PAGE    1
MIP-ISIS RQPROC FOR 550 - 03/04/82

  LOC  OBJ          LINE        SOURCE STATEMENT

                       1 $TITLE('MIP-ISIS RQPROC FOR 550 - 03/04/82')
                       2 ;ISIS$rqproc:
                       3 ;do;
                       4 ;
                       5 ; THIS MODULE CONTAINS THE ROUTINES THAT MANAGE THE
                       6 ; REQUEST QUEUES. THESE ROUTINES FOLLOW THE DEFINITIONS
                       7 ; OF THE FUNCTIONS AS DEFIND IN THE MIP ARCHITECTURE
                       8 ; SPECIFICATION. THERE ARE SEVEN ROUTINES HERE. FOUR
                       9 ; DIRECTLY MANAGE THE REQUEST QUEUES. THE OTHER THREE
                      10 ; IMPLEMENT TIMEOUT FUNCTIONS USED TO DETERMINE IF THE
                      11 ; DESTINATION DEVICE DOES NOT RESPOND.
                      12 ;
                      13 ; THE ROUTINES ARE:
                      14 ;
                      15 ; RQGPTR: REQUEST-GET-POINTER.
                      16 ;  THIS ROUTINE RETURNS A POINTER TO THE NEXT FREE GIVE SLOT
                      17 ;  IN THE OUTPUT REQUEST QUEUE.
                      18 ;
                      19 ; RQTPTR: REQUEST-TAKE-POINTER.
                      20 ;  THIS ROUTINE RETURNS A POINTER TO THE NEXT FILLED TAKE SLOT
                      21 ;  IN THE INPUT REQUEST QUEUE, IF THERE IS SOMETHING THERE.
                      22 ;
                      23 ; RLGPTR: RELEASE-GIVE-POINTER.
                      24 ;  THIS ROUTINE RELEASES THE FILLED GIVE SLOT.
                      25 ;
                      26 ; RLTPTR: RELEASE-TAKE-POINTER.
                      27 ;  THIS ROUTINE RELEASES THE EMPTIED TAKE SLOT.
                      28 ;
                      29 ; TRQGPT: TIMED REQUEST-GIVE-PTR.
                      30 ;  THIS ROUTINE CALLS RQGPTR LOOKING FOR A NON-FULL STATE. IT
                      31 ;  IMPLEMENTS A TIMECUT FEATURE WHEN WAITING UPON A FULL OUTPUT
                      32 ;  REQUEST QUEUE. IF THE QUEUE DOES NOT BECOME NON-FULL IN THE
                      33 ;  TIMEOUT PERIOD, THE DESTINATION DEVICE WILL BE DECLARED DEAD
                      34 ;  AND THE REQUEST ABORTED.
                      35 ;
                      36 ; INITT: INITIALIZE TIMER.
                      37 ;  THIS ROUTINE INITIALIZES THE TIMEOUT TIMER.
                      38 ;
                      39 ; BUMPT: BUMP TIME.
                      40 ;  THIS ROUTINE BUMPS THE TIME IN THE TIMEOUT TIMER. THE TIMER
                      41 ;  IS A SOFTWARE LOOP THAT COUNTS FROM 0 TO 65K.
                      42 ;
                      43 ;declare Request$queue$descriptor literally
                      44 ;  '             RQ$FLAG BYTE,
                      45 ;                RQFLAG2 byte,
                      46 ;                RQsize byte,
                      47 ;                RQE$size byte,
                      48 ;                Give$index byte,
                      49 ;                Give$state byte,
                      50 ;                Take$index byte,
                      51 ;                Take$state byte  ';
                      52
                      53
                      54          NAME    RQPROC
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  LOC  OBJ      LINE        SOURCE STATEMENT

