

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				2 *****
				3 *
				4 * TRE instruction tests
				5 *
				6 * NOTE: This test is based the CLCL-et-al Test
				7 * modified to only test the Performance
				8 * of the TRE instruction.
				9 *
				10 * James Wekel August 2022
				11 *****
				12 *****
				13 *
				14 * TRE Performance instruction tests
				15 *
				16 *****
				17 *
				18 * This program ONLY tests the performance of the TRE
				19 * instructions.
				20 * Tests:
				21 * 1. TRE of 512 bytes
				22 * 2. TRE of 512 bytes that crosses a page boundary,
				23 * which results in a CC=3, and a branch back
				24 * to complete the TRE instruction
				25 * 3. TRE of 2048 bytes
				26 * 4. TRE of 2048 bytes that crosses a page boundary,
				27 * which results in a CC=3, and a branch back
				28 * to complete the TRE instruction
				29 *
				30 *****
				31 * NOTE: When assembling using SATK, use the "-t S390" option.
				32 *****
				33 *
				34 * Example Hercules Testcase:
				35 *
				36 *
				37 * *Testcase TRE-02-performance (Test TRE instructions)
				38 *
				39 * archlvl 390
				40 * mainsize 3
				41 * numcpu 1
				42 * sysclear
				43 *
				44 * loadcore "\$(testpath)/TRE-02-performance"
				45 *
				46 * r 21fd=ff # (enable timing tests)
				47 * runtest 20 # (depends on the host)
				48 *qui
				49 * *Done
				50 *
				51 *
				52 *****

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				54 PRINT OFF
				3435 PRINT ON
				3437 *****
				3438 * SATK prolog stuff...
				3439 *****
				3441 ARCHLVL ZARCH=NO,MNOTE=NO
				3443+\$AL OPSYN AL
				3444+\$ALR OPSYN ALR
				3445+\$B OPSYN B
				3446+\$BAS OPSYN BAS
				3447+\$BASR OPSYN BASR
				3448+\$BC OPSYN BC
				3449+\$BCTR OPSYN BCTR
				3450+\$BE OPSYN BE
				3451+\$BH OPSYN BH
				3452+\$BL OPSYN BL
				3453+\$BM OPSYN BM
				3454+\$BNE OPSYN BNE
				3455+\$BNH OPSYN BNH
				3456+\$BNL OPSYN BNL
				3457+\$BNM OPSYN BNM
				3458+\$BNO OPSYN BNO
				3459+\$BNP OPSYN BNP
				3460+\$BNZ OPSYN BNZ
				3461+\$BO OPSYN BO
				3462+\$BP OPSYN BP
				3463+\$BXLE OPSYN BXLE
				3464+\$BZ OPSYN BZ
				3465+\$CH OPSYN CH
				3466+\$L OPSYN L
				3467+\$LH OPSYN LH
				3468+\$LM OPSYN LM
				3469+\$LPSW OPSYN LPSW
				3470+\$LR OPSYN LR
				3471+\$LTR OPSYN LTR
				3472+\$NR OPSYN NR
				3473+\$SL OPSYN SL
				3474+\$SLR OPSYN SLR
				3475+\$SR OPSYN SR
				3476+\$ST OPSYN ST
				3477+\$STM OPSYN STM
				3478+\$X OPSYN X
				3479+\$AHI OPSYN AHI
				3480+\$B OPSYN J
				3481+\$BC OPSYN BRC
				3482+\$BE OPSYN JE
				3483+\$BH OPSYN JH
				3484+\$BL OPSYN JL
				3485+\$BM OPSYN JM
				3486+\$BNE OPSYN JNE

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				3528 *****
				3529 * The actual "TRE02TST" program itself...
				3530 *****
				3531 *
				3532 * Architecture Mode: 390
				3533 * Addressing Mode: 31-bit
				3534 * Register Usage:
				3535 *
				3536 * R0 (work)
				3537 * R1 I/O device used by ENADEV and RAWIO macros
				3538 * R2 First base register
				3539 * R3 IOCB pointer for ENADEV and RAWIO macros
				3540 * R4 IO work register used by ENADEV and RAWIO
				3541 * R5-R7 (work)
				3542 * R8 ORB pointer
				3543 * R9 Second base register
				3544 * R10-R13 (work)
				3545 * R14 Subroutine call
				3546 * R15 Secondary Subroutine call or work
				3547 *
				3548 *****
00000200		00000000		3550 USING ASA,R0 Low core addressability
00000200		00000200		3551 USING BEGIN,R2 FIRST Base Register
00000200		00001200		3552 USING BEGIN+4096,R9 SECOND Base Register
00000200		00000000		3553 USING IOCB,R3 SATK Device I/O Control Block
00000200		00000000		3554 USING ORB,R8 ESA/390 Operation Request Block
00000200	0520			3556 BEGIN BALR R2,0 Initalize FIRST base register
00000202	0620			3557 BCTR R2,0 Initalize FIRST base register
00000204	0620			3558 BCTR R2,0 Initalize FIRST base register
00000206	5020 203C		0000023C	3559 ST R2,SAVER2
0000020A	4190 2800		00000800	3561 LA R9,2048(,R2) Initalize SECOND base register
0000020E	4190 9800		00000800	3562 LA R9,2048(,R9) Initalize SECOND base register
00000212	45E0 29A0		00000BA0	3564 BAL R14,INIT Initalize Program
				3565 *
				3566 ** Run the tests...
				3567 *
00000216	45E0 2050		00000250	3568 BAL R14,TEST91 Time TRE instruction (speed test)
				3569 *
				3570 *****
				3571 * Test for normal or unexpected test completion...
				3572 *****
0000021A	95FF 9FFD		000021FD	3574 CLI TIMEOPT,X'FF' Was this a timing run?
0000021E	4770 29B2		00000BB2	3575 BNE EOJ No, timing run; just go end normally
00000222	9594 9FFE		000021FE	3577 CLI TESTNUM,X'94' Did we end on expected test?
00000226	4770 29E0		00000BE0	3578 BNE FAILTEST No?! Then FAIL the test!

LOC	OBJECT	CODE	ADDR1	ADDR2	STMT
					3593 *****
					3594 * TEST91 Time TRE instruction (speed test)
					3595 *****
00000250	91FF	9FFD		000021FD	3597 TEST91 TM TIMEOPT,X'FF' Is timing tests option enabled?
00000254	078E				3598 BZR R14 No, skip timing tests
00000256	4150	2B80		00000D80	3600 LA R5,TREPERF Point R5 --> testing control table
0000025A			00000000		3601
					3602 USING TRETEST,R5 What each table entry looks like
					3603 *
0000025A	5050	2040	0000025A	00000001	3604 TST91LOP EQU * save current pref table base
				00000240	3605 ST R5,SAVER5
					3606 *
0000025E	4360	5000		00000000	3607 IC R6,TNUM Set test number
00000262	4260	9FFE		000021FE	3608 STC R6,TESTNUM
					3609 *
					3610 ** Initialize operand data (move data to testing address)
					3611 *
00000266	58A0	500C		0000000C	3612 L R10,OP1WHERE Where to move operand-1 data to
0000026A	58B0	5010		00000010	3613 L R11,OP1LEN operand-1 length
0000026E	5860	5004		00000004	3614 L R6,OP1DATA Where op1 data is right now
00000272	5870	5010		00000010	3615 L R7,OP1LEN How much of it there is
00000276	0EA6				3616 MVCL R10,R6
					3617 *
00000278	58C0	5014		00000014	3618 L R12,OP2WHERE Where to move operand-2 data to
0000027C	58D0	2ACC		00000CCC	3619 L R13,=A(OP2LEN) How much of it there is
00000280	5860	5008		00000008	3620 L R6,OP2DATA Where op2 data is right now
00000284	5870	2ACC		00000CCC	3621 L R7,=A(OP2LEN) How much of it there is
00000288	0EC6				3622 MVCL R12,R6
					3623 *
0000028A	4300	5001		00000001	3624 IC R0,TBYTE Set test byte
					3626 *
					3627 ** Next, time the overhead...
					3628 *
0000028E	5870	2AEC		00000CEC	3629 L R7,NUMLOOPS
00000292	B205	2AF0		00000CF0	3630 STCK BEGCLOCK
00000296	0560				3631 BALR R6,0
					3632
00000298	98AC	500C		0000000C	3633 LM R10,R12,OPSWHERE get TRE operands
0000029C	B2A5	00AC			3634 TRE R10,R12 do TRE
000002A0	4710	209C		0000029C	3635 BC B'0001',*-4 not finished
000002A4	98AC	500C		0000000C	3636 LM R10,R12,OPSWHERE
000002A8	4710	20AC		000002AC	3637 BC B'0001',*+4
					3638 *ETC.....
					3639 PRINT OFF
					3834 PRINT ON
000005AC	98AC	500C		0000000C	3835 LM R10,R12,OPSWHERE
000005B0	4710	23B4		000005B4	3836 BC B'0001',*+4
000005B4	98AC	500C		0000000C	3837 LM R10,R12,OPSWHERE

