

KG11-A

CYCLIC REDUND CHECK TEST
MD-11-DZKGA-B

EP-DZKGA-B-DL-B

APR 1977

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FICHE 1 OF 1

MADE IN USA

The microfiche card contains a grid of frames. The frames on the left side contain text and diagrams, including a large diagram of a rectangular structure with internal components. The frames on the right side contain data tables with multiple columns and rows of numbers and text. The text is too small to read clearly but appears to be technical specifications or test results.

.REM :

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZKGA-B-D
PRODUCT NAME: KG11A - CYCLIC REDUNDANCY CHECK TEST
DATE RELEASED: MARCH, 1977
MAINTAINER: DIAGNOSTIC GROUP
NOTE: REV. A OF THIS PROGRAM OBSOLETE MD-11-DSK

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ABSTRACT.

THIS PROGRAM TESTS THE LOGIC OF THE CYCLIC REDUNDANCY CHECK DEVICE (KG11A).

REQUIREMENTS.

A STANDARD PDP-11 (WITH OR WITHOUT A HARDWARE SWITCH REGISTER) AND A KG11

LOADING--STORAGE.

LOADING PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED.

DEVICE ADDRESS CHANGE.

TO CHANGE THE DEVICE ADDRESS (WHICH WAS LOADED AS 170700), CHANGE THE CONTENTS OF THE LOCATION "DEVADR" SHOWN ON PAGE 24/ SET THIS LOCATION TO THE ADDRESS OF THE CSR DESIRED, THEN START (OR RESTART) AS GIVEN IN OPERATION BELOW.

OPERATION.

1. THIS PROGRAM MAY BE OPERATED IN TWO MODES.
 - A. FULL TEST MODE.
THIS IS THE MAIN BODY OF THE PROGRAM AND SHOULD BE USED TO ACCEPT OR DIAGNOSE A DEVICE.
TO RUN: START AT LOC. 200 WITH SWR15 SET.
(DETAIL ON PAGE 5.)
 - B. SELECT TEST MODE
THIS IS A SUBPROGRAM TO ALLOW THE OPERATOR TO RUN A SELECT INSTRUCTION ON A SELECT DATA WORD.
TO RUN: START AT LOC. 204 WITH SWR15 SET.
SELECT INSTRUCTION ON SWR5-0.
SELECT DATA WORD ON SWR11-6.
(DETAIL ON PAGE 6.)

SWITCH REGISTER.

IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER. IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH REGISTER (LOC. 176) IS USED.

CONTROL:

THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY DOING THE FOLLOWING:

- 1) TYPE CONTROL G (<↑G>); THIS WILL ALLOW THE TTY TO ENTER DATA INTO LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.
- 2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWITCH REGISTER.)
- 3) AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE OF THE FOLLOWING AT THE TTY:
 - A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>. (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS WILL BE ALLOWED)
IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.
 - B) IF A CONTROL U (<↑U>) IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

1. SWR15 SET, HALT ON ERROR.
RESÉT, BYPASS ERROR.
2. SWR14 SET, SCOPE LOOP ON ERROR.
RESÉT, BYPASS ERROR.
3. SWR13 SET, INHIBIT PRINTOUTS DURING SCOPE LOOP.
RESÉT, ALLOW PRINTOUTS DURING SCOPE LOOP.
4. SWR12 SET, INHIBIT TRACE TRAPPING.
RESÉT, ALLOW TRACE TRAPPING.
5. SWR11 SET, INHIBIT ITERATIONS.
RESÉT, ALLOW ITERATIONS.
6. SWR11 - SWR6 AND SWR5 - SWR0 ARE DEFINED IN THE SELECT TEST MODE SECTION ON PG. 6 & 7.

FULL TEST MODE.

1. START OR RESTART.
 - A. ZERO THE SWR
 - B. LOAD 200 AND START
2. PROGRAM ACTION.
 - A. WHENEVER THE PROGRAM IS STARTED, OR RESTARTED, THE TTY WILL TYPE: KG11A.
 - B. IF THE SOFTWARE SWITCH REGISTER IS SELECTED THEN THE FOLLOWING WILL BE TYPED:
SWR=XXXXXX NEW=(REFER TO SWITCH REGISTER SECTION FOR OPERATOR ACTIONS)
 - C. IF THERE ARE NO ERRORS DETECTED, THE PROGRAM WILL LOOP INDEFINITELY AND WILL RING THE TTY BELL ONCE FOR EACH PASS. TRACE TRAP IS EFFECTIVE AND EACH SUBTEST IS BEING ITERATED 100 TIMES.
 - D. IF AN ERROR OCCURS, A ONE LINE ERROR MESSAGE WILL BE TYPED ON THE TTY AND THE PROGRAM WILL HALT. (SEE THE ERROR SECTION ON PAGE 8.)
3. OPERATER CONTROL VIA THE SWR.

(REFER TO SECTION ON SWITCH REGISTER SETTINGS FOR SOFTWARE SWITCH REGISTER.)

 - A. SWR15 SET. (NORMAL)
HALT ON ERROR AFTER ERROR MESSAGE IS TYPED.

SWR15 RESET.
TYPE THE ERROR MESSAGE AND CONTINUE TO THE NEXT ITERATION OF THE CURRENT TEST OR TO THE NEXT SUBTEST.
 - B. SWR12 SET.
INHIBIT TRACE TRAP.

SWR12 RESET (NORMAL)
ALLOW TRACE TRAP.
 - C. SWR11 SET.
INHIBIT ITERATIONS

SWR11 RESET (NORMAL)
ALLOW ITERATIONS

SELECT TEST MODE.

1. START OR RESTART.
 - A. RESET SWR15 THRU SWR0.
 - B. LOAD ADDRESS 204
 - C. SELECT THE INSTRUCTION TO BE TESTED FROM THE LIST OF INSTRUCTIONS ON PAGE NN OF THE PROGRAM LISTING.
SET SWR5 THRU SWR0 TO THE "I" NUMBER GIVEN WITH SAID INSTRUCTION.
 - D. SELECT THE DATA WORD TO BE TESTED FROM THE LIST OF DATA WORDS GIVEN ON PAGES NN AND NN OF THE PROGRAM LISTING.
SET SWR11 THRU SWR6 TO THE "D" NUMBER GIVEN WITH THE SAID DATA WORD.
 - E. START.
 - F. ****REFER TO SECTION ON SWITCH SETTINGS FOR SOFTWARE SWITCH REGISTER ACTION.

SPECIAL NOTES ON C. AND D. ABOVE.

1. THE SELECTED INSTRUCTION AND/OR THE SELECTED DATA MAY BE CHANGED WHILE THE PROGRAM IS RUNNING.
2. IF SWR11 THRU SWR6 ARE ALL RESET, THEN THE SELECTED INSTRUCTION WILL RUN ON ALL DATA WORDS.
3. IF SWR5 THRU SWR0 ARE ALL RESET THEN ALL INSTRUCTIONS WILL BE RUN ON THE SELECTED DATA WORD.
4. IF SWR11 THRU SWR6 AND SWR5 THRU SWR0 ARE ALL RESET, THEN ALL INSTRUCTIONS WILL BE RUN ON ALL DATA WORDS.

2. PROGRAM ACTION

- A. IF THERE ARE NO ERRORS THE PROGRAM WILL LOOP THE SELECTED INSTRUCTION (SWR5-0) USING THE SELECTED DATA (SWR11-6). TRACE TRAP IS EFFECTIVE.
- B. IF AN ERROR OCCURS, A ONE LINE ERROR MESSAGE WILL BE TYPED ON THE TTY AND THE PROGRAM WILL HALT. (SEE THE ERROR SECTION ON PAGE 8.)

(REFER TO SWITCH SETTING SECTION FOR USE OF SOFTWARE SWITCH REGISTER)

3. OPERATER CONTROL VIA THE SWR.

(REFER TO SECTION ON SWITCH SETTING'S FOR SOFTWARE SWITCH REGISTER DYNAMIC CHANGING.)

- A. SWR15 SET. (NORMAL)
HALT ON ERROR AFTER ERROR MESSAGE IS TYPED.

SWR15 RESET.
TYPE THE ERROR MESSAGE AND CONTINUE TESTING THE SELECTED INSTRUCTION (SWR5-0) USING THE SELECTED DATA (SWR11-6)
- B. SWR12 SET.
INHIBIT TRACE TRAP.

SWR12 RESET. (NORMAL)
ALLOW TRACE TRAP.
- C. SWR11 THRU SWR6.
SELECTED DATA WORD.
- D. SWR5 THRU SWR0.
SELECTED INSTRUCTION.

ERRORS

1. ERROR MESSAGE

***ROUTINE CHECKS FOR THE DYNAMIC CHANGING OF THE SOFTWARE SWITCH REGISTER REFER TO SWITCH SETTING SECTION FOR OPERATOR ACTION.
TESTX IXX DXX SXXXXXX HXXXXXX

TESTX (X = A OR B)
THIS IS THE NAME (TAG) OF THE TEST THAT WAS IN USE AT THE TIME OF THE ERROR.
TESTA IS ON PAGE 27 OF THE PROG. LIST.
TESTB IS ON PAGE 28 OF THE PROG. LIST.