                  55          PUBLIC  RQGPTR,RQTPTR,RLGPTR,RLTPTR
                  56          PUBLIC  TRQGPT,INITT,BUMPT
                  57          EXTRN   OUTRQD,INRQD
                  58          CSEG
                  59
                  60 $INCLUDE(:F1:MIP.EQU)
                =  61 ;
                =  62 ; DEFINE RQD RESULTS
                =  63 ;
  0001          =  64 GERROR  EQU     1H
  0004          =  65 GBUSY   EQU     4H
  0008          =  66 FIRSTG  EQU     8H
  0010          =  67 GDISAB  EQU     10H
  0020          =  68 GFULL   EQU     20H
  0040          =  69 DISABT  EQU     40H
  0080          =  70 FULLF   EQU     80H
                =  71
  0001          =  72 TERROR  EQU     1H
  0004          =  73 TBUSY   EQU     4H
  0008          =  74 FIRSTT  EQU     8H
  0010          =  75 TDISAB  EQU     10H
  0020          =  76 TEMPTY  EQU     20H
  0040          =  77 DISABG  EQU     40H
  0080          =  78 EMPTYF  EQU     80H
                =  79 ;
                =  80 ; DEFINE MIP CMDS AND RESPONSES
                =  81 ;
  0070          =  82 CSEND   EQU     70H
  0080          =  83 SENTOK  EQU     80H
  0081          =  84 UNKNP   EQU     81H
  0083          =  85 ACTIVP  EQU     83H
  0085          =  86 INSUFM  EQU     85H
  0087          =  87 INACTP  EQU     87H
  0089          =  88 DEADP   EQU     89H
                =  89 ;
                =  90 ; DEFINE MIP-ISIS PARAMETERS
                =  91 ;
  0000          =  92 MYIDS   EQU     0
  0003          =  93 THIDEV  EQU     3
                   94 $EJECT
```

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  LOC  OBJ          LINE        SOURCE STATEMENT

                      95 ;
                      96 ; RQGPTR: THE OUTPUT OF THIS ROUTINE IS IN THE A AND H/L
                      97 ;         REGISTERS. THE A REGISTER CONTAINS THE STANDARD
                      98 ;         MIP BITS WITH THE EXCEPTION OF THE BUSY BITS.
                      99 ;         IF A REG DOES NOT INDICATE AN ERROR, THEN HL
                     100 ;         CONTAINS THE POINTER TO THE FREE RQ SLOT
                     101 ;
                     102 RQGPTR:
  00C0 010400    E   103          LXI     B,OUTRQD+4      ; GIVE
  00C3 210600    E   104          LXI     H,OUTRQD+6;     ; TAKE
  00C6 0A            105          LDAX    B               ; GET INDEX/STATE
  00C7 AE            106          XRA     M
  00C8 57            107          MOV     D,A             ; SAVE EXCLUSIVE OR
  00C9 E67F          108          ANI     7FH             ; GET INDEX PART
  00CB C2C0C0    C   109          JNZ     RL1A            ; JMP IF INDEXES ARE NOT EQUAL
  00CE 7A            110          MOV     A,D             ; GI=TI, SEE IF EMPTY OR FULL
  00CF E680          111          ANI     80H             ; IF GF=TF THEN Q IS EMPTY
  00D1 CA2C00    C   112          JZ      RL1A
  00D4 F621          113          ORI     21H
  00D6 C9            114          RET                     ; GF<> TF, Q IS FULL
                     115
                     116 RQTPTR:
  00D7 AF            117          XRA     A               ; SET GIVE FLAG TO ZERO
  00D8 32000C    E   118          STA     INRQD
  00DB 010600    E   119          LXI     B,INRQD+6       ; TAKE
  00DE 210400    E   120          LXI     H,INRQD+4;      ; GIVE
  00E1 110800    E   121          LXI     D,INRQD+8
  00E4 0A            122          LDAX    B               ; TI
  00E5 BE            123          CMP     M               ; Q IS EMPTY IF GI=TI AND GF=TF
  00E6 C22F00    C   124          JNZ     RL1             ; JUMP IF GI=TI AND GF=TF
  00E9 F621          125          ORI     21H             ; EMPTY
  00EB C9            126          RET
                     127
  00EC 110800    E   128 RL1A:    LXI     D,OUTRQD+8
  00EF 0A            129 RL1:     LDAX    B               ; INDEX
  00F0 E67F          130          ANI     7FH
  00F2 87            131          ADD     A
  00F3 87            132          ADD     A               ; 16 * INDEX
  00F4 87            133          ADD     A
  00F5 87            134          ADD     A
  00F6 6F            135          MOV     L,A
  00F7 2600          136          MVI     H,0
  00F9 19            137          DAD     D
  00FA AF            138          XRA     A
  00FB C9            139          RET
                     140
                     141 $EJECT
```