LOC	OBJECT CODE	ADDR1	ADDR2	STMT			
000005B8	4710 23BC		000005BC	3838	BC	B'0001',*+4	
				3839			
000005BC	0676			3840	BCTR	R7,R6	
000005BE	B205 2AF8		00000CF8	3841	STCK	ENDCLOCK	
000005C2	45F0 2914		00000B14	3842	BAL	R15,CALCDUR	
000005C6	D207 2B08 2B00	00000D08	00000D00	3843	MVC	OVERHEAD,DURATION	
				3844	*		
				3845	**	Now do the actual timing run...	
				3846	*		
000005CC	5870 2AEC		00000CEC	3847	L	R7,NUMLOOPS	
000005D0	B205 2AF0		00000CF0	3848	STCK	BEGCLOCK	
000005D4	0560			3849	BALR	R6,0	
				3850			
000005D6	98AC 500C		0000000C	3851	LM	R10,R12,OPSWHERE	Load TRE operands
000005DA	B2A5 00AC			3852	TRE	R10,R12	do TRE
000005DE	4710 23DA		000005DA	3853	BC	B'0001',*-4	not finished?
000005E2	98AC 500C		0000000C	3854	LM	R10,R12,OPSWHERE	Load TRE operands
000005E6	B2A5 00AC			3855	TRE	R10,R12	do TRE
000005EA	4710 23E6		000005E6	3856	BC	B'0001',*-4	not finished?
				3857	*ETC.....	
				3858	PRINT	OFF	
				4119	PRINT	ON	
000009F6	98AC 500C		0000000C	4120	LM	R10,R12,OPSWHERE	
000009FA	B2A5 00AC			4121	TRE	R10,R12	
000009FE	4710 27FA		000009FA	4122	BC	B'0001',*-4	
00000A02	98AC 500C		0000000C	4123	LM	R10,R12,OPSWHERE	
00000A06	B2A5 00AC			4124	TRE	R10,R12	
00000A0A	4710 2806		00000A06	4125	BC	B'0001',*-4	
				4126			
				4127			
00000A0E	0676			4128	BCTR	R7,R6	
00000A10	B205 2AF8		00000CF8	4129	STCK	ENDCLOCK	
				4130	*		
00000A14	D204 2B51 2AD8	00000D51	00000CD8	4131	MVC	PRTLIN+33(5),=CL5'TRE'	
00000A1A	45F0 283A		00000A3A	4132	BAL	R15,RPTSPEED	
				4133	*		
				4134	*	more performance tests	
				4135	*		
00000A1E	5850 2040		00000240	4136	L	R5,SAVER5	restore perf table base
00000A22	4150 5024		00000024	4137	LA	R5,TRENEXT	Go on to next table entry
00000A26	D503 2AD0 5000	00000CD0	00000000	4138	CLC	=F'0',0(R5)	End of table?
00000A2C	4770 205A		0000025A	4139	BNE	TST91LOP	No, loop...
00000A30	5810 2038		00000238	4140	L	R1,SAVER1	Restore register 1
00000A34	5820 203C		0000023C	4141	L	R2,SAVER2	Restore first base register
00000A38	07FE			4142	BR	R14	Return to caller or FAILTEST

LOC	OBJECT	CODE	ADDR1	ADDR2	STMT	
					4144 *****	
					4145 * RPTSPEED	Report instruction speed
					4146 *****	
00000A3A	50F0	2910		00000B10	4148 RPTSPEED ST	Save return address
00000A3E	45F0	2914		00000B14	4149 BAL	Calculate duration
					4150 *	
00000A42	4150	2B08		00000D08	4151 LA	Subtract overhead
00000A46	4160	2B00		00000D00	4152 LA	From raw timing
00000A4A	4170	2B00		00000D00	4153 LA	Yielding true instruction timing
00000A4E	45F0	2968		00000B68	4154 BAL	Do it
					4155 *	
00000A52	98CD	2B00		00000D00	4156 LM	Convert to...
00000A56	8CC0	000C		0000000C	4157 SRDL	... microseconds
					4158 *	
00000A5A	4EC0	2B10		00000D10	4159 CVD	convert HIGH part to decimal
00000A5E	4ED0	2B18		00000D18	4160 CVD	convert LOW part to decimal
					4161 *	
00000A62	F877	2B20 2B10	00000D20	00000D10	4162 ZAP	Calculate...
00000A68	FC75	2B20 2ADD	00000D20	00000CDD	4163 MP	...decimal...
00000A6E	FA77	2B20 2B18	00000D20	00000D18	4164 AP	...microseconds
					4165 *	
00000A74	D20B	2B5B 2B74	00000D5B	00000D74	4166 MVC	(edit into...
00000A7A	DE0B	2B5B 2B23	00000D5B	00000D23	4167 ED	...print line)
					4169 RAWIO 4,FAIL=FAILIO	Print elapsed time on console
00000A80	9200	300E		0000000E	4170+ MVI	Clear SC information
00000A84	D201	300A 3006	0000000A	00000006	4171+ MVC	Clear accumulated status
00000A8A	5810	3000		00000000	4172+ L	Remember the device ID with which I am working
					4173+*	Initiate Subchannel-based input/output operation
00000A8E	5840	3018		00000018	4174+ \$L	Locate the ORB for the channel subsystem
00000A92	B233	4000		00000000	4175+ SSCH	Initiate the I/O operation
00000A96	A774	009D		00000BD0	4176+ \$BC	..Start function failed, report/handle the error
00000A9A	5840	3020		00000020	4177+ \$L	Locate the IRB storage area
00000A9E			00000000		4178+ USING	Make it addressable
					4180+*	Wait for I/O operation to present status via an interruption
00000A9E					4181+IOWT0007 DS	Wait for I/O to complete
00000A9E	D207	28C0 0078	00000AC0	00000078	4183+ MVC	Save Input/Output new PSW
00000AA4	D207	0078 28B8	00000078	00000AB8	4184+ MVC	Establish Input/Output new PSW
00000AAA	8200	28B0		00000AB0	4185+ \$LPSW	Wait for event
00000AB0	020A0000	00000000			4186+WPSW0008 PSW	Wait for event
00000AB8	00082000	00000AC8			4187+ION0008 PSW	I/O New PSW: cc==2
00000AC0	00000000	00000000			4188+IOS0008 DC	
					4189+*	Handle input/output interruption
00000AC8					4190+IRST0008 DS	
00000AC8	D207	0078 28C0	00000078	00000AC0	4191+ MVC	Restore input/output new PSW

