

TEST

TEST 3 UNARY & BINARY
MD-11-DOC-A

EP-DOC-A-DL-A
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digital
MADE IN U.S.A.

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DOAA TO DOLA-D
 PRODUCT NAME: FIRST LEVEL 1-12
 DATE CREATED: 17 MARCH 1970
 MAINTAINER: DIAGNOSTIC GROUP
 AUTHOR: JOHN MITTELL

THIS GROUP OF TESTS CONSIST OF:

PROCESSOR TEST	MAINDEC
TEST 1	BRANCH 11-DCAA
2	CON BRANCH 11-DOBA
3	UNARY 11-DOCA
4	UNARY AND BINARYS 11-DODA
5	ROTATE/SHIFT 11-DOEA
6	COMPARE 11-DOFA
7	COMPARE NOT 11-DOGA
8	MOVE 11-DOHA
9	BIS,BIC AND BIT 11-DOIA
10	ADD 11-DOJA
11	SUBTRACT 11-DOKA
12	JMP 11-DOLA

11-DCAA
11-DOBA
11-DOCA
11-DODA
11-DOEA
11-DOFA
11-DOGA
11-DOHA
11-DOIA
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1. ABSTRACT

THIS IS A GROUP OF 12 TESTS THAT INCREMENTALLY TEST AND ISOLATE SIMPLE MALFUNCTIONS OF THE PDP 11. THE TESTS SHOULD BE RUN IN THE INDICATED NUMERICAL SEQUENCE. THE SEQUENCE IS 1. BRANCH 2. CONDITIONAL BRANCH 3. UNARY 4. UNARY AND BINARYS 5. ROTATE/SHIFT 6. COMPARE (EQUALITY) 7. COMPARE (NON EQUALITY) 8. MOVE 9. BIT SET, CLEAR AND TEST 10. ADD 11. SUBTRACT 12. JUMP

THERE IS A SECOND GROUP OF TESTS FOR MORE COMPLEX MALFUNCTIONS.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11/20 STANDARD COMPUTER

2.2 STORAGE

2.2.1 PROGRAM STORAGE - THE PROGRAMS USE ALL OF A 4KW MEMORY WITH THE EXCEPTION OF 17500 TO 17776 (WHICH IS RESERVED FOR THE BOOT AND ABSOLUTE LOADER).

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTING

ALL PROGRAMS START AT ADDRESS 200.

4.2 STARTING ADDRESS OR ADDRESSES

(A) 200 = START AND RESTART ADDRESS

4.3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY. (BOTTOM 4K)
SET SWITCH REGISTER TO STARTING ADDRESS. (200)
LOAD ADDRESS.
PRESS START.
THE PROGRAM WILL LOOP, AND RING A BELL AFTER A FIXED NUMBER OF ITERATIONS.

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5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

5.1.1 NO SWITCHES ARE USED

5.1.3

5.2 SUBROUTINE ABSTRACTS

5.2.1 BEGIN SA 200

5.2.2 SCOPE

IS A "NOP" THAT IS PLACED BETWEEN EACH SUBTEST
IN THE INSTRUCTION SECTION. IF A SCOPE LOOP IS NEEDED,
INSERT A BRANCH TO THE PREVIOUS SCOPE LOCATION
AT THE CURRENT SCOPE LOCATION. (NOTE NOP=240)

5.2.3 HLT

INDICATES THE UNIQUE ADDRESS THAT TAGS THE
FAILING SUBTEST. THE INCORRECT DATA AT THE
TIME OF THE FAILURE MAY OR MAY NOT BE
DISPLAYED IN REGISTER ZERO, WHICH IS THE DATA
REGISTER ON A HALT.

5.3 PROGRAM AND/OR OPERATOR ACTION

5.3.1 LOADING AND STARTING AT 200 STARTS THE TEST. IF
AN ERROR IS DETECTED, THERE WILL BE A HALT.
WHEN A HALT OCCURS AND IT IS NECESSARY TO SCOPE ON
IT, PLACE INSERT A BRANCH INSTRUCTION IN THE
SCOPE LOCATION FOLLOWING THE HALT. THE BRANCH
INSTRUCTION SHOULD BRANCH YOU TO THE PREVIOUS
SCOPE LOCATION.

