

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 DEFINED 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	; RQGPT: 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	; RLGPT: 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 RQGPT LOOKING FOR A NON-FULL STATE. IT
		31	; IMPLEMENTS A TIMEOUT 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	

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	TEMPY 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

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:
0000	010400	E 103	LXI B,OUTRQD+4 ; GIVE
0003	210600	E 104	LXI H,OUTRQD+6; ; TAKE
0006	0A	105	LDAX B ; GET INDEX/STATE
0007	AE	106	XRA M
0008	57	107	MOV D,A ; SAVE EXCLUSIVE OR
0009	E67F	108	ANI 7FH ; GET INDEX PART
000B	C22C00	C 109	JNZ RL1A ; JMP IF INDEXES ARE NOT EQUAL
000E	7A	110	MOV A,D ; GI=TI, SEE IF EMPTY OR FULL
000F	E680	111	ANI 80H ; IF GF=TF THEN Q IS EMPTY
0011	CA2C00	C 112	JZ RL1A
0014	F621	113	ORI 21H
0016	C9	114	RET ; GF<> TF, Q IS FULL
		115	
		116	RQTPTR:
0017	AF	117	XRA A ; SET GIVE FLAG TO ZERO
0018	320000	E 118	STA INRQD
001B	010600	E 119	LXI B,INRQD+6 ; TAKE
001E	210400	E 120	LXI H,INRQD+4; ; GIVE
0021	11080C	E 121	LXI D,INRQD+8
0024	0A	122	LDAX B ; TI
0025	BE	123	CMP M ; Q IS EMPTY IF GI=TI AND GF=TF
0026	C22F00	C 124	JNZ RL1 ; JUMP IF GI=TI AND GF=TF
0029	F621	125	ORI 21H ; EMPTY
002B	C9	126	RET
		127	
002C	110800	E 128	RL1A: LXI D,OUTRQD+8
002F	0A	129	RL1: LDAX B ; INDEX
0030	E67F	130	ANI 7FH
0032	87	131	ADD A
0033	87	132	ADD A ; 16 * INDEX
0034	87	133	ADD A
0035	87	134	ADD A
0036	6F	135	MOV L,A
0037	2600	136	MVI H,0
0039	19	137	CAD D
003A	AF	138	XRA A
003B	C9	139	RET
		140	
		141	SEJECT

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	010400	E 151	LXI B,OUTRQD+4 ; GIVE
003F	210600	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	C25700	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	CRA 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	CUT 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

LOC	OBJ	LINE	SOURCE STATEMENT
0073	BB	197	CMP E
0074	7A	198	MOV A,D ; POSSIBLE NEW TI/TF
0075	C25700	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	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	210000	215	INITT: LXI H,0
008A	C39100	216	JMP LO
		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	222	BUMPT: LHLD TIMER
0090	23	223	INX H
0091	220000	224	LO: SHLD TIMER
0094	7C	225	MOV A,H
0095	B5	226	CRA 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	CD8700	235	TRQGPT: CALL INITT ; INIT TIMER
009A	CD0000	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	CD8DOC	241	CALL BUMPT
00A5	C29A00	242	JNZ L1
		243	;
		244	; TIMER EXPIRED, RETURN NON ZERO
00A8	3E51	245	MVI A,GDISAB OR DISABG OR GERROR
00AA	320500	246	STA OUTRQD+5 ; SET DEVICE TO DEAD
00AD	320500	247	STA INRQD+5
00B0	C9	248	RET
		249	
		250	

LOC	OBJ	LINE	SOURCE STATEMENT
0000	0000	252	TIMER: DW 0
		253	
		254	;end ISIS\$rqproc;
		255	END

PUBLIC SYMBOLS

BUMPT C 008D	INITT C 0087	RLGPTR C 003C	RLTPTR C 0062	RQGPTR C 0000	RQTPTR C 0017	TRQGPT C 0097
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EXTERNAL SYMBOLS

INRQD E 000C	OUTRQD E 000C
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USER SYMBOLS

ACTIVP A 0083	BUMPT C 008D	CSEND A 007D	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 000C	INSUFM A 0085	LO C 0091	L1 C 009A	MYIDS A 0000
OUTRQD E 000C	RL1 C 002F	RL1A C 002C	RL2 C 0057	RL3 C 007C	RLGPTR C 003C	RLTPTR C 0062
RQGPTR C 000C	RQTPTR C 0017	SENTOK A 0080	TBUSY A 0004	TDISAB A 0010	TEMPTY A 0020	TERROR A 0001
THIDEV A 0003	TIMER D 000C	TRQGPT C 0097	UNKNP A 0081			

ASSEMBLY COMPLETE, NO ERRORS