LOC	OBJECT	CODE	ADDR1	ADDR2	STMT	
					4192+* Process the interruption...	
					4193+* Validate interruption is for the expected subchannel	
00000ACE	5510	00B8		000000B8	4194+ CL 1,IOSSID Is this the device for which I am waiting?	
00000AD2	A774	FFE6		00000A9E	4195+ \$BNE IOWT0007 ..No, continue waiting for it	
					4196+* Accumulate interruption information from IRB	
00000AD6	B235	4000		00000000	4197+ TSCH 0(4) Retrive interrupt information	
00000ADA	A744	FFE2		00000A9E	4198+ \$BC B'0100',IOWT0007 CC1 (not status pending), wait for it to arriv	
00000ADE	A714	0079		00000BD0	4199+ \$BC B'0001',FAILIO CC3 (not operational), an error then	
					4200+* CC0 (status was pending), accumulate the status	
00000AE2	D600	300E	4003	0000000E	00000003	4201+ OC IOCBSC,IRBSCSW+SCSW2 Accumulate status control
00000AE8	D601	300A	4008	0000000A	00000008	4202+ OC IOCBST,IRBSCSW+SCSWUS Accumulate device and channel status
00000AEE	9104	300E			0000000E	4203+ TM IOCBSC,SCSWSPRI Primary subchannel status?
00000AF2	A7E4	FFD6			00000A9E	4204+ \$BNO IOWT0007 ..No, wait for primary status
00000AF6	D203	3010	4004	00000010	00000004	4205+ MVC IOCBSCCW,IRBSCSW+SCSWCCW CCW address
00000AFC	D201	3016	400A	00000016	0000000A	4206+ MVC IOCBRCNT,IRBSCSW+SCSWCNT Residual count
						4207+* Test for errors as specified in the IOCB
00000B02	910C	300A		0000000A		4208+ TM IOCBUS,CSWCE+CSWDE Channel end and device end both accumulated?
00000B06	A7E4	0065		00000BD0		4209+ \$BNO FAILIO Hunh? No CE and DE but do have primary status!
						4210+* Input/Output operation successful
00000B0A	58F0	2910		00000B10	4212	L R15,RPTSAVE Restore return address
00000B0E	07FF				4213	BR R15 Return to caller
00000B10	00000000				4215	RPTSAVE DC F'0' R15 save area

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4217 *****
				4218 * CALCDUR Calculate DURATION
				4219 *****
00000B14	50F0 2958		00000B58	4221 CALCDUR ST R15,CALCRET Save return address
00000B18	9057 295C		00000B5C	4222 STM R5,R7,CALCWORK Save work registers
				4223 *
00000B1C	9867 2AF0		00000CF0	4224 LM R6,R7,BEGCLOCK Remove CPU number from clock value
00000B20	8C60 0006		00000006	4225 SRDL R6,6 "
00000B24	8D60 0006		00000006	4226 SLDL R6,6 "
00000B28	9067 2AF0		00000CF0	4227 STM R6,R7,BEGCLOCK "
				4228 *
00000B2C	9867 2AF8		00000CF8	4229 LM R6,R7,ENDCLOCK Remove CPU number from clock value
00000B30	8C60 0006		00000006	4230 SRDL R6,6 "
00000B34	8D60 0006		00000006	4231 SLDL R6,6 "
00000B38	9067 2AF8		00000CF8	4232 STM R6,R7,ENDCLOCK "
				4233 *
00000B3C	4150 2AF0		00000CF0	4234 LA R5,BEGCLOCK Starting time
00000B40	4160 2AF8		00000CF8	4235 LA R6,ENDCLOCK Ending time
00000B44	4170 2B00		00000D00	4236 LA R7,DURATION Difference
00000B48	45F0 2968		00000B68	4237 BAL R15,SUBDWORD Calculate duration
				4238 *
00000B4C	9857 295C		00000B5C	4239 LM R5,R7,CALCWORK Restore work registers
00000B50	58F0 2958		00000B58	4240 L R15,CALCRET Restore return address
00000B54	07FF			4241 BR R15 Return to caller
00000B58	00000000			4243 CALCRET DC F'0' R15 save area
00000B5C	00000000 00000000			4244 CALCWORK DC 3F'0' R5-R7 save area
				4246 *****
				4247 * SUBDWORD Subtract two doublewords
				4248 * R5 --> subtrahend, R6 --> minuend, R7 --> result
				4249 *****
00000B68	90AD 2990		00000B90	4251 SUBDWORD STM R10,R13,SUBDWSAV Save registers
				4252 *
00000B6C	98AB 5000		00000000	4253 LM R10,R11,0(R5) Subtrahend (value to subtract)
00000B70	98CD 6000		00000000	4254 LM R12,R13,0(R6) Minuend (what to subtract FROM)
00000B74	1FDB			4255 SLR R13,R11 Subtract LOW part
00000B76	47B0 297E		00000B7E	4256 BNM *+4+4 (branch if no borrow)
00000B7A	5FC0 2AD4		00000CD4	4257 SL R12,=F'1' (otherwise do borrow)
00000B7E	1FCA			4258 SLR R12,R10 Subtract HIGH part
00000B80	90CD 7000		00000000	4259 STM R12,R13,0(R7) Store results
				4260 *
00000B84	98AD 2990		00000B90	4261 LM R10,R13,SUBDWSAV Restore registers
00000B88	07FF			4262 BR R15 Return to caller
00000B90	00000000 00000000			4264 SUBDWSAV DC 2D'0' R10-R13 save area

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4305 *****
				4306 * Initialize the CPU for I/O operations
				4307 *****
00000BF0	B766 29F8		00000BF8	4309 IOINIT IOINIT ,
00000BF4	47F0 29FC		00000BFC	4310+IOINIT LCTL 6,6,IOMK0014 Enable subchannel subclasses for interruptions
00000BF8				4311+ B IOMK0014+4
00000BF8	FF000000			4312+IOMK0014 DS 0F
				4313+ DC XL4'FF000000' All subchannel subclasses enabled
00000BFC	07FF			4315 BR R15 Return to caller
				4317 *****
				4318 * Enable the device, making it ready for use
				4319 *****
00000BFE	5810 2A44		00000C44	4321 ENADEV ENADEV ENAOKAY,FAILDEV,REG=4
00000C02	5840 3028		00000028	4322+ENADEV L 1,FIND0015
00000C06		00000000		4323+ \$L 4,IOCBSIB Locate where the SCHIB is to be stored
00000C06				4324+ USING SCHIB,4
00000C06	B234 4000		00000000	4325+FINL0015 DS 0H Retrieve Subchannel Information Block for desired device number
00000C0A	A774 FFDB		00000BC0	4326+ STSCH 0(4) Store the SCHIB for first subchannel
00000C0E	9101 4005		00000005	4327+ \$BC B'0111',FAILDEV Subchannel does not exist and device number not found
00000C12	A784 0011		00000C34	4328+ TM PMCW1_8,PMCWV Is the subchannel device number valid?
00000C16	D501 4006 3004	00000006	00000004	4329+ \$BZ FINN0015 ..No, check the next subchannel
00000C1C	A774 000C		00000C34	4330+ CLC PMCWDNUM,IOCBDEV Is this the device number being sought?
				4331+ \$BNE FINN0015 ..No, check the next subchannel
				4332+* Subchannel found!
00000C20	5010 3000		00000000	4333+ ST 1,IOCBDID Remember the subchannel so I/O can be done to it.
00000C24	9680 4005		00000005	4334+ OI PMCW1_8,PMCWE Make sure it is enabled so I/O requests accepted
00000C28	B232 4000		00000000	4335+ MSCH 0(4) Enable the subchannel to the channel sub-system
00000C2C	A784 0010		00000C4C	4336+ \$BC B'1000',ENAOKAY CC0 (SCHIB updated), device is ready.
00000C30	A7F4 FFC8		00000BC0	4337+ \$B FAILDEV CC1,CC2,CC3 (SCHIB update failed), quit
00000C34				4338+FINN0015 DS 0H Advance to next subchannel
00000C34	4110 1001		00000001	4339+ LA 1,1(0,1) Advance to next subchannel
00000C38	5510 2A48		00000C48	4340+ CL 1,FINM0015 Beyond maximum subchannel
00000C3C	A7D4 FFE5		00000C06	4341+ \$BNH FINL0015 ..No, examine the next subchannel
00000C40	A724 FFC0		00000BC0	4342+ \$BH FAILDEV ..Yes, failed to enable the device
00000C44				4343+ DROP 4 Forget SCHIB addressing
00000C44	00010000			4344+FIND0015 DC A(X'00010000') First subchannel subsystem ID
00000C48	0001FFFF			4345+FINM0015 DC A(X'0001FFFF') Last subchannel subsystem ID
00000C4C	07FF			4347 ENAOKAY BR R15 Return to caller