6. ERRORS

6.1 ALL ERRORS WILL CAUSE A HALT.

6.2 ERROR RECOVERY

ON TRAP ERRORS - RESTART AT 200.
DEPRESS CONTINUE TO CONTINUE TEST

7. RESTRICTIONS

7.1 STARTING RESTRICTION

NONE

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7.2 OPERATIONAL RESTRICTION
NONE

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8. MISCELLANEOUS

IF A HALT OCCURES IN THE TRAP OR INTERRUPT VECTOR AREA, REGISTER SIX SHOULD BE EXAMINED TO DETERMINE ITS CONTENTS, THEN USE REGISTER SIX CONTENTS AS AN ADDRESS TO DETERMINE THE LOCATION THE PROGRAM WAS AT, WHEN THE INTERRUPT OR TRAP OCCURRED. (MEMORY AS SPECIFIED BY R6 CONTAINS THE PC OF THE INSTRUCTION FOLLOWING THE INSTRUCTION WHERE THE TRAP OCCURED)

8.1 EXECUTION TIME

TIME BETWEEN BELLS

FOR TAPE 1	5	MINUTES
FOR TAPE 2	2.5	MINUTES
FOR TAPE 3	3	MINUTES
FOR TAPE 4	6	MINUTES
FOR TAPE 5	5	MINUTES
FOR TAPE 6	6	MINUTES
FOR TAPE 7	5	MINUTES
FOR TAPE 8	6	MINUTES
FOR TAPE 9	3	MINUTES
FOR TAPE 10	4	MINUTES
FOR TAPE 11	2	MINUTES
FOR TAPE 12	4	MINUTES

9. PROGRAM DESCRIPTION

- TEST 1 THIS IS A TEST OF THE UNCONDITIONAL BRANCH INSTRUCTION, IT PROVES THAT A LONG PROGRAM CAN BE LOADED AND THE INSTRUCTIONS CAN BE EXECUTED THROUGHOUT MEMORY.
- TEST 2 THIS IS A CONDITIONAL BRANCH TEST USING ALL OF THE CONDITIONAL BRANCH INSTRUCTIONS. IT TESTS THAT ALL COMBINATIONS OF CONDITION CODES ARE RESPONDED TO CORRECTLY. (THE CONDITION CODES ARE MANIPULATED WITH THE MICRO-PROGRAM OPERATIONS.)
- TEST 3 THIS IS A TEST OF THE UNARY INSTRUCTIONS AND THEIR EFFECTS UPON THE CONDITION CODES ONLY. MOSTLY REGISTER OPERATIONS.
- TEST 4 THIS IS A COMBINED USE OF UNARY AND BINARY INSTRUCTIONS TESTING THE RESULTS AND THE CONDITION CODES.
- TEST 5 THIS TEST ROTATE AND SHIFT INSTRUCTION, BOTH THE REGISTERS AND MEMORY LOCATIONS, WORD AND BYTE, ARE TESTED.
- TEST 6 THIS IS A TEST OF THE COMPARE INSTRUCTIONS FOR

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EQUALITY. ALL CONDITIONAL BRANCHES THAT WILL
BRANCH ON ANY FORM OF EQUALITY ARE ALSO TESTED.
BOTH WORD AND BYTE OPERATIONS ARE USED.

(9 CONT'D)

TEST 7 COMPARE NOT. THIS IS A TEST OF THE COMPARE INSTRUCTIONS WHERE NO VALUES ARE EQUAL. HERE BRANCHES FOR NOT EQUAL, GREATER THAN AND LESS THAN, ETC., ARE TESTED.

TEST 8 CHECKS THE MOVE INSTRUCTION BOTH TO MEMORY AND REGISTERS.

TEST 9 CHECK THE BIS, BIC AND BIT INSTRUCTION BOTH TO MEMORY AND TO REGISTERS.

TEST 10 TESTS THE ADD INSTRUCTION.

TEST 11 TESTS THE SUBTRACT INSTRUCTION.

TEST 12 TEST OF THE JUMP INSTRUCTION IN MOST MODES.

NOTE THAT STACK OPERATION AND INSTRUCTIONS THAT USE THEM ARE NOT TESTED IN THIS GROUP OF TEST.