IXX (XX = A NUMBER FROM 01 THRU 57)
THIS IS THE NAME/NUMBER (TAG) OF THE INSTRUCTION IN USE AT THE TIME OF THE ERROR.
R1 (INST. POINTER) POINTS AT THIS INSTRUCTION.
THE INSTRUCTION TABLE IS ON PAGE 18 OF THE PROG. LIST.

DXX (XX = A NUMBER FROM 01 THRU 77)
THIS IS THE NAME/NUMBER (TAG) OF THE DATA WORD IN USE AT THE TIME OF THE ERROR.
R2 (DATA WORD POINTER) POINTS AT THIS DATA WORD.
THE DATA WORD TABLE IS ON PG. 20 OF THE PROG. LIST.

SXXXXXX (XXXXXX = ANY 6 DIGIT, 16 BIT, OCTAL NUMBER)
THIS IS THE SIMULATED (GOOD) BCC WORD.

HXXXXXX (XXXXXX = ANY 6 DIGIT, 16 BIT, OCTAL NUMBER)
THIS IS THE HARDWARE (BAD) BCC WORD.

DONE BIT: S\S (EACH X CAN =0 OR 1)
THIS IS THE STATUS OF THE DONE BIT (BIT 7 OF THE CSR).
THE FIRST NUMBER (X\) IS WHAT THE DONE BIT SHOULD BE (GOOD). THE SECOND NUMBER (\X) IS WHAT THE DONE BIT ACTUALLY WAS.

2. OPTIONS AFTER A HALT ON ERROR.

IF THE SOFTWARE SWITCH REGISTER IS USED THEN THE OPERATOR CAN CHANGE THE SWREG LOCATION BY TYPING A 1G AND THEN CONTINUING.

A. SCOPE LOOP. SEE SCOPE LOOP SECTION.

B. BYPASS THIS ERROR AND CONTINUE TO THE NEXT ITERATION OR SUBTEST.

1. RESET SWR14 AND SWR15.

2. CONTINUE.

C. UTILIZE SELECT TEST MODE (PAGE 6)

SCOPE LOOP

ROUTINE CHECKS FOR IG FUNCTION.

1. SET UP.
 - A. SET SWR14.
 - B. RESET SWR15.
 - C. CONTINUE.
2. PROGRAM ACTION.

THE PROGRAM WILL SCOPE LOOP ON THE FAILING TEST FOR AS LONG AS SWR14 IS SET, AND SWR15 IS RESET.
3. OPERATOR CONTROL VIA THE SWR.
 - A. SWR13 SET.
INHIBIT ERROR TYPEOUTS.

SWR13 RESET.
ALLOW ERROR TYPEOUTS.
 - B. SWR12 SET.
INHIBIT TRACE TRAPS.

SWR12 RESET.
ALLOW TRACE TRAPS.

FORCED ERROR TYPEOUT.

IN THE EVENT OF AN UNEXPECTED OR ILLEGAL TRAP, OR AT ANY TIME THE OPERATOR DEEMS IT USEFUL, THE PROGRAM CAN BE HALTED (IF IT HASN'T ALREADY) AND A TYPEOUT CAN BE OBTAINED AS TO THE STATUS OF THE PROGRAM.

THIS TYPEOUT IS THE SAME ONE USED IN THE EVENT OF AN ACTUAL ERROR. (SEE ERROR MESSAGE ON PG. 8.)

1. HALT THE PROGRAM
2. START AT LOC. 210. (SWR SETTINGS ARE IMMATERIAL.)

THE TYPEOUT WILL BE MADE AND THE PROGRAM WILL HALT. THE PROGRAM CAN NOW BE RESTARTED. (SEE OPERATION, PG. 3.)

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;KG11A CYCLIC REDUNDANCY CHECK DEVICE TEST.
;COPYRIGHT 1976,1977 DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754.
;PROGRAM OBSOLETES MD-11-D8K
;RELEASED 21 MAY 76 BY SAM CARPENTER
;SUPPORTS THE SOFTWARE SWITCH REGISTER LOC.176
;ALSO SUPPORTS THE DYNAMIC LOADING OF LOC. 176
;REVISED TO MEET ALL ACT11 SPEC.S; REV. B RELEASED FEB. 1977

;TRAP CATCHER (LOC. 0 TO LOC. 776)*****

```
000030      .REPT 30  
             .+2  
             HALT           ;TRAPPED TO PREVIOUS ADDRESS.  
             .ENDR  
  
000030      .REPT 30  
             .+2  
             HALT           ;TRAPPED TO PREVIOUS ADDRESS.  
             .ENDR  
  
000030      .REPT 30  
             .+2  
             HALT           ;TRAPPED TO PREVIOUS ADDRESS.  
             .ENDR  
  
000030      .REPT 30  
             .+2  
             HALT           ;TRAPPED TO PREVIOUS ADDRESS.  
             .ENDR  
  
000030      .REPT 30  
             .+2  
             HALT           ;TRAPPED TO PREVIOUS ADDRESS.  
             .ENDR  
  
000010      .REPT 10  
             .+2  
             HALT           ;TRAPPED TO PREVIOUS ADDRESS.  
             .ENDR
```

MO1

```
458  
459 000014 000014 . =14  
460 000014 004042 TRTRTN  
461 000016 000340 340  
462 000030 000030 . =30  
463 000030 003154 ERR  
464 000032 000340 340  
465 000034 000034 . =34  
466 000034 004030 SCORCD  
467 000036 000340 340  
468 000046 000046 . =46  
469 000046 002406 $ENDAD  
470 000052 000052 . =52  
471 000052 000000 000000  
472  
473 ; ; SOFTWARE SWITCH REGISTER*****  
474  
475 000176 000176 . =176  
476 000176 000000 SWREG: 0 ; SOFTWARE SWITCH REGISTER  
477  
478 ; ; PROGRAM STARTS*****  
479  
480 000200 000200 . =200  
481 000200 000167 001456 NORMAL: JMP IDENT  
482 000204 000204 . =204  
483 000204 000167 001606 SELECT: JMP INTA  
484 000210 000210 . =210  
485 000210 000167 003122 FORERR: JMP FORCER  
486
```

NO1

Address	Instruction	Operation
497		; INSTRUCTION TABLE
498	001000	. = 1000
489	001000	000402 ; LRC8 1 STEP.
490	001002	004104 SMLRCF ; LRC8 2 STEPS.
491	001004	001002 ; LRC8 3 STEPS.
492	001006	004104 SMLRCF ; LRC8 4 STEPS.
493	001010	001402 ; LRC8 5 STEPS.
494	001012	004104 SMLRCF ; LRC8 6 STEPS.
495	001014	002002 ; LRC8 7 STEPS.
496	001016	004104 SMLRCF ; LRC8 8 STEPS.
497	001020	002402 ; LRC8 9 STEPS.
498	001022	004104 SMLRCF ; LRC8 10 STEPS.
499	001024	003002 ; LRC8 11 STEPS.
500	001026	004104 SMLRCF ; LRC8 12 STEPS.
501	001030	003402 ; LRC8 13 STEPS.
502	001032	004104 SMLRCF ; LRC8 14 STEPS.
503	001034	004002 ; LRC8 15 STEPS.
504	001036	004104 SMLRCF ; LRC16 1 STEP.
505	001040	000403 ; LRC16 2 STEPS.
506	001042	004060 SMLRCC ; LRC16 3 STEPS.
507	001044	001003 ; LRC16 4 STEPS.
508	001046	004060 SMLRCC ; LRC16 5 STEPS.
509	001050	001403 ; LRC16 6 STEPS.
510	001052	004060 SMLRCC ; LRC16 7 STEPS.
511	001054	002003 ; LRC16 8 STEPS.
512	001056	004060 SMLRCC ; LRC16 9 STEPS.
513	001060	002403 ; LRC16 10 STEPS.
514	001062	004060 SMLRCC ; LRC16 11 STEPS.
515	001064	003003 ; LRC16 12 STEPS.
516	001066	004060 SMLRCC ; LRC16 13 STEPS.
517	001070	003403 ; LRC16 14 STEPS.
518	001072	004060 SMLRCC ; LRC16 15 STEPS.
519	001074	004003 ; LRC16 16 STEPS.
520	001076	004060 SMLRCC ; CRC16 1 STEP.
521	001100	000401 ; CRC16 2 STEPS.
522	001102	004214 SMC16C ; CRC16 3 STEPS.
523	001104	001001 ; CRC16 4 STEPS.
524	001106	004214 SMC16C ; CRC16 5 STEPS.
525	001110	001401 ; CRC16 6 STEPS.
526	001112	004214 SMC16C ; CRC16 7 STEPS.
527	001114	002001 ; CRC16 8 STEPS.
528	001116	004214 SMC16C ; CRC16 9 STEPS.
529	001120	002401 ; CRC16 10 STEPS.
530	001122	004214 SMC16C ; CRC16 11 STEPS.
531	001124	003001 ; CRC16 12 STEPS.
532	001126	004214 SMC16C ; CRC16 13 STEPS.
533	001130	003401 ; CRC16 14 STEPS.
534	001132	004214 SMC16C ; CRC16 15 STEPS.
535	001134	004001 ; CRC16 16 STEPS.
536	001136	004214 SMC16C ; CCITT 1 STEP.
537	001140	000405 ; CCITT 2 STEPS.
538	001142	004352 SMCITC
539	001144	001005
540	001146	004352 SMCITC