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4349 *****
				4350 * Structure used by RAWIO identifying
				4351 * the device and operation being performed
				4352 *****
				4354 IOCB_009 IOCB X'009',CCW=CONPGM
00000C50	00000000			4355+IOCB_009 DC A(0) +0 Device Identifier (supplied by ENADEV macro)
00000C54	0009			4356+ DC AL2(X'009') +4 Device address or device number
00000C56	0000			4357+ DC H'0' +6 Must be zeros
00000C58	D3			4358+ DC AL1(X'D3') +8 Default detected unit errors
00000C59	3F			4359+ DC AL1(X'3F') +9 Default detected channel errors
00000C5A	0000			4360+ DC HL2'0' +10 Accumulated unit and channel errors
00000C5C	0000			4361+ DC HL2'0' +12 Tested unit and channel status
00000C5E	00			4362+ DC XL1'00' +14 Accumulated subchannel status control from SCSW
00000C5F	80			4363+ DC XL1'80' +15 Default unsolicited wait condition
00000C60	00000000			4364+ DC F'0' +16 I/O status CCW address
00000C64	00000000			4365+ DC F'0' +20 residual count
00000C68	00000CC0			4366+ DC A(IORB0016) +24 Address where ORB is located
00000C6C	00000000			4367+ DC A(0) +28 reserved
00000C70	00000C80			4368+ DC A(IIRB0016) +32 Address where IRB stored
00000C74	00000000			4369+ DC A(0) +36 reserved
00000C78	00000C80			4370+ DC A(IIRB0016) +40 Address where SCHIB stored
00000C7C	00000000			4371+ DC A(0) +44 reserved
00000C80	00000000 00000000			4372+IIRB0016 DC 16F'0' Embedded shared IRB and SCHIB area
00000CC0				4374+IORB0016 DS 0XL12
00000CC0	00000000			4375+ DC A(0) Word 0 - Interruption Parameter
00000CC4	00			4376+ DC AL1((0)*16+B'0000') Word 1, bits 0-7
00000CC5	80			4377+ DC BL1'10000000' Word 1, bits 8-15
00000CC6	FF			4378+ DC AL1(255) Word 1, bits 16-23
00000CC7	00			4379+ DC BL1'00000000' Word 1, bits 24-31
00000CC8	00000D28			4380+ DC AL4(CONPGM) Word 2 - CCW address

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4382 *****
				4383 * Working Storage
				4384 *****
00000CCC				4386 LTORG , Literals pool
00000CCC	00000100			4387 =A(OP2LEN)
00000CD0	00000000			4388 =F'0'
00000CD4	00000001			4389 =F'1'
00000CD8	E3D9C540 40			4390 =CL5'TRE'
00000CDD	04294967 296C			4391 =P'4294967296'
		00000400	00000001	4393 K EQU 1024 One KB
		00001000	00000001	4394 PAGE EQU (4*K) Size of one page
		00010000	00000001	4395 K64 EQU (64*K) 64 KB
		00100000	00000001	4396 MB EQU (K*K) 1 MB
		000021FE	00000001	4398 TESTADDR EQU (2*PAGE+X'200'-2) Where test/subtest numbers will go
		000021FD	00000001	4399 TIMEADDR EQU (TESTADDR-1) Address of timing tests option flag
		00200000	00000001	4401 MAINSIZE EQU (2*MB) Minimum required storage size
		00000020	00000001	4402 NumpGTBS EQU ((MAINSIZE+K64-1)/K64) Number of Page Tables needed
		00000002	00000001	4403 NUMSEGTB EQU ((NumpGTBS*4)/(16*4)) Number of Segment Tables
		00003000	00000001	4404 SEGTABLES EQU (3*PAGE) Segment Tables Origin
		00003080	00000001	4405 PAGETABS EQU (SEGTABLES+(NumpGTBS*4)) Page Tables Origin
00000CE4	00B00060			4406 CRLREG0 DC 0A(0),XL4'00B00060' Control Register 0
00000CE8	00003002			4407 CTLREG1 DC A(SEGTABLES+NUMSEGTB) Control Register 1
00000CEC	00002710			4409 NUMLOOPS DC F'10000' 10,000 * 100 = 1,000,000
00000CF0	BBBBBBBBB	BBBBBBBBB		4411 BEGCLOCK DC 0D'0',8X'BB' Begin
00000CF8	EEEEEEEE	EEEEEEEE		4412 ENDCLOCK DC 0D'0',8X'EE' End
00000D00	DDDDDDDD	DDDDDDDD		4413 DURATION DC 0D'0',8X'DD' Diff
00000D08	FFFFFFFF	FFFFFFFF		4414 OVERHEAD DC 0D'0',8X'FF' Overhead
00000D10	00000000	0000000C		4416 TICKSAAA DC PL8'0' Clock ticks high part
00000D18	00000000	0000000C		4417 TICKSBBB DC PL8'0' Clock ticks low part
00000D20	00000000	0000000C		4418 TICKSTOT DC PL8'0' Total clock ticks
00000D28	09000044	00000D30		4420 CONPGM CCW1 X'09',PRTLINE,0,PRTLNG
00000D30	40404040	40404040		4421 PRTLINE DC C' 1,000,000 iterations of XXXXX'
00000D56	40A39696	9240F9F9		4422 DC C' took 999,999,999 microseconds'
		00000044	00000001	4423 PRTLNG EQU *-PRTLINE
00000D74	40202020	6B202020		4424 EDIT DC X'402020206B2020206B202120'

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4426 *****
				4427 * TRETEST DSECT
				4428 *****
				4430 TRETEST DSECT ,
00000000	00			4432 TNUM DC X'00' TRE table Number
00000001	00			4433 TBYTE DC X'00' TRE Testbyte
00000002	00			4434 DC X'00'
00000003	00			4435 DC X'00'
00000004	00000000			4437 OP1DATA DC A(0) Pointer to Operand-1 data
00000008	00000000			4438 OP2DATA DC A(0) Pointer to Operand-2 data
				4439
0000000C	00000000	0000000C	00000001	4440 OPSWHERE EQU * Where TRE Operands are located
00000010	00000000			4441 OP1WHERE DC A(0) Where Operand-1 data should be placed
00000014	00000000			4442 OP1LEN DC F'0' How much data is there - 1
				4443 OP2WHERE DC A(0) Where Operand-2 data should be placed
		00000100	00000001	4444 OP2LEN EQU 256 Operand-2 is always 256
00000018	00000000			4446 FAILMASK DC A(0) Failure Branch on Condition mask
0000001C	00000000 00000000			4448 ENDREGS DC A(0),XL4'00' Ending R1/R2 register values
		00000024	00000001	4450 TRENEXT EQU * Start of next table entry...
		AABBCCDD	00000001	4452 REG2PATT EQU X'AABBCCDD' Register 2 starting/ending CC0 value
		000000DD	00000001	4453 REG2LOW EQU X'DD' (last byte above)
		00000000	00003000	4455 TRE02TST CSECT ,