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  LOC  OBJ          LINE        SOURCE STATEMENT

                     142         ; RLGPTR: THIS ROUTINE HAS NO PARAMETERS. IT IS CALLED AFTER
                     143 ;         RQGPTR HAS BEEN CALLED AND THE GIVE SLOT FILLED IN
                     144 ;         IN ORDER TO INDICATE TO THE DESTINATION DEVICE THAT
                     145 ;         SOMETHING IS IN THE QUEUE. IT MUST BE CALLED ONLY
                     146 ;         AFTER RQGPTR HAS BEEN CALLED WITHOUT AN ERROR BEING
                     147 ;         RETURNED. THAT IS, RLGPTR MUST BE CALLED FOLLOWING
                     148 ;         SUCCESSFUL RQGPTR CALLS. THIS ROUTINE WILL ALSO
                     149 ;         GENERATE A SIGNAL INTERRUPT TO THE DESTINATION DEVICE
                     150 RLGPTR:
  003C 01040C    E   151           LXI     B,OUTRQD+4      ; GIVE
  003F 21060C    E   152           LXI     H,OUTRQD+6      ; TAKE
  0042 0A            153           LDAX    B               ; GI
  0043 3C            154           INR     A
  0044 E681          155           ANI     81H             ; FORM POSSIBLE NEW GI/FF
  0046 57            156           MOV     D,A
  0047 E601          157           ANI     1               ; GET GI PART ONLY
  0049 5F            158           MOV     E,A
  004A 7E            159           MOV     A,M             ; TI
  004B E67F          160           ANI     7FH
  004D BB            161           CMP     E
  004E 7A            162           MOV     A,D             ; PUT NEW GI/GF INTO A
  004F C2570C    C   163           JNZ     RL2
  0052 7E            164           MOV     A,M             ; FORM NEW GF=NOT TF
  0053 2F            165           CMA
  0054 E680          166           ANI     80H
  0056 B3            167           ORA     E               ; GI PART
                     168
  0057 02            169 RL2:      STAX    B               ; STORE NEW GI/GF
  0058 210000    E   170           LXI     H,OUTRQD        ; SET FLAG
  005B 3601          171           MVI     M,1H
  005D 3E02          172           MVI     A,2
  005F D3A4          173           OUT     0A4H
  0061 C9            174           RET
                     175
                     176 ;
                     177 ; RLTPTR: THIS ROUTINE HAS NO PARAMETERS. IT IS CALLED AFTER
                     178 ;         RQTPTR HAS BEEN CALLED AND THE GIVE SLOT FILLED IN
                     179 ;         IN ORDER TO INDICATE TO THE DESTINATION DEVICE THAT
                     180 ;         SOMETHING HAS BEEN TAKEN FROM THE QUEUE. T MUST BE
                     181 ;         CALLED ONLY AFTER RQTPTR HAS BEEN CALLED WITHOUT AN
                     182 ;         ERROR BEING RETURNED. THAT IS, RLTPTR MUST BE CALLED
                     183 ;         FOLLOWING SUCCESSFUL RQGPTR CALLS. THIS ROUTINE WILL
                     184 ;         ALSO GENERATE AN INTERRUPT TO THE DESTINATION DEVICE.
                     185
                     186 RLTPTR:
  0062 010600    E   187           LXI     B,INRQD+6       ; TAKE
  0065 210400    E   188           LXI     H,INRQD+4       ; GIVE
  0068 0A            189           LDAX    B               ; TI
  0069 3C            190           INR     A
  006A E681          191           ANI     81H             ; FORM POSSIBLE NEW TI/TF
  006C 57            192           MOV     D,A
  006D E601          193           ANI     1               ; GET TI PART ONLY
  006F 5F            194           MOV     E,A
  0070 7E            195           MOV     A,M             ; GI
  0071 E67F          196           ANI     7FH
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  LOC  OBJ          LINE        SOURCE STATEMENT