- 10. LISTING
- 11. FLOW CHART(S)

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295          :START OF TEST
296 000200   BEGIN:
297
298          ;BASIC TEST FOR REGISTER %D
299
300          ;TEST "CLR"
301          SCOPE
302          SCC
303          CLR      %D          ;SHOULD SET Z
304          BEQ      .+4        ;Z NOT SET
305          HLT
306
307          ;TEST "COM"
308          SCOPE
309          SCC
310          CLR      %D          ;000000
311          COM      %D          ;17777, N SHOULD BE SET
312          BMI      .+4        ;"N" NOT SET
313          HLT
314
315          ;TEST "INC"
316          SCOPE
317          SCC
318          CLR      %D          ;CLEAR
319          COM      %D          ;COMPLIMENT
320          INC      %D          ;ALL ONES TO ZERO, AT Z
321          BEQ      .+4        ;BRANCH ON Z
322          HLT          ;Z NOT SET
323
324          ;TEST "DEC"
325          SCOPE
326          SCC
327          CLR      %D          ;CLEAR
328          DEC      %D          ;ZERO MINUS 1=17777
329          BMI      .+4        ;N NOT SET
330          HLT
331
332          ;TEST "NEG"
333          SCOPE
334          SCC
335          CLR      %D          ;000000
336          NEG      %D          ;000000
337          BEQ      .+4        ;Z NOT SET
338          HLT          ;Z NOT SET
339
340          ;TEST "NEG"
341          SCOPE
342          SCC
343          CLR      %D          ;000000
344          INC      %D          ;000001
345          NEG      %D          ;177777
346          BMI      .+4        ;N NOT SET
347          HLT
348
349          ;TEST ADC
350          SCOPE
351          CLR      %D          ;CARRY=1
352          SEC
353          SET C
354          ADC      %D          ;000001
355          BNE      .+4
356          HLT          ;Z NOT CLEARED

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351 ;TEST "ADC"
352 000326 000240 SCOPE
353 000330 000257 CCC ; CARRY=0
354 000332 005000 CLR %0 ; 000000
355 000334 005500 ADC %0 ; ADD-CARRY=C00000
356 000336 001401 BEQ .+4 ; Z NOT SET
357 000340 000000 HLT ; Z NOT SET
358 ;TEST "SBC"
359 000342 000240 SCOPE
360 ; CARRY=1
361 000344 005000 CLR %0 ; 000000
362 000346 000261 SEC ; SET C
363 000350 005600 SBC %0 ; 000000-1=177777
364 000352 100401 BMI .+4
365 000354 000000 HLT ; N NOT SET
366 ;TEST TST
367 000356 000240 SCOPE
368 000360 005000 CLR %0 ; 000000
369 000362 000277 SCC ; SET CODES
370 000364 005700 TST %0 ; N=0, Z=1
371 000366 100001 BPL .+4
372 000370 000000 HLT ; N WAS NOT CLEARED
373 000372 000240 SCOPE
374 ;BASIC TEST FOR REGISTER %D
375
376 ;TEST "CLFB"
377 000374 000240 SCOPE
378 000376 000277 SCC
379 000400 105000 CLRB %0 ; SHOULD SET Z
380 000402 001401 BEQ .+4 ; Z NOT SET
381 000404 000000 HLT
382 ;TEST "COMB"
383 000406 000240 SCOPE
384 000410 000277 SCC
385 000412 105000 CLRB %0 ; 000000
386 000414 105100 COMB %0 ; 17777 N SHOULD BE SET
387 000416 100401 BMI .+4 ; "N" NOT SET
388 000420 000000 HLT
389 ;TEST "INCB"
390 000422 000240 SCOPE
391 000424 000277 SCC
392 000426 105000 CLRB %0 ; CLEAR
393 000430 105100 COMB %0 ; COMPLEMENT
394 000432 105200 INCB %0 ; ALL ONES TO ZERO, AT Z
395 000434 001401 BEQ .+4 ; BRANCH ON Z
396 000436 000000 HLT ; Z NOT SET
397 ;TEST "DECB"
398 000440 000240 SCOPE
399 000442 000277 SCC
400 000444 105000 CLRB %0 ; CLEAR
401 000446 105300 DECB %0 ; ZERO MINUS 1=17777
402 000450 100401 BMI .+4
403 000452 000000 HLT ; N NOT SET
404 ;TEST "NEGB"
405 000454 000240 SCOPE
406 000456 000277 SCC