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4457 *****
				4458 * TRE Performace Test data...
				4459 *****
00000D80				4460 TREPERF DC 0A(0) start of table
00000D80	91990000			4462 TREPOP1 DC X'91',X'99',X'00',X'00'
00000D84	00001118 00001C18			4463 DC A(TRELOP10),A(TRELOP20)
00000D8C	00020000 00000200			4464 DC A(00+(02*K64)),A(512),A(MB+(02*K64)) no crosses
00000D98	00000007			4465 DC A(7) CC0
00000D9C	00020200 AABBCDD			4466 DC A(00+(02*K64)+512),A(REG2PATT)
00000DA4	92990000			4468 TREPOP2 DC X'92',X'99',X'00',X'00'
00000DA8	00001118 00001C18			4469 DC A(TRELOP10),A(TRELOP20)
00000DB0	0002FFF4 00000200			4470 DC A(00+(03*K64)-12),A(512),A(MB+(03*K64)) op1 crosses
00000DBC	00000007			4471 DC A(7) CC0
00000DC0	000301F4 AABBCDD			4472 DC A(00+(03*K64)-12+512),A(REG2PATT)
00000DC8	93990000			4474 TREPOP3 DC X'93',X'99',X'00',X'00'
00000DCC	00001118 00001C18			4475 DC A(TRELOP10),A(TRELOP20)
00000DD4	00040000 00000800			4476 DC A(00+(04*K64)),A(2048),A(MB+(04*K64)) no crosses
00000DE0	00000007			4477 DC A(7) CC0
00000DE4	00290800 AABBCDD			4478 DC A(00+(041*K64)+2048),A(REG2PATT)
00000DEC	94990000			4480 TREPOP4 DC X'94',X'99',X'00',X'00'
00000DF0	00001118 00001C18			4481 DC A(TRELOP10),A(TRELOP20)
00000DF8	0003FFF4 00000800			4482 DC A(00+(04*K64)-12),A(2048),A(MB+(04*K64)) op1 crosses
00000E04	00000007			4483 DC A(7) CC0
00000E08	002907F4 AABBCDD			4484 DC A(00+(041*K64)-12+2048),A(REG2PATT)
00000E10	00000000			4486 DC A(0) end of table
00000E14	00000000			4487 DC A(0) end of table

LOC	OBJECT CODE	ADDR1	ADDR2	STMT				
				4514	*****			
				4515	*	Fixed storage locations		
				4516	*****			
00001D18		00001D18	000021FD	4518	ORG	TRE02TST+TIMEADDR	(s/b @ X'21FD')	
000021FD	00			4520	TIMEOPT	DC	X'00'	Set to non-zero to run timing tests
000021FE		000021FE	000021FE	4522	ORG	TRE02TST+TESTADDR	(s/b @ X'21FE', X'21FF')	
000021FE	00			4524	TESTNUM	DC	X'00'	Test number of active test
000021FF	00			4525	SUBTEST	DC	X'00'	Active test sub-test number
00002200		00002200	00003000	4527	ORG	TRE02TST+SEGTABLS	(s/b @ X'3000')	
00003000	00			4529	DATTABS	DC	X'00'	Segment and Page Tables will go here...

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4531 *****
				4532 * IOCB DSECT
				4533 *****
				4535 DSECTS NAME=IOCB
				4537+IOCB DSECT
				4538+* Field usage by: CH SC Description (R->program read-only, X->program read/write)
00000000				4539+IOCBID DS 0F +0 R Device Identifier - Subsystem ID for channel subsystem
00000000	0000			4540+ DS H +0 R reserved - must be zeros
00000002	0000			4541+IOCBDEV DS H +2 R Channel Unit Device address of I/O operation
00000004	0000			4542+IOCBDEV DS H +4 X X Device address or device number (R after ENADEV)
00000006	0000			4543+IOCBZERO DS H +6 R R Must be zeros
00000008	00			4544+IOCBUM DS X +8 X X Unit status test mask
00000009	00			4545+IOCBUM DS X +9 X X Channel status test mask
0000000A				4546+IOCBST DS 0H +10 X X Input/Output unit and channel status accumulation
0000000A	00			4547+IOCBUS DS X +10 R R Accumulated unit status
0000000B	00			4548+IOCBUS DS X +11 R R Accumulated channel status
0000000C	00			4549+IOCBUT DS X +14 R R Used to test unit status
0000000D	00			4550+IOCBCT DS X +13 R R Used to test channel status
0000000E	00			4551+IOCBSC DS X +14 R Accumulted subchannel status control
0000000F	00			4552+IOCBWAIT DS X +15 X X Recognized unsolicited interruption unit status events
00000010	00000000			4553+IOCBSCCW DS A +16 R R I/O status CCW address
00000014				4554+IOCBSCNT DS 0F +20 R R I/O status residual count as a positive full word
00000014	0000			4555+ DS H +20 R reserved must be zeros
00000016	0000			4556+IOCBRCNT DS H +22 R I/O status residual count as an unsigned halfword
00000018				4557+IOCBCAW DS 0A +24 X Channel Address word
00000018	00000000 00000000			4558+IOCBORB DS AD +24 X Address of the ORB for channel subsystem I/O
00000020	00000000 00000000			4559+IOCBIRB DS AD +32 X Channel subsystem IRB address
00000028	00000000 00000000			4560+IOCBSIB DS AD +40 X Channel subsystem SCHIB address
		00000030	00000001	4561+IOCBL EQU *-IOCB Length of IOCB control block (48) without embedded structures

LOC	OBJECT CODE	ADDR1	ADDR2	STMT					
				4563	*****				
				4564	*	ORB DSECT			
				4565	*****				
				4567	DSECTS NAME=ORB				
				4569+ORB	DSECT				
00000000	00000000			4570+ORBPARM	DC	F'0'	Word 0, bits 0-31		
00000004	00			4572+ORB1_0	DC	X'00'	Word 1, bits 0-7		
		000000F0	00000001	4573+ORBKEYM	EQU	X'F0'	Word 1, bits 0-3		- Storage Key Mask
		00000008	00000001	4574+ORBS	EQU	X'08'	Word 1, bit 4		- Suspend Control
		00000004	00000001	4575+ORBC	EQU	X'04'	Word 1, bit 5		- Streaming Mode Control
		00000002	00000001	4576+ORBM	EQU	X'02'	Word 1, bit 6		- Modification Control
		00000001	00000001	4577+ORBY	EQU	X'01'	Word 1, bit 7		- Synchronization Control
00000005	00			4579+ORB1_8	DC	X'00'	Word 1, bits 8-15		
		00000080	00000001	4580+ORBF	EQU	X'80'	Word 1, bit 8		- CCW Format-Control
		00000040	00000001	4581+ORBP	EQU	X'40'	Word 1, bit 9		- Pre-fetch control
		00000020	00000001	4582+ORBI	EQU	X'20'	Word 1, bit 10		- Initial-status Interruption Control
		00000010	00000001	4583+ORBA	EQU	X'10'	Word 1, bit 11		- Address Limit Checking Control
		00000008	00000001	4584+ORBU	EQU	X'08'	Word 1, bit 12		- Suppress-suspended-interruption control
		00000004	00000001	4585+ORBB	EQU	X'04'	Word 1, bit 13		- Channel-Program-Type Control
		00000002	00000001	4586+ORBH	EQU	X'02'	Word 1, bit 14		- Format 2-IDAW Control
		00000001	00000001	4587+ORBT	EQU	X'01'	Word 1, bit 15		- 2K-IDAW control
00000006	00			4588+ORBLPM	DC	X'00'	Word 1, bits 16-23		- Logical Path Mask
00000007	00			4589+ORRB1_24	DC	X'00'	Word 1, bits 24-31		
		00000080	00000001	4590+ORBL	EQU	X'80'	Word 1, bit 24		- Incorrect Length Suppression Mode
		0000007F	00000001	4591+ORBRSV3	EQU	X'7F'	Word 1, bits 25-31		- reserved must be zeros
		00000040	00000001	4592+ORBD	EQU	X'40'	Word 1, bit 25		- MIDAW Addressing Control
		0000003E	00000001	4593+ORBRSV26	EQU	X'3E'	Word 1, bits 26-30		- reserved must be zeros
		0000007E	00000001	4594+ORBRSV25	EQU	X'7E'	Word 1, bits 25-30		- reserved must be zeros
		00000001	00000001	4595+ORBX	EQU	X'01'	Word 1, bit 31		- ORB-extension control
00000008	00000000			4597+ORBCCW	DC	A(0)	Word 2, bits 1-31		- Channel Program Address
		00000080	00000001	4598+ORBRSV4	EQU	X'80'	Word 2, bit 0		- reserved must be zero
		0000000C	00000001	4599+ORBLLEN	EQU	*-ORB Length of standard ORB			
				4600+* Extended ORB fields					
0000000C	00			4601+ORBCSS	DC	X'00'	Word 3, bits 0-7		- Channel Subsystem Priority
0000000D	00			4602+ORBRSV5	DC	X'00'	Word 3, bits 8-15		- reserved must be zeros
0000000E				4603+ORBPGM	DC	0X'00'	Word 3, bits 16-23		- Transport mode reserves for program use
0000000E	00			4604+ORBCU	DC	X'00'	Word 3, bits 16-23		- Control Unit Priority
0000000F	00			4605+ORBRSV6	DC	X'00'	Word 3, bits 24-31		- reserved must be zeros
00000010	00000000 00000000			4606+ORBRSV7	DC	XL16'00'	Words 4-7		- reserved must be zeros
		00000020	00000001	4607+ORBXLEN	EQU	*-ORB Length of extended ORB			