B02

541	001150	001405	I33:	001405	;CCITT 3 STEPS.
542	001152	004352		SMCITC	
543	001154	002005	I34:	002005	;CCITT 4 STEPS.
544	001156	004352		SMCITC	
545	001160	002405	I35:	002405	;CCITT 5 STEPS.
546	001162	004352		SMCITC	
547	001164	003005	I36:	003005	;CCITT 6 STEPS.
548	001166	004352		SMCITC	
549	001170	003405	I37:	003405	;CCITT 7 STEPS.
550	001172	004352		SMCITC	
551	001174	004005	I40:	004005	;CCITT 10 STEPS.
552	001176	004352		SMCITC	
553	001200	000400	I41:	000400	;CRC12 1 STEP.
554	001202	004502		SMC12B	
555	001204	001000	I42:	001000	;CRC12 2 STEPS.
556	001206	004502		SMC12B	
557	001210	001400	I43:	001400	;CRC12 3 STEPS.
558	001212	004502		SMC12B	
559	001214	002000	I44:	002000	;CRC12 4 STEPS.
560	001216	004502		SMC12B	
561	001220	002400	I45:	002400	;CRC12 5 STEPS.
562	001222	004502		SMC12B	
563	001224	003000	I46:	003000	;CRC12 6 STEPS.
564	001226	004502		SMC12B	
565	001230	000102	I47:	000102	;LRCB ONE BYTE DATA.
566	001232	004076		SMLRCE	
567	001234	000112	I50:	000112	;LRCB TWO BYTE DATA.
568	001236	004070		SMLRCD	
569	001240	000103	I51:	000103	;LRC16 ONE BYTE DATA.
570	001242	004052		SMLRCB	
571	001244	000113	I52:	000113	;LRC16 TWO BYTE DATA.
572	001246	004044		SMLRCA	
573	001250	000101	I53:	000101	;CRC16 ONE BYTE DATA.
574	001252	004206		SMC16B	
575	001254	000111	I54:	000111	;CRC16 TWO BYTE DATA.
576	001256	004200		SMC16A	
577	001260	000105	I55:	000105	;CCITT ONE BYTE DATA.
578	001262	004344		SMCITB	
579	001264	000115	I56:	000115	;CCITT TWO BYTE DATA
580	001266	004336		SMCITA	
581	001270	000100	I57:	000100	;CRC12 ONE BYTE DATA.
582	001272	004474		SMC12A	
583	001274	000102	I60:	000102	;RESERVED.
584	001276	004076		SMLRCE	
585	001300	000102	I61:	000102	;RESERVED.
586	001302	004076		SMLRCE	
587	001304	000102	I62:	000102	;RESERVED.
588	001306	004076		SMLRCE	
589	001310	000102	I63:	000102	;RESERVED.
590	001312	004076		SMLRCE	
591	001314	000102	I64:	000102	;RESERVED.
592	001316	004076		SMLRCE	
593	001320	000102	I65:	000102	;RESERVED
594	001322	004076		SMLRCE	
595					

596	001324	000102	I66:	000102	; RESERVED
597	001326	004076		SMLRCE	
598	001330	000102	I67:	000102	; RESERVED
599	001332	004076		SMLRCE	
600	001334	000102	I70:	000102	; RESERVED
601	001336	004076		SMLRCE	
602	001340	000102	I71:	000102	; RESERVED
603	001342	004076		SMLRCE	
604	001344	000102	I72:	000102	; RESERVED
605	001346	004076		SMLRCE	
606	001350	000102	I73:	000102	; RESERVED
607	001352	004076		SMLRCE	
608	001354	000102	I74:	000102	; RESERVED
609	001356	004076		SMLRCE	
610	001360	000102	I75:	000102	; RESERVED
611	001362	004076		SMLRCE	
612	001364	000102	I76:	000102	; RESERVED
613	001366	004076		SMLRCE	
614	001370	000102	I77:	000102	; RESERVED
615	001372	004076		SMLRCE	
616					

			: DATA WORD TABLE
617			
618			
619	001374	000001	001: 000001
620	001376	000002	002: 000002
621	001400	000004	003: 000004
622	001402	000010	004: 000010
623	001404	000020	005: 000020
624	001406	000040	006: 000040
625	001410	000100	007: 000100
626	001412	000200	010: 000200
627	001414	000400	011: 000400
628	001416	001000	012: 001000
629	001420	002000	013: 002000
630	001422	004000	014: 004000
631	001424	010000	015: 010000
632	001426	020000	016: 020000
633	001430	040000	017: 040000
634	001432	100000	020: 100000
635	001434	177776	021: 177776
636	001436	177775	022: 177775
637	001440	177773	023: 177773
638	001442	177767	024: 177767
639	001444	177757	025: 177757
640	001446	177737	026: 177737
641	001450	177677	027: 177677
642	001452	177577	030: 177577
643	001454	177377	031: 177377
644	001456	176777	032: 176777
645	001460	175777	033: 175777
646	001462	173777	034: 173777
647	001464	167777	035: 167777
648	001466	157777	036: 157777
649	001470	137777	037: 137777
650	001472	077777	040: 077777

651 001474 052525
652 001476 125252
653 001500 031463
654 001502 146314
655 001504 070707
656 001506 107070
657 001510 007417
658 001512 170360
659 001514 041045
660 001516 136732
661 001520 154321
662 001522 023456
663 001524 133333
664 001526 044444
665 001530 000000
666 001532 177777
667 001534 000000
668 001536 111111
669 001540 022222
670 001542 133333
671 001544 044444
672 001546 155555
673 001550 066666
674 001552 177777
675 001554 101010
676 001556 111111
677 001560 121212
678 001562 131313
679 001564 141414
680 001566 151515
681 001570 161616

D41: 052525
D42: 125252
D43: 031463
D44: 146314
D45: 070707
D46: 107070
D47: 007417
D50: 170360
D51: 041045
D52: 136732
D53: 154321
D54: 023456
D55: 133333
D56: 044444
D57: 000000
D60: 177777
D61: 000000
D62: 111111
D63: 022222
D64: 133333
D65: 044444
D66: 155555
D67: 066666
D70: 177777
D71: 101010
D72: 111111
D73: 121212
D74: 131313
D75: 141414
D76: 151515
D77: 161616

;;EQUATES, CONSTANTS AND VARIABLES

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682
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684
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686 000000
687 000001
688 000002
689 000003
690 000004
691 000005
692 000006
693 000007
694 000007
695 001572 177570
696 177776
697 104400
698 104000
699 000240
700 177560
701 177562
702 177564
703 177566
704 001000
705 001270
706 001374
707 001570
708 001574 170700
709 001576 000000
710 001600 000000
711 001602 000000
712 001604 000000
713 001606 000000
714 001610 000000
715 001612 000000
716 001614 000000
717 001616 000100
718 001620 000000
719 001622 000000
720 001624 000000
721 001626 000000
722 001630 000000
723 001632 000000
724 001634 000000
725 001636 000000
726 001640 000000
727 001642 000000
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729 001646 000000
730 001650 000000
731 001652 000000
732 001654 000000
733 001656 000000
734 001660 000000

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R0=%0
R1=%1
R2=%2
R3=%3
R4=%4
R5=%5
SP=%6
PC=%7
R7=PC
SWR: 177570
PS=177776
SCOPE=TRAP
HLT=EMT
NOP=240
TKCSR= 177560
TKDBR= 177562
TPCSR= 177564
TPDBR= 177566
INTBEG=I01
INTEND=I57
DATABEG=D01
DATEND=D77
DEVADR: 170700
DFLG: 0
DFLGA: 0
EFLG: 0
HBCC: 0
HDONE: 0
IFLG: 0
IFLGA: 0
ITACNT: 0
ITANO: 100
OPSTAT: 0
OTACNT: 0
OTAWKA: 0
OTAWKB: 0
SELFLG: 0
SCORTN: 0
SMBCC: 0
SMBCCA: 0
SMCNT: 0
SMDATA: 0
SMDONE: 0
SMWKA: 0
SMWKB: 0
STCNT: 0
TEWK: 0
FTITLE: 0
PASCNT: 0

```