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407 000460 105000          CLRB      %0          ;000000
408 000462 105400          NEGB      %0          ;000000
409 000464 001401          BEQ       .+4         ;Z NOT SET
410 000466 000000          HLT
411                          ;TEST "NEGB"
412 000470 000240          SCOPE
413 000472 000277          SCC
414 000474 105000          CLRB      %0          ;000000
415 000476 105200          INCB      %0          ;000001
416 000500 105400          NEGB      %0          ;177777
417 000502 100401          BMI      .+4
418 000504 000000          HLT
419                          ;TEST ADCB
420 000506 000240          SCOPE
421                          ;CARRY=1
422 000510 105000          CLRB      %0          ;000000
423 000512 000261          SEC
424 000514 105500          ADCB      %0          ;SET C
425 000516 001001          BNE      .+4         ;000001
426 000520 000000          HLT
427                          ;TEST "ADCB"
428 000522 000240          SCOPE
429 000524 000257          CCC
430 000526 105000          CLRB      %0          ;CARRY=0
431 000530 105500          ADCB      %0          ;000000
432 000532 001401          BEQ       .+4         ;ADD-CARRY=000000
433 000534 000000          HLT
434                          ;TEST "SBCB"
435 000536 000240          SCOPE
436                          ;CARRY=1
437 000540 105000          CLRB      %0          ;000000
438 000542 000261          SEC
439 000544 105600          SBCB      %0          ;SET C
440 000546 100401          BMI      .+4         ;000000-1=177777
441 000550 000000          HLT
442                          ;TEST TSTB
443 000552 000240          SCOPE
444 000554 105000          CLRB      %0          ;000000
445 000556 000277          SCC
446 000560 105700          TSTB      %0          ;SET CODES
447 000562 100001          BPL      .+4         ;N=0, Z=1
448 000564 000000          HLT
449 000566 000240          SCOPE
450
451
452                          ;BASIC TEST FOR REGISTER %1
453
454                          ;TEST "CLR"
455 000570 000240          SCOPE
456 000572 000277          SCC
457 000574 005001          CLR       %1
458 000576 001401          BEQ       .+4         ;SHOULD SET Z
459 000600 000000          HLT
460                          ;TEST "COM"
461 000602 000240          SCOPE
462 000604 000277          SCC

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463	000606	005001	CLR	%1	:000000
464	000610	005101	COM	%1	:17777 N SHOULD BE SET
465	000612	100401	BMI	.+4	: "N" NOT SET
466	000614	000000	HLT		
467			;TEST "INC"		
468	000616	000240	SCOPE		
469	000620	000277	SCC		
470	000622	005001	CLR	%1	:CLEAR
471	000624	005101	COM	%1	:COMPLIMENT
472	000626	005201	INC	%1	:ALL ONES TO ZERO, AT Z
473	000630	001401	BEQ	.+4	:BRANCH ON Z
474	000632	000000	HLT		:Z NOT SET
475			;TEST "DEC"		
476	000634	000240	SCOPE		
477	000636	000277	SCC		
478	000640	005001	CLR	%1	:CLEAR
479	000642	005301	DEC	%1	:ZERO MINUS 1=17777
480	000644	100401	BMI	.+4	
481	000646	000000	HLT		:N NOT SET
482			;TEST "NEG"		
483	000650	000240	SCOPE		
484	000652	000277	SCC		
485	000654	005001	CLR	%1	:000000
486	000656	005401	NEG	%1	:000000
487	000660	001401	BEQ	.+4	:Z NOT SET
488	000662	000000	HLT		:Z NOT SET
489			;TEST "NEG"		
490	000664	000240	SCOPE		
491	000666	000277	SCC		
492	000670	005001	CLR	%1	:000000
493	000672	005201	INC	%1	:000001
494	000674	005401	NEG	%1	:177777
495	000676	100401	BMI	.+4	
496	000700	000000	HLT		:N NOT SET
497			;TEST ADC		
498	000702	000240	SCOPE		
499					:CARRY=1
500	000704	005001	CLR	%1	:000000
501	000706	000261	SEC		:SET C
502	000710	005501	ADC	%1	:000001
503	000712	001001	BNE	.+4	
504	000714	000000	HLT		:Z NOT CLEARED
505			;TEST "ADC"		
506	000716	000240	SCOPE		
507	000720	000257	CCC		:CARRY=0
508	000722	005001	CLR	%1	:000000
509	000724	005501	ADC	%1	:ADD-CARRY=000000
510	000726	001401	BEQ	.+4	:Z NOT SET
511	000730	000000	HLT		:Z NOT SET
512			;TEST "SBC"		
513	000732	000240	SCOPE		
514					:CARRY=1
515	000734	005001	CLR	%1	:000000
516	000736	000261	SEC		:SET C
517	000740	005601	SBC	%1	:000000-1=177777
518	000742	100401	BMI	.+4	