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4625 *****
				4626 * SCSW DSECT
				4627 *****
				4629 DSECTS NAME=SCSW
00000000	00			4631+SCSW DSECT Subchannel Status Word
				4632+SCSWFLAG DC X'00' Flags
		000000F0	00000001	4633+SCSWKEYM EQU X'F0' Storage Key Mask of subchannel storage key
		00000008	00000001	4634+SCSWUSC EQU X'08' Suspend Control
		00000004	00000001	4635+SCSWESWF EQU X'04' Extended Status Word Format
		00000003	00000001	4636+SCSWDCCM EQU X'03' Deferred condiont code mask
		00000000	00000001	4637+SCSWDCC0 EQU X'00' Normal I/O interruption
		00000001	00000001	4638+SCSWDCC1 EQU X'01' Deferred condition code is 1
		00000003	00000001	4639+SCSWDCC3 EQU X'03' Deferred condition code is 3
00000001	00			4641+SCSWCTLS DC X'00' General Controls
		00000080	00000001	4642+SCSWCCWF EQU X'80' CCW Format control when ...
		00000040	00000001	4643+SCSWCCWP EQU X'40' CCW Prefetch Control
		00000020	00000001	4644+SCSWISIC EQU X'20' Initial-Status-Interruption Control
		00000010	00000001	4645+SCSWALKC EQU X'10' Address-Limit-Checking Control
		00000008	00000001	4646+SCSWSSIC EQU X'08' Suppress suspended interruption
		00000004	00000001	4647+SCSW0CC EQU X'04' Zero-Condition Code
		00000002	00000001	4648+SCSWECWC EQU X'02' Extended Control Word control
		00000001	00000001	4649+SCSWPNOP EQU X'01' Path Not Operational
00000002	00			4651+SCSW1 DC X'00' Control Byte 1
		00000070	00000001	4652+SCSWFM EQU X'70' Functional Control Mask
		00000040	00000001	4653+SCSWFS EQU X'40' Function Control - Start Function
		00000020	00000001	4654+SCSWFH EQU X'20' Function Control - Halt Function
		00000010	00000001	4655+SCSWFC EQU X'10' Function Control - Clear Function
		00000008	00000001	4656+SCSWARP EQU X'08' Activity Control - Resume pending
		00000004	00000001	4657+SCSWASP EQU X'04' Activity Control - Start pending
		00000002	00000001	4658+SCSWAHP EQU X'02' Activity Control - Halt pending
		00000001	00000001	4659+SCSWACP EQU X'01' Activity Control - Clear pending
00000003	00			4660+SCSW2 DC X'00' Control Byte 2
		00000080	00000001	4661+SCSWASA EQU X'80' Activity Control - Subchannel Active
		00000040	00000001	4662+SCSWADA EQU X'40' Activity Control - Device Active
		00000020	00000001	4663+SCSWASUS EQU X'20' Activity Control - Suspended
		00000010	00000001	4664+SCSWASAS EQU X'10' Status Control - Alert Status
		00000008	00000001	4665+SCSWSINT EQU X'08' Status Control - Intermediate Status
		00000004	00000001	4666+SCSWSPRI EQU X'04' Status Control - Primary Status
		00000002	00000001	4667+SCSWSSEC EQU X'02' Status Control - Secondary Status
		00000001	00000001	4668+SCSWSPEN EQU X'01' Status Control - Status Pending
00000004	00000000			4670+SCSWCCW DC A(0) CCW Address
00000008	00			4672+SCSWUS DC X'00' Unit Status
		00000080	00000001	4673+SCSWATTN EQU X'80' Attention
		00000040	00000001	4674+SCSWSM EQU X'40' Status modifier
		00000020	00000001	4675+SCSWCUE EQU X'20' Control-unit end
		00000010	00000001	4676+SCSWBUSY EQU X'10' Busy
		00000008	00000001	4677+SCSWCE EQU X'08' Channel end

LOC	OBJECT CODE	ADDR1	ADDR2	STMT
				4696 *****
				4697 * (other DSECTS needed by SATK)
				4698 *****
				4700 DSECTS PRINT=OFF,NAME=(ASA,SCHIB,CCW0,CCW1,CSW)
				4976 PRINT ON
				4978 *****
				4979 * Register equates
				4980 *****
		00000000	00000001	4982 R0 EQU 0
		00000001	00000001	4983 R1 EQU 1
		00000002	00000001	4984 R2 EQU 2
		00000003	00000001	4985 R3 EQU 3
		00000004	00000001	4986 R4 EQU 4
		00000005	00000001	4987 R5 EQU 5
		00000006	00000001	4988 R6 EQU 6
		00000007	00000001	4989 R7 EQU 7
		00000008	00000001	4990 R8 EQU 8
		00000009	00000001	4991 R9 EQU 9
		0000000A	00000001	4992 R10 EQU 10
		0000000B	00000001	4993 R11 EQU 11
		0000000C	00000001	4994 R12 EQU 12
		0000000D	00000001	4995 R13 EQU 13
		0000000E	00000001	4996 R14 EQU 14
		0000000F	00000001	4997 R15 EQU 15
				4999 END

SYMBOL	TYPE	VALUE	LENGTH	DEFN	REFERENCES
CSWCUE	U	00000020	1	4905	
CSWDCC0	U	00000000	1	4896	
CSWDCC1	U	00000001	1	4897	
CSWDCC3	U	00000003	1	4898	
CSWDCCM	U	00000003	1	4895	
CSWDE	U	00000004	1	4908	4208
CSWFLAG	X	00000000	1	4890	
CSWFMT	4	00000000	8	4889	4923
CSWFMTL	U	00000008	1	4923	
CSWICTL	U	00000002	1	4919	
CSWIL	U	00000040	1	4914	
CSWKEYM	U	000000F0	1	4891	
CSWLOG	U	00000004	1	4894	
CSWPCI	U	00000080	1	4913	
CSWPRGM	U	00000020	1	4915	
CSWPROT	U	00000010	1	4916	
CSWSM	U	00000040	1	4904	
CSWSUSP	U	00000008	1	4893	
CSWUC	U	00000002	1	4909	
CSWUS	X	00000004	1	4902	
CSWUX	U	00000001	1	4910	
CTLREG1	A	00000CE8	4	4407	
DATTABS	X	00003000	1	4529	
DURATION	D	00000D00	8	4413	3843 4152 4153 4156 4236
DWAT0010	3	00000BB8	8	4288	4287
DWAT0011	3	00000BC8	8	4293	4292
DWAT0012	3	00000BD8	8	4298	4297
DWAT0013	3	00000BE8	8	4303	4302
EDIT	X	00000D74	12	4424	4166 4167
ENADEV	I	00000BFE	4	4322	4276
ENAOKEY	I	00000C4C	2	4347	4336
ENDCLOCK	D	00000CF8	8	4412	3841 4129 4229 4232 4235
ENDREGS	A	0000001C	4	4448	
EOJ	H	00000BB2	2	4286	3575 3583
EXTCPUAD	H	00000084	2	4754	
EXTICODE	H	00000086	2	4755	
EXTIPARM	F	00000080	4	4753	
EXTNPSW	F	00000058	8	4743	
EXTOPSW	F	00000018	8	4715	4721
FAILDEV	H	00000BC0	2	4291	4327 4337 4342
FAILIO	H	00000BD0	2	4296	4176 4199 4209
FAILMASK	A	00000018	4	4446	
FAILTEST	H	00000BE0	2	4301	3578 3581
FIND0015	A	00000C44	4	4344	4322
FINL0015	H	00000C06	2	4325	4341
FINM0015	A	00000C48	4	4345	4340
FINN0015	H	00000C34	2	4338	4329 4331
IIRB0016	F	00000C80	4	4372	4368 4370
IMAGE	1	00000000	12289	0	
INIT	H	00000BA0	2	4270	3564
IOCB	4	00000000	48	4537	4561 3553
IOCBCAW	A	00000018	4	4557	