  0073 BB            197          CMP     E
  0074 7A            198          MOV     A,D             ; POSSIBLE NEW TI/TF
  0075 C25700    C   199          JNZ     RL2
  0078 7E            200          MOV     A,M             ; FORM NEW TF= GF
  0079 E680          201          ANI     80H
  007B B3            202          ORA     E               ; TI PART
                     203
  007C 02            204 RL3:     STAX    B               ; STORE NEW TF/GF
  007D 210100    E   205          LXI     H,OUTRQD+1      ; SET FLAG
  0080 3680          206          MVI     M,80H
  0082 3E02          207          MVI     A,2
  0084 D3A4          208          OUT     0A4H
  0086 C9            209          RET
                     210
                     211 ;
                     212 ; THESE ARE TIMERS ROUTINES THAT VARIOUS OTHER ROUTINES USE FOR TIMEOUT
                     213 ; PUPOSES
                     214 ;
  0087 21000C        215 INITT:   LXI     H,0
  008A C39100    C   216          JMP     L0
                     217
                     218 ;
                     219 ; THIS ROUTINE BUMPS THE TIMER. THE STATE IS RETURNED VIA THE ZERO
                     220 ; FLAG. IF SET THEN THE TIMER HAS EXPIRED.
                     221 ;
  008D 2A0000    D   222 BUMPT:   LHLD    TIMER
  0090 23            223          INX     H
  0091 220000    D   224 L0:      SHLD    TIMER
  0094 7C            225          MOV     A,H
  0095 B5            226          ORA     L
  0096 C9            227          RET
                     228 ;
                     229 ; THIS IS A ROUTINE TO WAIT FOR A NON FULL OUTPUT RQD. IF AFTER 65K
                     230 ; TRIES, IT ISN'T NONFULL, IT ASSUMES THE OTHR DEVICE IS DEAD
                     231 ; A DEAD DEVICE IS INDICATED BY THE ZERO FLAG BEING SET. IF THE
                     232 ; ZERO FLAG IS NOT SET, THEN THE A REGISTER CONTAINS THE
                     233 ; RQGPTR STATUS BITS.
                     234 ;
  0097 CD870C    C   235 TRQGPT:  CALL    INITT           ; INIT TIMER
  009A CD0000    C   236 L1:      CALL    RQGPTR          ; CHECK IF FULL
  009D 4F            237          MOV     C,A
  009E E620          238          ANI     GFULL
  00A0 79            239          MOV     A,C             ; RESTORE VALUE WITHOUT AFFECTING FLAGS"
  00A1 C8            240          RZ                      ; IF ZERO THEN WAS NOT FULL
  00A2 CD8D0C    C   241          CALL    BUMPT
  00A5 C29A00    C   242          JNZ     L1
                     243                                  ; TIMER EXPIRED, RETURN NON ZERO
                     244
  00A8 3E51          245          MVI     A,GDISAB OR DISABG OR GERROR
  00AA 320500    E   246          STA     OUTRQD+5        ; SET DEVICE TO DEAD
  00AD 320500    E   247          STA     INRQD+5
  00B0 C9            248          RET
                     249
                     250
                     251          DSEG
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  LOC  OBJ          LINE        SOURCE STATEMENT

  0000 0000          252 TIMER:  DW      0
                     253
                     254 ;end ISIS$rqproc;
                     255         END
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PUBLIC SYMBOLS
BUMPT  C 008D    INITT  C 0087    RLGPTR C 003C    RLTPTR C 0062    RQGPTR C 0000    RQTPTR C 0017    TRQGPT C 0097

EXTERNAL SYMBOLS
INRQD  E 000C    OUTRQD E 0000

USER SYMBOLS
ACTIVP A 0083    BUMPT  C 008D    CSEND  A 0070    DEADP  A 0089    DISABG A 0040    DISABT A 0040    EMPTYF A 0080
FIRSTG A 0008    FIRSTT A 0008    FULLF  A 0080    GBUSY  A 0004    GDISAB A 0010    GERROR A 0001    GFULL  A 0020
INACTP A 0087    INITT  C 0087    INRQD  E 0000    INSUFM A 0085    LO     C 0091    L1     C 009A    MYIDS  A 0000
OUTRQD E 0000    RL1    C 002F    RL1A   C 002C    RL2    C 0057    RL3    C 007C    RLGPTR C 003C    RLTPTR C 0062
RQGPTR C 0000    RQTPTR C 0017    SENTOK A 0080    TBUSY  A 0004    TDISAB A 0010    TEMPTY A 0020    TERROR A 0001
THIDEV A 0003    TIMER  D 0000    TRQGPT C 0097    UNKNP  A 0081

ASSEMBLY COMPLETE,  NO ERRORS
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