```

;WORK
;INSTRUCTION POINTER.
;DATA POINTER.
;DEVICE ADDRESS POINTER (BCC).
;WORK
;SUBROUTINES.
;STACK POINTER
;PC
;SWITCH REGISTER.
;PROCESSOR STATUS
;TTY KEYBOARD STATUS
;TTY KEYBOARD BUFFER
;PRINTER STATUS
;PRINTER BUFFER

```

;TITLE PRINTED = 1

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735
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738 001662 000005          IDENT:  RESET
739 001664 012706 001000  MOV      #1000,SP          ;SET SP TO 1000.
740 001670 023737 000042 000046  CMP      @#42,@#46      ;IN ACT11 AUTOMATIC MODE?
741 001676 001444          BEQ      INIT           ;YES, SKIP TITLE
742 001700 005767 177752  TST     FTITLE         ;HAS TITLE BEEN PRINTED BEFORE?
743 001704 001041          BNE     INIT           ;YES, SKIP TITLE
744 001706 004567 001746  JSR     R5,TYPE        ;TYPE THE PROG. NAME.
745 001712 077536 043513 030461  .ASCII  /↑/⟨177⟩/KG11A - CYCLIC REDUNDANCY CHECK TEST, MC-11-DZKGA-B/⟨177⟩/↑+/
746 001720 020101 020055 054503
747 001726 046103 041511 051040
748 001734 042105 047125 040504
749 001742 041516 020131 044103
750 001750 041505 020113 0.2524
751 001756 052123 020054 042115
752 001764 030455 026461 055104
753 001772 043513 026501 077502
754 002000 057536
755
756 002002 012767 000001 177646  .EVEN
757 002010 005067 177614  INIT:  MOV      #1,FTITLE  ;SET FLAG
758 002014 000402          CLR     SELFLG        ;CLEAR SELFLG (START WAS FROM LOC. 200.)
759 002016 005267 177606  BR      INTB          ;BRANCH.
760 002022 000005          INTA:  INC     SELFLG  ;SET SELFLG (START WAS FROM LOC. 204.)
761 002024 005067 177552  INTB:  RESET
762 002030 012706 001000  CLR     EFLG
763 002034 023737 000042 000046  MOV     #1000,SP
764 002042 001402          CMP     @#42,@#46      ;ARE WE IN ACT11 AUTOMATIC MODE?
765 002044 004767 002600  BEQ     +6            ;YES, NEVER MIND ABOUT SWR
766 002050 016703 177520  JSR     PC,SUSWR      ;CHECK FOR HARDWARE SWITCH REGISTER
767 002054 005723          MOV     DEVADR,R3     ;R3 ← DEVICE ADDRESS.
768 002056 004567 000012  TST    (R3)+          ;ADJUST R3 TO POINT AT BCC.
769 002062 005767 177542  JSR     R5,OPCHG      ;READ SWR & SET UP PROG. ACCORDINGLY.
770 002066 001434          TST    SELFLG        ;WAS START FROM LOC. 200?
771 002070 000167 000324  BEQ     FULMOD        ;YES - BRANCH.
772
773
774 002074 017767 177472 177516  OPCHG: MOV     @SWR,OPSTAT ;STORE SWR.
775 002102 052767 000020 175666  BIS     #20,PS        ;SET "T" BIT IN PS.
776 002110 032767 010000 177502  BIT     #10000,OPSTAT ;INHIBIT TRACE TRAP?
777 002116 001403          BEQ     OPCA         ;NO. - BRANCH
778 002120 042767 000020 175650  BIC     #20,PS        ;YES. - CLEAR "T" BIT IN PS.
779 002126 005767 177476  OPCA:  TST     SELFLG  ;SELECT MODE (START WAS FROM 202)?
780 002132 001011          BNE     OPCB         ;YES. - BRANCH.
781 002134 016767 177456 177452  MOV     ITANO,ITACNT  ;NO. - SET ITERATE CNT. TO ITERATE NO.
782 002142 032767 004000 177450  BIT     #4000,OPSTAT  ;INHIBIT ITERATIONS?
783 002150 001402          BEQ     OPCB         ;NO. - BRANCH.
784 002152 005067 177436  CLR     ITACNT        ;YES. - CLEAR ITERATE COUNTER
785 002156 000205          OPCB:  RTS     R5      ;RETURN.

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002160 012701 001000
002164 012702 001374
002170 116167 000001 177442
002176 004767 002542
002202 005067 177426
002206 052767 000200 177430
002214 004571 000002
002220 105761 000001
002224 001413
002226 031127 004000
002232 001005
002234 021167 176764
002240 001402
002242 005067 177376
002246 004567 000476
002252 000402
002254 004567 000606
002260 027767 177306 177332
002266 001403
002270 004567 177600
002274 000731
002276 032767 004000 177314
002304 001011
002306 005767 177346
002312 001406
002314 005367 177274
002320 001337
002322 016767 177270 177284
002330 020227 001570
002334 001403
002336 062702 000002
002342 000712
002344 020127 001270
002350 001403
002352 062701 000004
002356 000702
002360 004567 001274
002364 025007
002366 005015
002370 057400
002372 005267 177262
002376 013700 000042
002402 001405
002404 000005
002406 004710
002410 000240
002412 000240
002414 000240
002416 000660

; FULL TEST MODE. CONTROL THE TESTING OF ALL KG11 INSTRUCTIONS
; IN THE INSTRUCTION TABLE USING ALL DATA WORDS IN THE DATA
; WORD TABLE WITH EACH INSTRUCTION.

FULMOD: MOV #INTBEG,R1
FULA: MOV #DATABEG,R2
FULB: MOV8 +1(R1),SMCNT
JSR PC,CKSWR
CLR SMBC
BIS #200,SMDONE
JSR R5,2+2(R1)
FULC: TSTB +1(R1)
BEQ FULE
BIT (R1),#4000
BNE FULD
CMP (R1),I46
BEQ FULD
CLR SMDONE
FULD: JSR R5,TESTA
BR FULF
FULF: JSR R5,TESTB
CMP 2SWR,OPSTAT
BEQ FULG
JSR R5,OPCHG
BR FULMOD
FULG: BIT #4000,OPSTAT
BNE FULH
TST PASCNT
BEQ FULH
DEC ITACNT
BNE FULC
FULH: MOV ITANO,ITACNT
CMP R2,#DATEND
BEQ FULI
ADD #2,R2
BR FULB
FULI: CMP R1,#INTEND
BEQ FULJ
ADD #4,R1
BR FULA
FULJ: JSR R5,TYPE
025007
005015
057400
INC PASCNT
MOV #42,R0
BEQ RETURN
SENDAD: JSR 7,(R0)
NOP
NOP
RETURN: BR FULMOD

; INST. POINTER (R1) SET TO BEGIN OF INST. TABLE.
; DATA POINTER (R2) SET TO BEGIN OF DATA TABLE.
; STEP COUNT (IF ANY) SET FOR SIMULATE.
; CHECK FOR CNTL G TO LOAD SWR
; SIMULATED BCC SET TO 0.
; SET THE SIMULATED DONE BIT.
; SIMULATE INST. (VIA R1) ON DATA (VIA R2).
; IS THE INST. A STEP TYPE?
NO - BRANCH.
YES. - IS THE INST. I10,I20,I30, OR I40?
YES. - BRANCH.
NO. - IS THE INST. I46?
YES. - BRANCH.
NO. - CLEAR THE SIMULATED DONE BIT.
DO TEST A (STEP INST. TEST).
BRANCH.
NO. - DO TEST B (NON-STEP INST. TEST).
HAS OPERATION STATUS STATUS (SWR) CHANGED?
NO. - BRANCH.
YES. - GO SET UP NEW OPERATION STATUS.
BRANCH.
NO. - ITERATE?
NO. - BRANCH
FIRST PASS?
YES, SKIP ITERATIONS THIS TIME
YES. - DECREMENT ITERATE COUNTER. IS IT=0?
NO. - BRANCH. (KEEP ITERATING).
YES. - SET ITERATE CTR. TO ITERATE NUMBER.
HAVE ALL DATA WORDS BEEN TESTED?
YES - BRANCH.
NO. - ADVANCE DATA POINTER (R2).
BRANCH.
HAVE ALL INSTS. BEEN TESTED?
YES. - BRANCH.
NO. - ADVANCE INST. POINTER (R1).
BRANCH.
YES. PASS COMPLETE. RING TTY BELL AND PRINT '*'.

; INCREMENT PASS COUNT SO SUBSEQUENT
; PASSES WILL ITERATE

; START TEST OVER

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002420 012701 001000
002424 016767 177170 177156
002432 042767 177700 177150
002440 016767 177144 177144
002446 001412
002450 000241
002452 006167 177132
002456 006167 177126
002462 162767 000004 177120
002470 066701 177114
002474 012702 001374
002500 016767 177114 177070
002506 042767 170077 177062
002514 016767 177056 177056
002522 001420
002524 000241
002526 006067 177044
002532 006067 177040
002536 006067 177034
002542 006067 177030
002546 006067 177024
002552 162767 000002 177016
002560 066702 177012
002564 004767 002154
002570 116167 000001 177042
002576 005067 177032
002602 052767 000200 177034
002610 004571 000002
002614 105761 000001
002620 001413
002622 031127 004000
002626 001005
002630 021167 176370
002634 001402
002636 005067 177002
002642 004567 000102
002646 000402
002650 004567 000212
002654 026777 176740 176710
002662 001403
002664 004567 177204
002670 000653
002672 005767 176702
002676 001010
002700 020227 001570
002704 001403
002706 062702 000002
002712 000724
002714 012702 001374
002720 005767 176666
002724 001317
002726 020127 001270

;SELECT TEST MODE. CONTROL THE TESTING OF THE INSTRUCTION SELECTED
;ON SWRS-0 (00=ALL INSTS.) USING THE DATA WORD SELECTED ON SWR11-6.
SELMOD: MOV #INTBEG,R1 ;INST. POINTER (R1) SET TO THE INST.
MOV OPSTAT,IFLG ;SELECTED ON SR BITS 5-0.
BIC #177700,IFLG
MOV IFLG,IFLGA
BEQ SELA
CLC
ROL IFLG
ROL IFLG
SUB #4,IFLG
ADD IFLG,R1
SELA: MOV #DATBEG,R2 ;DATA POINTER (R2) SET TO THE DATA
MOV OPSTAT,DFLG ;WORD SELECTED ON SR BITS 11-6
BIC #170077,DFLG
MOV DFLG,DFLGA
BEQ SELB
CLC
ROR DFLG
ROR DFLG
ROR DFLG
ROR DFLG
ROR DFLG
SUB #2,DFLG
ADD DFLG,R2
SELB: JSR PC,CKSWR ;CHECK FOR CNTL G TO LOAD SWREG
MOVB +1(R1),SMCNT ;STEP COUNT (IF ANY) SET FOR SIMULATE.
CLR SMBCC ;SIMULATED BCC SET TO 0.
BIS #200,SMDONE ;SET THE SIMULATED DONE BIT.
JSR R5,#+2(R1) ;SIMULATE INST. (VIA R1) ON DATA (VIA R2).
TSTB +1(R1) ;IS THE INST. A STEP TYPE?