SYMBOL	TYPE	VALUE	LENGTH	DEFN	REFERENCES	
ORBD	U	00000040	1	4592		
ORBF	U	00000080	1	4580		
ORBH	U	00000002	1	4586		
ORBI	U	00000020	1	4582		
ORBKEYM	U	000000F0	1	4573		
ORBL	U	00000080	1	4590		
ORBLLEN	U	0000000C	1	4599		
ORBLPM	X	00000006	1	4588		
ORBM	U	00000002	1	4576		
ORBP	U	00000040	1	4581		
ORBPARM	F	00000000	4	4570		
ORBPGM	X	0000000E	1	4603		
ORBRVS25	U	0000007E	1	4594		
ORBRVS26	U	0000003E	1	4593		
ORBRVS3	U	0000007F	1	4591		
ORBRVS4	U	00000080	1	4598		
ORBRVS5	X	0000000D	1	4602		
ORBRVS6	X	0000000F	1	4605		
ORBRVS7	X	00000010	16	4606		
ORBS	U	00000008	1	4574		
ORBT	U	00000001	1	4587		
ORBU	U	00000008	1	4584		
ORBX	U	00000001	1	4595		
ORBXLEN	U	00000020	1	4607		
ORBY	U	00000001	1	4577		
ORRB1_24	X	00000007	1	4589		
OVERHEAD	D	00000D08	8	4414	3843	4151
PAGE	U	00001000	1	4394	4398	4404
PAGETABS	U	00003080	1	4405		
PCFETO	A	000000C4	4	4801		
PERACCID	X	000000A1	1	4779		
PERADDR	F	00000098	4	4776		
PERCODE	X	00000096	1	4773		
PERCODMK	U	000000F0	1	4774		
PGMACCID	X	000000A0	1	4778		
PGMDXC	F	00000090	4	4768		
PGMICODE	H	0000008E	2	4767		
PGMIID	F	0000008C	4	4763		
PGMIILC	X	0000008D	1	4765		
PGMIILCM	U	0000000C	1	4766		
PGMNPSW	F	00000068	8	4745		
PGMOPSW	F	00000028	8	4717	4725	
PGMTRX	F	00000090	4	4769		
PMCW1_0	X	00000004	1	4930		
PMCW1_8	X	00000005	1	4933	4328	4334
PMCW	U	00000004	1	4965		
PMCWCHP0	X	00000010	1	4954		
PMCWCHP1	X	00000011	1	4955		
PMCWCHP2	X	00000012	1	4956		
PMCWCHP3	X	00000013	1	4957		
PMCWCHP4	X	00000014	1	4958		
PMCWCHP5	X	00000015	1	4959		

SYMBOL	TYPE	VALUE	LENGTH	DEFN	REFERENCES												
PMCWCHP6	X	00000016	1	4960													
PMCWCHP7	X	00000017	1	4961													
PMCWDNUM	H	00000006	2	4945	4330												
PMCWE	U	00000080	1	4934	4334												
PMCWEXC	X	0000001B	1	4964													
PMCWIP	F	00000000	4	4929													
PMCWISCM	U	00000038	1	4931													
PMCWLM	U	00000060	1	4935													
PMCWLMG	U	00000020	1	4936													
PMCWMLL	U	00000040	1	4937													
PMCWLP	X	00000008	1	4947													
PMCWLPUM	X	0000000A	1	4949													
PMCWM	U	00000004	1	4941													
PMCWMBI	H	0000000C	2	4951													
PMCWMM	U	00000018	1	4938													
PMCWMMC	U	00000008	1	4940													
PMCWME	U	00000010	1	4939													
PMCWPA	X	0000000F	1	4953													
PMCWPI	X	0000000B	1	4950													
PMCWPN	X	00000009	1	4948													
PMCWPO	X	0000000E	1	4952													
PMCWRES1	X	00000018	4	4962													
PMCWRES2	X	00000018	3	4963													
PMCWS	U	00000001	1	4967													
PMCWT	U	00000002	1	4942													
PMCWV	U	00000001	1	4943	4328												
PMCW	U	00000002	1	4966													
PRTL	C	00000D30	38	4421	4423	4131	4166	4167	4420								
PRTL	U	00000044	1	4423	4420												
R0	U	00000000	1	4982	3550	3624											
R1	U	00000001	1	4983	4140												
R10	U	0000000A	1	4992	3612	3616	3633	3634	3636	3641	3643	3645	3647	3649	3651	3653	3655
					3657	3659	3661	3663	3665	3667	3669	3671	3673	3675	3677	3679	3681
					3683	3685	3687	3689	3691	3693	3695	3697	3699	3701	3703	3705	3707
					3709	3711	3713	3715	3717	3719	3721	3723	3725	3727	3729	3731	3733
					3735	3737	3739	3741	3743	3745	3747	3749	3751	3753	3755	3757	3759
					3761	3763	3765	3767	3769	3771	3773	3775	3777	3779	3781	3783	3785
					3787	3789	3791	3793	3795	3797	3799	3801	3803	3805	3807	3809	3811
					3813	3815	3817	3819	3821	3823	3825	3827	3829	3831	3835	3837	3851
					3852	3854	3855	3860	3861	3863	3864	3866	3867	3869	3870	3872	3873
					3875	3876	3878	3879	3881	3882	3884	3885	3887	3888	3890	3891	3893
					3894	3896	3897	3899	3900	3902	3903	3905	3906	3908	3909	3911	3912
					3914	3915	3917	3918	3920	3921	3923	3924	3926	3927	3929	3930	3932
					3933	3935	3936	3938	3939	3941	3942	3944	3945	3947	3948	3950	3951
					3953	3954	3956	3957	3959	3960	3962	3963	3965	3966	3968	3969	3971
					3972	3974	3975	3977	3978	3980	3981	3983	3984	3986	3987	3989	3990
					3992	3993	3995	3996	3998	3999	4001	4002	4004	4005	4007	4008	4010
					4011	4013	4014	4016	4017	4019	4020	4022	4023	4025	4026	4028	4029
					4031	4032	4034	4035	4037	4038	4040	4041	4043	4044	4046	4047	4049
					4050	4052	4053	4055	4056	4058	4059	4061	4062	4064	4065	4067	4068
					4070	4071	4073	4074	4076	4077	4079	4080	4082	4083	4085	4086	4088
					4089	4091	4092	4094	4095	4097	4098	4100	4101	4103	4104	4106	4107