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519 000744 000000          HLT          ;N NOT SET
520          ;TEST TST
521 000746 000240          SCOPE
522 000750 005001          CLR          %1          ;000000
523 000752 000277          SCC          ;SET CODES
524 000754 005701          TST          %1          ;N=0,Z=1
525 000756 100001          BPL          .+4
526 000760 000000          HLT
527 000762 000240          SCOPE          ;N WAS NOT CLEARED
528          ;BASIC TEST FOR REGISTER %1
529
530          ;TEST "CLRB"
531 000764 000240          SCOPE
532 000766 000277          SCC
533 000770 105001          CLRB          %1          ;SHOULD SET Z
534 000772 001401          BEQ          .+4          ;Z NOT SET
535 000774 000000          HLT
536          ;TEST "COMB"
537 000776 000240          SCOPE
538 001000 000277          SCC
539 001002 105001          CLRB          %1          ;000000
540 001004 105101          COMB          %1          ;17777,N SHOULD BE SET
541 001006 100401          BMI          .+4          ;"N" NOT SET
542 001010 000000          HLT
543          ;TEST "INCB"
544 001012 000240          SCOPE
545 001014 000277          SCC
546 001016 105001          CLRB          %1          ;CLEAR
547 001020 105101          COMB          %1          ;COMPLIMENT
548 001022 105201          INCB          %1          ;ALL ONES TO ZERO, AT Z
549 001024 001401          BEQ          .+4          ;BRANCH ON Z
550 001026 000000          HLT          ;Z NOT SET
551          ;TEST "DECB"
552 001030 000240          SCOPE
553 001032 000277          SCC
554 001034 105001          CLRB          %1          ;CLEAR
555 001036 105301          DECB          %1          ;ZERO MINUS 1=17777
556 001040 100401          BMI          .+4
557 001042 000000          HLT          ;N NOT SET
558          ;TEST "NEGB"
559 001044 000240          SCOPE
560 001046 000277          SCC
561 001050 105001          CLRB          %1          ;000000
562 001052 105401          NEGB          %1          ;000000
563 001054 001401          BEQ          .+4          ;Z NOT SET
564 001056 000000          HLT          ;Z NOT SET
565          ;TEST "NEGB"
566 001060 000240          SCOPE
567 001062 000277          SCC
568 001064 105001          CLRB          %1          ;000000
569 001066 105201          INCB          %1          ;000001
570 001070 105401          NEGB          %1          ;177777
571 001072 100401          BMI          .+4
572 001074 000000          HLT          ;N NOT SET
573          ;TEST AOCB
574 001076 000240          SCOPE