BEQ SELD ;NO. - BRANCH.
BIT (R1),#4000 ;YES. - IS THE INST. I10,I20,I30, OR I40?
BNE SELC ;YES. - BRANCH.
CMP (R1),I46 ;NO. - IS THE INST. I46?
BEQ SELC ;YES. - BRANCH.
CLR SMDONE ;NO. - CLEAR THE SIMULATED DONE BIT.
SELC: JSR R5,TESTA ;DO TEST A (STEP INST TEST).
BR SELE ;BRANCH.
SELD: JSR R5,TESTB ;NO - DO TEST B (NON-STEP INST. TEST).
SELE: CMP OPSTAT,JSWR ;HAS OPERATION STATUS (SWR SETTINGS) CHANGED?
BEQ SELF ;NO. - BRANCH.
JSR R5,OPCHG ;YES. - GO SET UP NEW OPEATION STATUS.
BR SELMOD ;BRANCH.
SELF: TST DFLGA ;IS DATA FLAGA NON-ZERO?
BNE SELH ;YES. - DATA POINTER (R2) IS FROZEN. - BRANCH.
CMP R2,#DATEND ;NO. - HAVE ALL DATA WORDS BEEN TESTED?
BEQ SELG ;YES. - BRANCH.
ADD #2,R2 ;NO. - ADVANCE DATA POINTER (R2).
BR SELB ;BRANCH.
SELG: MOV #DATBEG,R2 ;DATA POINTER (R2) SET TO BEGIN OF DATA TABLE.
SELH: TST IFLGA ;IS INST. FLAGA NON-ZERO?
BNE SELB ;YES. - INST. POINTER (R1) IS FROZEN (BRANCH).
CMP R1,#INTEND ;NO. - HAVE ALL INSTS. BEEN TESTED?

898	002732	001403	
899	002734	062701	000004
900	002740	000711	
901	002742	012701	001000
902	002746	000706	
903			

SELI:

BEG	SELI
ADD	#4,R1
BR	SELB
MOV	#INTBEG,R1
BR	SELB

;YES. - BRANCH.
 ;NO. - ADVANCE INST. POINTER (R1).
 ;BRANCH.
 ;INST. POINTER (R1) SET TO BEGIN OF INST. TABLE.
 ;BRANCH.

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002750 104400
002752 116167 000001 176672
002760 012763 000020 177776
002766 111163 177776
002772 011263 000002
002776 052763 000040 177776
003004 000240
003006 016367 177776 176572
003014 011367 176564
003020 005367 176626
003024 001364
003026 042767 177577 176552
003034 026767 176546 176602
003042 001004
003044 026767 176534 176562
003052 001401
003054 104000
003056 005767 176520
003062 001374
003064 000205

:TEST A.
:TEST THE INSTRUCTION POINTED AT BY R1 USING THE DATA WORD
:POINTED AT BY R2. (HIGH BYTE OF THE INST. WORD IS THE STEP COUNT
:& LOW BYTE IS THE ACTUAL INST.) THE FINAL RESULT IS STORED
:INTO LOC. "HBCC" TO BE COMPARED WITH THE SIMULATED RESULT
:WHICH HAS BEEN STORED IN LOC. "SMBCC".

TESTA: SCOPE ;GO RECORD ENTRY TO THIS TEST.
MOV #1(R1),STCNT ;SET UP STEP COUNT.
MOV #20,-2(R3) ;CLEAR THE BCC & THE DONE BIT.
MOV (R1),-2(R3) ;MOVE INST. TO CSR.
MOV (R2),+2(R3) ;MOVE DATA TO DSR.
TAA: BIS #40,-2(R3) ;STEP (SHIFT) ONE.
NOP ;PAUSE.
MOV -2(R3),HDONE ;READ & STORE CSR (DONE BIT)
MOV (R3),HBCC ;READ & STORE BCC.
DEC STCNT ;IS STEP COUNT = 0?
BNE TAA ;NO - BRANCH.
BIC #177577,HDONE ;YES. - CLEAR ALL BUT THE DONE BIT.
CMP HDONE,SMDONE ;HARDWARE DONE BIT = SIMULATED DONE BIT?
BNE TAB ;NO. - BRANCH. (ERROR)
CMP HBCC,SMBCC ;YES. - HARDWARE BCC = SIMULATED BCC?
BEQ TAC ;YES. - BRANCH.
TAB: HLT ;NO. - TRAP TO ERROR HANDLER.
TAC: TST EFLG ;IS AN ERROR SCOPE LOOP RUNNING?
BNE TAB ;YES. - BRANCH.
RTS R5 ;NO. - RETURN.


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939 003066 104400
940 003070 012763 000020 177776
941 003076 011163 177776
942 003102 011263 000002
943 003106 000240
944 003110 016367 177776 176470
945 003116 011367 176462
946 003122 032767 000200 176456
947 003130 001404
948 003132 026767 176446 176474
949 003140 001401
950 003142 104000
951 003144 005767 176432
952 003150 001374
953 003152 000205

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;TEST B.
;TEST THE INSTRUCTION POINTED AT BY R1 USING THE DATA WORD
;POINTED AT BY R2. THE RESULT IS STORED IN LOC. "HBCC" TO BE
;COMPARED WITH THE SIMULATED RESULT WHICH HAS BEEN STORED
;IN LOC. "SMBCC".

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TESTB: SCOPE
MOV #20,-2(R3) ;GO RECORD ENTRY TO THIS TEST.
MOV (R1),-2(R3) ;CLEAR THE BCC.
MOV (R2),+2(R3) ;MOVE INST. TO CSR.
NOP ;MOVE DATA TO DBR (COMPUTE BCC).
MOV -2(R3),HDONE ;PAUSE.
MOV (R3),HBCC ;READ & STORE CSR (DONE BIT)
BIT #200,HDONE ;READ & STORE BCC.
BEQ TBA ;IS DONE BIT = 1?
CMP HBCC,SMBCC ;NO. - BRANCH. (ERROR)
BEQ TBB ;HARDWARE BCC = SIMULATED BCC?
HLT ;YES. - BRANCH.
TST EFLG ;NO. - TRAP TO ERROR HANDLER.
BNE TBA ;IS AN ERROR SCOPE LOOP RUNNING.
RTS R5 ;YES. - BRANCH.
;NO. - RETURN.

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954
955 ;TRAP SERVICE ROUTINE (CALLED BY PSUEDO-OP HLT)
956 ;ERROR HANDLER. - TYPEOUTS - HALT - SCOPE LOOP.
957
958 003154 004767 001564 ERR: JSR PC,CKSWR ;CHECK FOR CNTL G TO LOAD SWREG
959 003160 005767 176416 TST EFLG ;FIRST ERR CALL FOR CURRENT TEST?
960 003164 001003 BNE ERA ;NO. - BRANCH.
961 003166 005267 176410 INC EFLG ;YES. - SET ERR FLAG.
962 003172 000404 BR ERH ;BRANCH. (UNCONDITIONAL TYPE OUT).
963 003174 032767 020000 176416 ERA: BIT #20000,OPSTAT ;INHIBIT TYPE OUT?
964 003202 001002 BNE ERC ;YES. - BRANCH.
965 003204 004567 000140 ERB: JSR R5,TYPERR ;NO. - TYPE ERR MESSAGE.
966 003210 023737 000042 000046 ERC: CMP @#42,@#46 ;ARE WE IN ACT11 AUTOMATIC MODE?
967 003216 001404 BEQ .+12 ;YES. HALT ON ERROR
968 003220 032777 100000 176344 BIT #100000,@SWR ;HALT ON ERR?
969 003226 001401 BEQ ERD ;NO. - BRANCH.
970 003230 000000 HALT ;YES. - HALT HERE AND WAIT FOR OPERATOR.
971 003232 004767 001506 ERD: JSR PC,CKSWR ;CHECK FOR CNTL G TO LOAD SWREG
972 003236 027767 176330 176354 CMP @SWR,OPSTAT ;HAS OPERATION STATUS (SWR) CHANGED?
973 003244 001402 BEQ ERE ;NO. - BRANCH.
974 003246 004567 176622 JSR R5,OPCHG ;YES - GO SET UP NEW OPERATION STATUS.
975 003252 032767 040000 176340 ERE: BIT #40000,CPSTAT ;SCOPE LOOP?
976 003260 001403 BEQ ERF ;NO. - BRANCH.
977 003262 022626 CMP (SP)+,(SP)+ ;YES. - POP STACK
978 003264 000177 JMP @SCORTN ;RETURN (SCOPE LOOP).
979 003270 005067 176306 ERF: CLR EFLG ;CLEAR ERR FLAG.
980 003274 005767 176330 TST SELFLG ;SELECT MODE?
981 003300 001001 BNE ERG ;YES. - BRANCH.
982 003302 000002 RTI ;NO. - RETURN (CONTINUE TESTING).
983 003304 032777 000077 176260 ERG: BIT #77,@SWR ;SWR5-0 = 0?
984 003312 001410 BEQ ERH ;YES. - BRANCH.
985 003314 032777 007700 176250 BIT #7700,@SWR ;NO. - SWR6-11 = 0?
986 003322 001404 BEQ ERH ;YES. - BRANCH.
987 003324 062706 000006 ADD #6,SP ;NO. - POP STACK.
988 003330 000167 177064 JMP SELMOD ;RESTART AT SELMOD.
989 003334 000002 ERH: RTI ;RETURN (CONTINUE TESTING).
990
991
992
993 00333E 000005 FORCER: RESET ;FORCE AN ERROR-TYPE TYPEOUT
994 003340 004567 000004 JSR R5,TYPERR ;WHENEVER STARTED FROM LOC.210.
995 003344 000000 FEA: HALT ;THEN HALT.
996 003346 000776 BR FEA
997
  
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998
999 ;SUBROUTINE - SET UP AND TYPE THE ERROR MESSAGE THAT STARTS AT EMA.
1000
1001 003350 105761 000001 TYPERR: TSTB +1(R1)
1002 002354 001404 BEQ TEA
1003 003356 012767 020101 000214 MOV #20101,EMC
1004 003364 000403 BR TEB
1005 003366 012767 020102 000204 TEA: MOV #20102,EMC
1006 003374 010167 176254 TEB: MOV R1,TEWK
1007 003400 162767 000774 176246 SUB #INTBEG-4,TEWK
1008 003406 006067 176242 ROR TEWK
1009 003412 006067 176236 ROR TEWK
1010 003416 042767 177700 176230 BIC #177700,TEWK
1011 003424 004567 000306 JSR R5,OTA
1012 003430 001654 TEWK
1013 003432 003606 EMF
1014 003434 000002 2
1015 003436 010267 176212 MOV R2,TEWK
1016 003442 162767 001372 176204 SUB #DATABEG-2,TEWK
1017 003450 006067 176200 ROR TEWK
1018 003454 042767 177700 176172 BIC #177700,TEWK
1019 003462 004567 000250 JSR R5,OTA
1020 003466 001654 TEWK
1021 003470 003613 EMH+1
1022 003472 000002 2
1023 003474 004567 000236 JSR R5,OTA
1024 003500 001634 SMBCC
1025 003502 003624 EMM
1026 003504 000006 6
1027 003506 004567 000224 JSR R5,OTA
1028 003512 001604 HBCC
1029 003514 003635 EMQ+1
1030 003516 000006 6
1031 003520 112767 000061 000123 MOVB #61,EMX+1
1032 003526 032767 000200 176110 BIT #200,SMDONE
1033 003534 001003 BNE TEC
1034 003536 112767 000060 000105 MOVB #60,EMX+1
1035 003544 112767 000061 000101 TEC: MOVB #61,EMY+1
1036 003552 032767 000200 176026 BIT #200,HDONE
1037 003560 001003 BNE TED
1038 003562 112767 000060 000063 MOVB #60,EMY+1
1039 003570 004567 000064 TED: JSR R5,TYPE
1040 003574 042524 EMA: .ASCII /TE/
1041 003576 052123 EMB: .ASCII /ST/
1042 003600 020077 EMC: .ASCII /? /
1043 003602 044440 EMD: .ASCII / I /
1044 003604 037477 EME: .ASCII /?? /
1045 003606 020040 EMF: .ASCII / /
1046 003610 037504 EMG: .ASCII /D? /