SYMBOL	TYPE	VALUE	LENGTH	DEFN	REFERENCES
SCHIB	4	00000000	52	4926	4973 4324
SCHIBL	U	00000034	1	4973	
SCHMBA	A	00000028	8	4971	
SCHMDA1	X	00000030	4	4972	
SCHMDA3	X	00000028	12	4970	
SCHPMCW	X	00000000	28	4928	
SCHSCSW	X	0000001C	12	4969	
SCSW	4	00000000	12	4631	4693
SCSW0CC	U	00000004	1	4647	
SCSW1	X	00000002	1	4651	
SCSW2	X	00000003	1	4660	4201
SCSWACP	U	00000001	1	4659	
SCSWADA	U	00000040	1	4662	
SCSWAHP	U	00000002	1	4658	
SCSWALKC	U	00000010	1	4645	
SCSWARP	U	00000008	1	4656	
SCSWASA	U	00000080	1	4661	
SCSWASP	U	00000004	1	4657	
SCSWASUS	U	00000020	1	4663	
SCSWATTN	U	00000080	1	4673	
SCSWBUSY	U	00000010	1	4676	
SCSWCCTL	U	00000004	1	4688	
SCSWCCW	A	00000004	4	4670	4205
SCSWCCWF	U	00000080	1	4642	
SCSWCCWP	U	00000040	1	4643	
SCSWCDAT	U	00000008	1	4687	
SCSWCE	U	00000008	1	4677	
SCSWCHNG	U	00000001	1	4690	
SCSWCNT	H	0000000A	2	4692	4206
SCSWCS	X	00000009	1	4682	
SCSWCTLS	X	00000001	1	4641	
SCSWCUE	U	00000020	1	4675	
SCSWDCC0	U	00000000	1	4637	
SCSWDCC1	U	00000001	1	4638	
SCSWDCC3	U	00000003	1	4639	
SCSWDCCM	U	00000003	1	4636	
SCSWDE	U	00000004	1	4678	
SCSWECWC	U	00000002	1	4648	
SCSWESWF	U	00000004	1	4635	
SCSWFC	U	00000010	1	4655	
SCSWFH	U	00000020	1	4654	
SCSWFLAG	X	00000000	1	4632	
SCSWFM	U	00000070	1	4652	
SCSWFS	U	00000040	1	4653	
SCSWICTL	U	00000002	1	4689	
SCSWIL	U	00000040	1	4684	
SCSWISIC	U	00000020	1	4644	
SCSWKEYM	U	000000F0	1	4633	
SCSWL	U	0000000C	1	4693	
SCSWPCI	U	00000080	1	4683	
SCSWPNOP	U	00000001	1	4649	
SCSWPRGM	U	00000020	1	4685	

SYMBOL	TYPE	VALUE	LENGTH	DEFN	REFERENCES				
SCSWPROT	U	00000010	1	4686					
SCSWSAS	U	00000010	1	4664					
SCSWSINT	U	00000008	1	4665					
SCSWSM	U	00000040	1	4674					
SCSWSPEN	U	00000001	1	4668					
SCSWSPRI	U	00000004	1	4666	4203				
SCSWSSSEC	U	00000002	1	4667					
SCSWSSIC	U	00000008	1	4646					
SCSWUSUC	U	00000008	1	4634					
SCSWUC	U	00000002	1	4679					
SCSWUS	X	00000008	1	4672	4202				
SCSWUX	U	00000001	1	4680					
SEGTABLS	U	00003000	1	4404	4405	4527	4407		
SSARCHMD	X	000000A3	1	4781					
SSARS	F	00000120	4	4837					
SSCLKCMP	F	000000E0	8	4831					
SSCPUTIM	F	000000D8	8	4830					
SSCRS	F	000001C0	4	4840					
SSFPRS	D	00000160	8	4838					
SSGRS	F	00000180	4	4839					
SSMODEL	F	0000010C	4	4835					
SSPREFIX	F	00000108	4	4834					
SSPSW	F	00000100	8	4833					
SSXSAA	A	000000D4	4	4829					
STFLDATA	F	000000C8	4	4802					
SUBDWORD	I	00000B68	4	4251	4154	4237			
SUBDWSAV	D	00000B90	8	4264	4251	4261			
SUBTEST	X	000021FF	1	4525	3580				
SVCICODE	H	0000008A	2	4761					
SVCIID	F	00000088	4	4757					
SVCIILC	X	00000089	1	4759					
SVCIILCM	U	0000000C	1	4760					
SVCNPSW	F	00000060	8	4744					
SVCOPSW	F	00000020	8	4716	4723				
TBYTE	X	00000001	1	4433	3624				
TEST91	I	00000250	4	3597	3568				
TESTADDR	U	000021FE	1	4398	4399	4522			
TESTNUM	X	000021FE	1	4524	3577	3608			
TICKSAAA	P	00000D10	8	4416	4159	4162			
TICKSBBB	P	00000D18	8	4417	4160	4164			
TICKSTOT	P	00000D20	8	4418	4162	4163	4164	4167	
TIMEADDR	U	000021FD	1	4399	4518				
TIMEOPT	X	000021FD	1	4520	3574	3597			
TIMER	F	00000050	4	4740					
TNUM	X	00000000	1	4432	3607				
TRE02TST	J	00000000	12289	3505	3508	3515	3523	3525	4518 4522 4527
TRELOP10	X	00001118	4	4500	4463	4469	4475	4481	
TRELOP20	X	00001C18	1	4512	4463	4469	4475	4481	
TRENEXT	U	00000024	1	4450	4137				
TREPERF	A	00000D80	4	4460	3600				
TREPOP1	X	00000D80	1	4462					
TREPOP2	X	00000DA4	1	4468					

SYMBOL	TYPE	VALUE	LENGTH	DEFN	REFERENCES	
TREPOP3	X	00000DC8	1	4474		
TREPOP4	X	00000DEC	1	4480		
TRETEST	4	00000000	36	4430	3602	
TRTOP10	X	00000E18	4	4493		
TRTOP111	X	00000F18	4	4495		
TRTOP1F0	X	00001018	4	4497		
TRTOP20	X	00001918	1	4506		
TRTOP211	X	00001A18	1	4508		
TRTOP2F0	X	00001B18	1	4510		
TST91LOP	U	0000025A	1	3604	4139	
TTDES	F	00000054	4	4741		
UA0	F	00000010	8	4713		
UA1	F	0000004C	4	4738		
UA2	F	000000A4	4	4783		
UA3	F	000000B4	4	4792		
UA4	X	000000B8	1	4793		
UA5	X	000000CC	8	4803		
UA6	X	000000EC	8	4809		
UA7	F	00000118	8	4820		
UA8	X	00000180	32	4849		
WPSW0008	3	00000AB0	8	4186	4185	
ZBRKADDR	A	00000110	8	4819		
ZEMONCNT	F	0000010C	4	4818		
ZEMONCTR	A	00000100	8	4816		
ZEMONSIZ	F	00000108	4	4817		
ZEXTNPSW	X	000001B0	16	4852		
ZEXTOPSW	X	00000130	16	4844		
ZIONPSW	X	000001F0	16	4856		
ZIOOPSW	X	00000170	16	4848		
ZMCKNPSW	X	000001E0	16	4855		
ZMCKOPSW	X	00000160	16	4847		
ZMKFAILA	F	000000F8	8	4811		
ZMONCODE	F	000000B0	8	4786		
ZPGMNPSW	X	000001D0	16	4854		
ZPGMOPSW	X	00000150	16	4846		
ZPGMTRX	F	000000A8	8	4785		
ZRSTNPSW	X	000001A0	16	4851		
ZRSTOPSW	X	00000120	16	4843		
ZSASDISP	U	000011C0	1	4857		
ZSVCNPSW	X	000001C0	16	4853		
ZSVCOPSW	X	00000140	16	4845		
=A(OP2LEN)	A	00000CCC	4	4387	3619	3621
=CL5'TRE'	C	00000CD8	5	4390	4131	
=F'0'	F	00000CD0	4	4388	4138	
=F'1'	F	00000CD4	4	4389	4257	
=P'4294967296'	P	00000CDD	6	4391	4163	

DESC	SYMBOL	SIZE	POS	ADDR
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Entry: 0

Image	IMAGE	12289	0000-3000	0000-3000
Region	CODE	12289	0000-3000	0000-3000
CSECT	TRE02TST	12289	0000-3000	0000-3000

STMT	FILE NAME
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```
1 /devstor/dev/satk/samples/tests/TRE-02-performance.asm
2 /home/tn529/dev/satk/srcasm/satk.mac
```

**** NO ERRORS FOUND ****