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575                                     ;CARRY=1
576 001108 105001          CLRB      %1          ;000000
577 001108 000261          SEC          ;SET C
578 001104 105501          ADCB      %1          ;000001
579 001106 001001          BNE          .+4
580 001110 000000          HLT          ;Z NOT CLEARED
581                                     ;TEST "ADCB"
582 001112 000240          SCOPE
583 001114 000257          CCC
584 001116 105001          CLRB      %1          ;CARRY=0
585 001120 105501          ADCB      %1          ;000000
586 001122 001401          BEQ          .+4          ;ADD-CARRY=000000
587 001124 000000          HLT          ;Z NOT SET
588                                     ;TEST "SBCB"
589 001126 000240          SCOPE
590
591 001130 105001          CLRB      %1          ;CARRY=1
592 001132 000261          SEC          ;00000
593 001134 105601          SBCB      %1          ;SET C
594 001136 100401          BMI          .+4          ;000000-1=177777
595 001140 000000          HLT          ;N NOT SET
596                                     ;TEST TSTB
597 001142 000240          SCOPE
598 001144 105001          CLRB      %1          ;000000
599 001146 000277          SCC          ;SET CODES
600 001150 105701          TSTB      %1          ;N=0,Z=1
601 001152 100001          BPL          .+4
602 001154 000000          HLT          ;N WAS NOT CLEARED
603 001156 000240          SCOPE
604
605
606                                     ;BASIC TEST FOR REGISTER %2
607
608                                     ;TEST "CLR"
609 001160 000240          SCOPE
610 001162 000277          SCC
611 001164 005002          CLR          %2          ;SHOULD SET Z
612 001166 001401          BEQ          .+4          ;Z NOT SET
613 001170 000000          HLT
614                                     ;TEST "COM"
615 001172 000240          SCOPE
616 001174 000277          SCC
617 001176 005002          CLR          %2          ;000000
618 001200 005102          COM          %2          ;17777,N SHOULD BE SET
619 001202 100401          BMI          .+4          ;"N" NOT SET
620 001204 000000          HLT
621                                     ;TEST "INC"
622 001206 000240          SCOPE
623 001210 000277          SCC
624 001212 005002          CLR          %3          ;CLEAR
625 001214 005102          COM          %1          ;COMPLIMENT
626 001216 005202          INC          %2          ;ALL ONES TO ZERO, AT Z
627 001220 001401          BEQ          .+4          ;BRANCH ON Z
628 001222 000000          HLT          ;Z NOT SET
629 001224 000240          SCOPE
  
```



```

631 001276 000277      SCC
632 001278 005002      CLR      %2      ;CLEAR
633 001278 005302      DEC      %2      ;ZERO MINUS 1=17777
634 001278 100401      BMI      .+4
635 001278 000000      HLT
;TEST "NEG"
636 001278 000000      HLT      ;N NOT SET
637 001278 000240      SCOPE
638 001278 000277      SCC
639 001278 005002      CLR      %2      ;000000
640 001278 005402      NEG      %2      ;000000
641 001278 001401      BEQ      .+4      ;Z NOT SET
642 001278 000000      HLT      ;Z NOT SET
;TEST "NEG"
643 001278 000000      HLT
644 001278 000240      SCOPE
645 001278 000277      SCC
646 001278 005002      CLR      %2      ;000000
647 001278 005202      INC      %2      ;000001
648 001278 005402      NEG      %2      ;177777
649 001278 100401      BMI      .+4
650 001278 000000      HLT
;TEST AOC
651 001278 000000      HLT      ;N NOT SET
652 001272 000240      SCOPE
653 001272 000240      SCOPE
654 001274 005002      CLR      %2      ;CARRY=1
655 001276 001261      SEC      %2      ;000000
656 001300 005502      RDC      %2      ;SET C
657 001302 001001      BNE      .+4      ;000001
658 001304 000000      HLT
;TEST "AOC"
659 001304 000000      HLT      ;Z NOT CLEARED
660 001306 000240      SCOPE
661 001310 001257      CCC
662 001312 005002      CLR      %2      ;CARRY=0
663 001314 005502      RDC      %2      ;000000
664 001316 001401      BEQ      .+4      ;ADD-CARRY=000000
665 001320 000000      HLT      ;Z NOT SET
666 001320 000000      HLT      ;Z NOT SET
;TEST "SBC"
667 001322 000240      SCOPE
668 001322 000240      SCOPE
669 001324 005002      CLR      %2      ;CARRY=1
670 001326 000261      SEC      %2      ;000000
671 001330 005602      SBC      %2      ;SET C
672 001332 100401      BMI      .+4      ;000000-1=177777
673 001334 000000      HLT
;TEST TST
674 001334 000000      HLT      ;N NOT SET
675 001336 000240      SCOPE
676 001340 005002      CLR      %2      ;000000
677 001342 000277      SCC
678 001344 005702      TST      %2      ;SET CODES
679 001346 100001      BPL      .+4      ;N=0,Z=1
680 001350 000000      HLT
681 001352 000240      SCOPE      ;N WAS NOT CLEARED
682 001352 000240      SCOPE      ;BASIC TEST FOR REGISTER %2
683 001352 000240      SCOPE
;TEST "CLRB"
684 001352 000240      SCOPE
685 001354 000240      SCC
686 001356 000277      SCC

```

687	001360	105002	CLRB	%2	: SHOULD SET Z
688	001362	001401	BEQ	.+4	: Z NOT SET
689	001364	000000	HLT		
690			; TEST "COMB"		
691	001366	000240	SCOPE		
692	001370	000277	SCC		
693	001372	105002	CLRB	%2	: 000000
694	001374	105102	COMB	%2	: 17777 N SHOULD BE SET
695	001376	100401	BMI	.+4	: "N" NOT SET
696	001400	000000	HLT		
697			; TEST "INCB"		
698	001402	000240	SCOPE		
699	001404	000277	SCC		
700	001406	105002	CLRB	%2	: CLEAR
701	001410	105102	COMB	%2	: COMPLEMENT
702	001412	105202	INCB	%2	: ALL ONES TO ZERO, AT Z
703	001414	001401	BEQ	.+4	: BRANCH ON Z
704	001416	000000	HLT		: Z NOT SET
705			; TEST "DECB"		
706	001420	000240	SCOPE		
707	001422	000277	SCC		
708	001424	105002	CLRB	%2	: CLEAR
709	001426	105302	DECB	%2	: ZERO MINUS 1=17777
710	001430	100401	BMI	.+4	
711	001432	000000	HLT		: N NOT SET
712			; TEST "NEGB"		
713	001434	000240	SCOPE		
714	001436	000277	SCC		
715	001440	105002	CLRB	%2	: 000000
716	001442	105402	NEGB	%2	: 000000
717	001444	001401	BEQ	.+4	: Z NOT SET
718	001446	000000	HLT		: Z NOT SET
719			; TEST "NEGB"		
720	001450	000240	SCOPE		
721	001452	000277	SCC		
722	001454	105002	CLRB	%2	: 000000
723	001456	105202	INCB	%2	: 000001
724	001460	105402	NEGB	%2	: 177777
725	001462	100401	BMI	.+4	
726	001464	000000	HLT		: N NOT SET
727			; TEST ADCB		
728	001466	000240	SCOPE		
729					: CARRY=1
730	001470	105002	CLRB	%2	: 000000
731	001472	000261	SEC		: SET C
732	001474	105502	ADCB	%2	: 000001
733	001476	001001	BNE	.+4	
734	001500	000000	HLT		: Z NOT CLEARED
735			; TEST "ADCB"		
736	001502	000240	SCOPE		
737	001504	000257	CCC		: CARRY=0
738	001506	105002	CLRB	%2	: 000001
739	001510	105502	ADCB	%2	: ADD-CARRY=000000
740	001512	001401	BEQ	.+4	: Z NOT SET
741	001514	000000	HLT		: Z NOT SET
742			; TEST "SBCB"		