```

1047	003612	020077
1048	003614	051440
1049	003616	037477
1050	003620	037477
1051	003622	037477
1052	003624	020040
1053	003626	037510
1054	003630	037477
1055	003632	037477
1056	003634	020077
1057	003636	042040
1058	003640	047117
1059	003642	020105
1060	003644	044502
1061	003646	035124
1062	003650	037440
1063	003652	037534
1064	003654	057536
1065	003656	000205

EMH:	.ASCII	/ ? /
EMI:	.ASCII	/ S /
EMJ:	.ASCII	/ ?? /
EMK:	.ASCII	/ ?? /
EML:	.ASCII	/ ?? /
EMM:	.ASCII	/ / /
EMN:	.ASCII	/ H ? /
EMO:	.ASCII	/ ?? /
EMP:	.ASCII	/ ?? /
EMQ:	.ASCII	/ ? /
EMR:	.ASCII	/ D /
EMS:	.ASCII	/ ON /
EMU:	.ASCII	/ E /
EMV:	.ASCII	/ BI /
EMW:	.ASCII	/ T : /
EMX:	.ASCII	/ ? /
EMY:	.ASCII	/ ^ ? /
EMZ:	.ASCII	/ ! + /
RTS		RS

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1066
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1071 003660 105767 173700
1072 003664 100375
1073 003666 121527 000136
1074 003672 001005
1075 003674 105725
1076 003676 004567 177756
1077 003702 005015
1078 003704 000137
1079 003706 121527 000137
1080 003712 001403
1081 003714 112567 173646
1082 003720 000757
1083 003722 105725
1084 003724 032705 000001
1085 003730 001401
1086 003732 005205
1087 003734 000205

```

```

:SUBROUTINE - TYPE ON THE TTY THE MESSAGE IMMEDIATELY FOLLOWING
:THE CALL TO THIS SUBROUTINE. UP-ARROW (^) CAUSES A CRLF AND BACK-ARROW
:(+) CAUSES TERMINATION OF TYPEOUT. RETURN WILL BE TO THE INSTRUCTION
:FOLLOWING THE MESSAGE.
TYPE:  TSTB  TPCSR
      BPL   TYPE
      CMPB  (RS),#136
      BNE   TPA
      TSTB  (RS)+
      JSR   RS,TYPE
      005015
      000137
TPA:   CMPB  (RS),#137
      BEQ   TPB
      MOVB  (RS)+,TPDBR
      BR    TYPE
TPB:   TSTB  (RS)+
      BIT   #1,RS
      BEQ   TPC
      INC  RS
TPC:   RTS   RS

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1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113

003736 013567 175662
003742 012504
003744 012567 175652
003750 016767 175650 175650
003756 000241
003760 006067 175640
003764 000241
003766 006067 175632
003772 000241
003774 006067 175624
004000 042767 177770 175620
004006 052767 000060 175612
004014 116744 175606
004020 005367 175576
004024 001351
004026 000205

:SUBROUTINE - OCTAL TO ALPHA CONVERSION ACCORDING TO THE THREE WORDS
:IMMEDIATELY FOLLOWING THE CALL TO THIS SUBROUTINE. THE FIRST WORD POINTS
:AT THE WORD TO BE CONVERTED. THE SECOND WORD POINTS AT THE STARTING
:LOC. WHERE THE RESULT IS TO BE MOVED. THE THIRD WORD IS THE NUMBER
:OF CHARACTERS TO BE CONVERTED AND MOVED. RETURN WILL BE TO THE
:INSTRUCTION FOLLOWING THESE THREE WORDS.

OTA: MOV 2(R5)+,OTAWKA
MOV (R5)+,R4
MOV (R5)+,OTACNT
OTALA: MOV OTAWKA,OTAWKB
CLC
ROR OTAWKA
CLC
ROR OTAWKA
CLC
ROR OTAWKA
BIC #177770,OTAWKB
BIS #60,OTAWKB
MOVB OTAWKB,-(R4)
DEC OTACNT
BNE OTALA
RTS R5

```

1114
1115 ;TRAP SERVICE ROUTINE - SCOPE = TRAP.
1116
1117 004030 011667 175576 SCORCD: MOV (SP), SCORTN ;SAVE THE STARTING LOC. OF TESTA OR TESTB.
1118 004034 004767 000704 JSR PC, CKSWR ;CHECK FOR CNTL G TO LOAD SWREG
1119 004040 000002 RTI ;RETURN.
1120
1121 ;TRAP SERVICE ROUTINE - "T" BIT SET =TRAP.
1122
1123 004042 000002 TRTRTN: RTI ;GOOD BOY, NOW RETURN.
1124

```

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1125      :SUBROUTINE - SIMULATE ALL MODES OF LRC
1126 004044 012767 000010 175556 SMLRCA: MOV #10,SMCNT ;ENTRY LRC16 DOUBLE BYTE DATA.
1127 004052 062767 000010 175560 SMLRCB: ADD #10,SMCNT ;ENTRY LRC16 SINGLE BYTE DATA.
1128 004060 042767 100000 000070 SMLRCC: BIC #100000,SMLRCJ ;ENTRY STEP LRC16.
1129 004066 000411 BR SMLRCG
1130 004070 012767 000010 175542 SMLRCD: MOV #10,SMCNT ;ENTRY LRC8 DOUBLE BYTE DATA.
1131 004076 062767 000010 175534 SMLRCE: ADD #10,SMCNT ;ENTRY LRC8 SINGLE BYTE DATA.
1132 004104 052767 100000 000044 SMLRCF: BIS #100000,SMLRCJ ;ENTRY STEP LRC8.
1133 004112 005767 175522 SMLRCG: TST SMCNT
1134 004116 001002 BNE SMLRCH
1135 004120 005267 175514 INC SMCNT
1136 004124 016767 175504 175504 SMLRCH: MOV SMBCC,SMBCCA
1137 004132 011267 175504 MOV (R2),SMDATA
1138 004136 016767 175472 175502 SMLRCI: MOV SMBCC,SMWKA
1139 004144 066767 175472 175474 ADD SMDATA,SMWKA
1140 004152 006067 175470 ROR SMWKA
1141 004156 006067 175452 SMLRCJ: ROR SMBCC ;INSTR. MODIFIED: LRC16=ROR LRC8=FORB.
1142 004162 000241 CLC
1143 004164 006067 175452 ROR SMDATA
1144 004170 005367 175444 DEC SMCNT
1145 004174 001360 BNE SMLRCI
1146 004176 000205 RTS
1147

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```

1148
1149
1150 ;SUBROUTINE - SIMULATE ALL MODES OF CRC16.
1151
1152 004200 012767 000010 175432 SMC16A: MOV #10, SMCNT ;ENTRY CRC16 DOUBLE BYTE DATA.
1153 004206 062767 000010 175424 SMC16B: ADD #10, SMCNT ;ENTRY CRC16 SINGLE BYTE DATA.
1154 004214 005767 175420 SMC16C: TST SMCNT ;ENTRY STEP CRC16.
1155 004220 001002 BNE SMC16D
1156 004222 005267 175412 INC SMCNT
1157 004226 016767 175402 175402 SMC16D: MOV SMBCC, SMBCCA
1158 004234 011267 175402 MOV (R2), SMDATA
1159 004240 016767 175370 175400 SMC16E: MOV SMBCC, SMWKA
1160 004246 066767 175370 175372 ADD SMDATA, SMWKA
1161 004254 000241 CLC
1162 004256 006067 175352 ROR SMBCC
1163 004262 000241 CLC
1164 004264 006067 175352 ROR SMDATA
1165 004270 006067 175352 ROR SMWKA
1166 004274 103014 BCC SMC16F
1167 004276 012767 120001 175342 MOV #120001, SMWKA
1168 004304 046767 175324 175334 BIC SMBCC, SMWKA
1169 004312 042767 120001 175314 BIC #120001, SMBCC
1170 004320 066767 175322 175306 ADD SMWKA, SMBCC
1171 004326 005367 175306 SMC16F: DEC SMCNT
1172 004332 001342 BNE SMC16E
1173 004334 000205 RTS R5
1174
1175 ;SUBROUTINE - SIMULATE ALL MODES OF CCITT.
1176
1177 004336 012767 000010 175274 SMCITA: MOV #10, SMCNT ;ENTRY CCITT DOUBLE BYTE DATA.
1178 004344 062767 000010 175266 SMCITB: ADD #10, SMCNT ;ENTRY CCITT SINGLE BYTE DATA.
1179 004352 005767 175262 SMCITC: TST SMCNT ;ENTRY STEP CCITT.
1180 004356 001002 BNE SMCITD
1181 004360 005267 175254 INC SMCNT
1182 004364 016767 175244 175244 SMCITD: MOV SMBCC, SMBCCA
1183 004372 011267 175244 MOV (R2), SMDATA
1184 004376 016767 175232 175242 SMCITE: MOV SMBCC, SMWKA
1185 004404 066767 175232 175234 ADD SMDATA, SMWKA
1186 004412 000241 CLC
1187 004414 006067 175214 ROR SMBCC
1188 004420 000241 CLC
1189 004422 006067 175214 ROR SMDATA
1190 004426 006067 175214 ROR SMWKA
1191 004432 103014 BCC SMCITF
1192 004434 012767 102010 175204 MOV #102010, SMWKA
1193 004442 046767 175166 175176 BIC SMBCC, SMWKA
1194 004450 042767 102010 175156 BIC #102010, SMBCC
1195 004456 066767 175164 175150 ADD SMWKA, SMBCC
1196 004464 005367 175150 SMCITF: DEC SMCNT
1197 004470 001342 BNE SMCITE
1198 004472 000205 RTS R5
1199
1200 ;SUBROUTINE - SIMULATE ALL MODES OF CRC12.
1201
1202 004474 012767 000006 175136 SMC12A: MOV #6, SMCNT ;ENTRY CRC12 SINGLE BYTE DATA.
1203 004502 005767 175132 SMC12B: TST SMCNT ;ENTRY STEP CRC12.

```

1204	004506	001002				BNE	SMC12C
1205	004510	005267	175124			INC	SMCNT
1206	004514	016767	175114	175114	SMC12C:	MOV	SMBCC, SMBCCA
1207	004522	011267	175114			MOV	(R2), SMDATA
1208	004526	016767	175102	175112	SMC12D:	MOV	SMBCC, SMWKA
1209	004534	066767	175102	175104		ADD	SMDATA, SMWKA
1210	004542	106367	175066			ASLB	SMBCC
1211	004546	106367	175062			ASLB	SMBCC
1212	004552	006067	175056			ROR	SMBCC
1213	004556	106067	175052			RORB	SMBCC
1214	004562	106067	175046			RORB	SMBCC
1215	004566	042767	160000	175040		BIC	#160000, SMBCC
1216	004574	006067	175046			ROR	SMWKA
1217	004600	103014				BCC	SMC12E
1218	004602	012767	036001	175036		MOV	#36001, SMWKA
1219	004610	046767	175020	175030		BIC	SMBCC, SMWKA
1220	004616	042767	036001	175010		BIC	#36001, SMBCC
1221	004624	066767	175016	175002		ADD	SMWKA, SMBCC
1222	004632	000241			SMC12E:	CLC	
1223	004634	006067	175002			ROR	SMDATA
1224	004640	005367	174774			DEC	SMCNT
1225	004644	001330				BNE	SMC12D
1226	004646	000205				RTS	R5

```

1227
1228
1229
1230      ; SWITCH REGISTER SIZING ROUTINE
1231 004650 013746 000006      SUSWR: MOV    @#6, -(SP)      ; SAVE VECTORS
1232 004654 013746 000004      MOV    @#4, -(SP)
1233 004660 012737 004700 000004  MOV    #64, @#4      ; SET UP FOR TIMEOUT
1234 004666 022777 177777 174676  CMP    #-1, @SWR     ; REFERENCE HARDWARE SWITCH REGISTER
1235 004674 001402      BEQ    65$
1236 004676 000404      BR     66$
1237 004700 022626      64$:  CMP    (SP)+, (SP)+  ; ADJUST STACK
1238 004702 012767 000176 174662 65$:  MOV    #SWREG, SWR   ; POINT TO SOFTWARE SWITCH REG
1239 004710 012637 000004      66$:  MOV    (SP)+, @#4    ; RESTORE VECTORS
1240 004714 012637 000006      MOV    (SP)+, @#6
1241 004720 022767 000176 174644  CMP    #SWREG, SWR   ; IS SWREG USED
1242 004726 001002      BNE    67$
1243 004730 004767 000070      JSR    PC, CNTLU     ; ALLOW SWREG TO BE LOADED
1244 004734 000207      67$:  RTS    PC
1245
1246
1247      ; CHECK SWITCH REGISTER ROUTINE. CHECKS FOR +G TO ALLOW CHANGING
1248      ; OF LOC.176.
1249      ; LOCATIONS USED:
1250 004736 000000      TEMPST: .WORD 0
1251 004740 000000      COUNT:  .WORD 0
1252 004742 000000      TIB:    .WORD 0
1253
1254
1255 004744 022767 000176 174620  CKSWR: CMP    #SWREG, SWR   ; SOFTWARE SWITCH REGISTER PRESENT
1256 004752 001143      BNE    OUT           ; NO GET OUT
1257 004754 105767 172600      TSTB  TKCSR         ; YES, WAIT FOR
1258 004760 100140      BPL    OUT           ; READY, GET CHARACTER
1259 004762 016767 172574 177752  MOV    TKDBR, TIB    ; AND STRIP OFF
1260 004770 042767 177600 177744  BIC    #177600, TIB  ; THE GARBAGE
1261 004776 022767 000007 177736  CMP    #7, TIB      ; IS IT ^ (+G)
1262 005004 001126      BNE    OUT
1263 005006 004567 176646      JSR    RS, TYPE     ; TYPE CNTL G
1264 005012 041536 052116 020114  .ASCII /+CNTL G+//
1265 005020 057107      137
1266      .EVEN
1267 005024 004567 176706      CNTLU: JSR    RS, OTA      ; MOVE CONTENTS
1268 005030 000176      SWREG  ; OF SWREG TO BE
1269 005032 005055      MSWREG ; TYPED FOLLOWING
1270 005034 000006      6      ; THE MESSAGE SWR=
1271 005036 004567 176616      JSR    RS, TYPE     ; TYPE THE COMPLETE MESSAGE
1272
1273 005042 051536 051127 075  MSWR:  .ASCII /+SWR=/      ; SWR=
1274 005047 077 037477 037477  .ASCII /?????/?/    ; XXXXXX
1275 005054 077
1276 005055 040 020040 020040  MSWREG: .ASCII / /
1277 005062 040
1278 005063 040 042516 036527  MNEW:  .ASCII / NEW= +/    ; NEW=
1279 005070 057440
1280
1281      .EVEN
    
```

1282	005072	005067	177640		\$READ:	CLR	TEMPST	
1283	005076	012767	000007	177634		MOV	#7,COUNT	
1284	005104	004767	000154		1\$:	JSR	PC,TTIN	;GO READ A CHARACTER
1285	005110	042767	177600	177624		BIC	#177600,TIB	;STRIP OFF GARBAGE
1286	005116	122767	000025	177616		CMPB	#25,TIB	;IS IT A ↑U?
1287	005124	001001				BNE	2\$;BRANCH IF NOT
1288	005126	000736			3\$:	BR	CNTLU	;START OVER
1289	005130	122767	000015	177604	2\$:	CMPB	#15,TIB	;IS IT A <CR>?
1290	005136	001010				BNE	4\$;BRANCH IF NOT
1291	005140	004567	176514			JSR	R5,TYPE	;TYPE LF,CR
1292	005144	057536				.ASCII	/↑+//	
1293	005146	022767	000007	177564		CMP	#7,COUNT	;WAS IT FIRST CHARACTER
1294	005154	001036				BNE	7\$;CHANGE SWR IF NOT FIRST ONE
1295	005156	000441			8\$:	BR	OUT	;GET OUT
1296	005160	122767	000060	177554	4\$:	CMPB	#60,TIB	
1297	005166	003004				BGT	5\$	
1298	005170	122767	000067	177544		CMPB	#67,TIB	
1299	005176	002005				BGE	6\$	
1300	005200	004567	176454		5\$:	JSR	R5,TYPE	
1301	005204	037536	057536			.ASCII	/↑↑↑+//	
1302	005210	000746				BR	3\$;START OVER IF NOT LEGAL CHARACTER
1303	005212	006367	177520		6\$:	ASL	TEMPST	
1304	005216	006367	177514			ASL	TEMPST	
1305	005222	006367	177510			ASL	TEMPST	
1306	005226	142767	000060	177506		BICB	#60,TIB	;GET NITTY-GRITTY
1307	005234	156767	177502	177474		BISB	TIB,TEMPST	
1308	005242	005367	177472			DEC	COUNT	;ONLY WANT 6 DIGITS
1309	005246	001754				BEQ	5\$	
1310	005250	000715				BR	1\$	
1311	005252	016777	177460	174312	7\$:	MOV	TEMPST,JSWR	;CHANGE SWITCH REGISTER CONTENTS
1312	005260	000736				BR	8\$	
1313	005262	000207			OUT:	RTS	PC	;RETURN TO PROGRAM

```

1314
1315
1316
1317 005264 005067 172270
1318 005270 005067 172266
1319 005274 005067 177442
1320 005300 005267 172254
1321 005304 105767 172250
1322 005310 100375
1323 005312 016767 172244 177422
1324 005320 105767 172240
1325 005324 100375
1326 005326 116767 177410 172232
1327 005334 000207
1328
1329 000001

```

```

;TTY INPUT SUBROUTINE*****
TTIN: CLR TKCSR
      CLR TKOBR
      CLR TIB
      INC TKCSR
TTIN1: TSTB TKCSR
      BPL TTIN1
      MOV TKOBR,TIB
TTIN2: TSTB TPCSR
      BPL TTIN2
      MOVB TIB,TPOBR
      RTS PC
.END

```

CKSWR	004744	D56	001526	FEA	003344	I32	001144	PASCNT	001660
CNTLU	005024	D57	001530	FORCER	003336	I33	001150	PS =	177776
COJNT	004740	D60	001532	FORERR	000210	I34	001154	RETURN	00241E
DATBEG=	001374	D61	001534	FTITLE	001656	I35	001160	R7 =	%000007
DATEND=	001570	D62	001536	FULA	002164	I36	001164	SCOPE =	104400
DEVADR	001574	D63	001540	FULB	002170	I37	001170	SCORCD	004030
DFLG	001576	D64	001542	FULC	002220	I40	001174	SCORTN	001632
DFLGA	001600	D65	001544	FULD	002246	I41	001200	SELA	002474
D01	001374	D66	001546	FULE	002254	I42	001204	SELB	002564
D02	001376	D67	001550	FULF	002260	I43	001210	SELC	002642
D03	001400	D70	001552	FULG	002276	I44	001214	SELD	002650
D04	001402	D71	001554	FULH	002330	I45	001220	SELE	002654
D05	001404	D72	001556	FULI	002344	I46	001224	SELECT	000204
D06	001406	D73	001560	FULJ	002360	I47	001230	SELF	002672
D07	001410	D74	001562	FULMOD	002160	I50	001234	SELFLG	001630
D10	001412	D75	001564	HBCC	001604	I51	001240	SELG	002714
D11	001414	D76	001566	HDONE	001606	I52	001244	SELH	002720
D12	001416	D77	001570	HLT =	104000	I53	001250	SELI	002742
D13	001420	EFLG	001602	IDENT	001662	I54	001254	SELMOD	002420
D14	001422	EMA	003574	IFLG	001610	I55	001260	SMBCC	001634
D15	001424	EMB	003576	IFLGA	001612	I56	001264	SMBCCA	001636
D16	001426	EMC	003600	INIT	002010	I57	001270	SMCITA	004336
D17	001430	EMD	003602	INTA	002016	I60	001274	SMCITB	004344
D20	001432	EME	003604	INTB	002022	I61	001300	SMCITC	004352
D21	001434	EMF	003606	INTBEG=	001000	I62	001304	SMCITD	004364
D22	001436	EMG	003610	INTEND=	001270	I63	001310	SMCITE	004376
D23	001440	EMH	003612	ITACNT	001614	I64	001314	SMCITF	004464
D24	001442	EMI	003614	ITANO	001616	I65	001320	SMCNT	001640
D25	001444	EMJ	003616	I01	001000	I66	001324	SMC12A	004474
D26	001446	EMK	003620	I02	001004	I67	001330	SMC12B	004502
D27	001450	EML	003622	I03	001010	I70	001334	SMC12C	004514
D30	001452	EMM	003624	I04	001014	I71	001340	SMC12D	004526
D31	001454	EMN	003626	I05	001020	I72	001344	SMC12E	004632
D32	001456	EMO	003630	I06	001024	I73	001350	SMC16A	004200
D33	001460	EMP	003632	I07	001030	I74	001354	SMC16B	004206
D34	001462	EMQ	003634	I10	001034	I75	001360	SMC16C	004214
D35	001464	EMR	003636	I11	001040	I76	001364	SMC16D	004226
D36	001466	EMS	003640	I12	001044	I77	001370	SMC16E	004240
D37	001470	EMU	003642	I13	001050	MNEW	005063	SMC16F	004326
D40	001472	EMV	003644	I14	001054	MSWR	005042	SMDATA	001642
D41	001474	EMW	003646	I15	001060	MSWREG	005055	SMDONE	001644
D42	001476	EMX	003650	I16	001064	NOP =	000240	SMLRCA	004044
D43	001500	EMY	003652	I17	001070	NORMAL	000200	SMLRCB	004052
D44	001502	ERZ	003654	I20	001074	OPCA	002126	SMLRCC	004060
D45	001504	ERA	003174	I21	001100	OPCB	002156	SMLRCD	004070
D46	001506	ERB	003204	I22	001104	OPCHG	002074	SMLRCE	004076
D47	001510	ERC	003210	I23	001110	OPSTAT	001620	SMLRCF	004104
D50	001512	ERD	003232	I24	001114	OTA	003736	SMLRCG	004112
D51	001514	ERE	003252	I25	001120	OTACNT	001622	SMLRCH	004124
D52	001516	ERF	003270	I26	001124	OTALA	003750	SMLRCI	004136
D53	001520	ERG	003304	I27	001130	OTAWKA	001624	SMLRCJ	004156
D54	001522	ERH	003334	I30	001134	OTAWKB	001626	SMWKA	001646
D55	001524	ERR	003154	I31	001140	OUT	005262	SMWKB	001650

STCNT	001652	TBA	003142	TESTA	002750	TPB	003722	TTIN2	005320
SUSWR	004650	TBB	003144	TESTB	003066	TPC	003734	TYPE	002660
SWR	001572	TEA	003366	TEWK	001654	TPCSR =	177564	TYPERR	003350
SWREG	000176	TEB	003374	TIB	004742	TPDBR =	177566	\$ENDAD	002406
*AA	002776	TEC	003544	TKCSR =	177560	TRTRTN	004042	\$READ	005072
*AB	003054	TED	003570	TKDBR =	177562	TTIN	005264	.	= 005336
*AC	003056	TEMPST	004736	TPA	003706	TTIN1	005304		

. ABS. 005336 000

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

DSKZ:DZKGA.B, DSKZ:DZKGA.B/SOL=DSKZ:DZKGA.B.P11
RUN-TIME: 4 9 1 SECONDS
RUN-TIME RATIO: 145/14=10.0
CORE USED: 5K (9 PAGES)