```

743 001516 000240          SCOPE
744 001518 105002          CLR      %2          ;CARRY=1
745 001520 000261          SEC          ;00000
746 001522 105602          SBCB      %2          ;SET C
747 001524 100401          BMI      .+4        ;00000-1=17777
748 001526 000000          HLT
;TEST TSTB
749 001528 000240          SCOPE
750 001530 105002          CLR      %2          ;00000
751 001532 000277          SCC          ;SET CODES
752 001534 105702          TSTB     %2          ;N=0,Z=1
753 001536 100001          BPL      .+4        ;N WAS NOT CLEARED
754 001538 000000          HLT
755 001540 000240          SCOPE
;BASIC TEST FOR REGISTER %3
756 001542 000240          ;TEST "CLR"
757 001544 000277          SCOPE
758 001546 005003          SCC          ;SHOULD SET Z
759 001548 001401          CLR      %3          ;Z NOT SET
760 001550 000000          BEQ      .+4
761 001552 000240          ;TEST "COM"
762 001554 000277          SCOPE
763 001556 005003          SCC          ;00000
764 001558 005103          CLR      %3          ;17777,N SHOULD BE SET
765 001560 100401          COM      %3          ;"N" NOT SET
766 001562 000000          BMI      .+4
767 001564 000240          ;TEST "INC"
768 001566 000277          SCOPE
769 001568 005003          SCC          ;CLEAR
770 001570 005103          CLR      %3          ;COMPLIMENT
771 001572 001401          COM      %3          ;ALL ONES TO ZERO, AT Z
772 001574 000000          BMI      .+4        ;BRANCH ON Z
773 001576 000240          ;TEST "DEC"
774 001578 000277          SCOPE
775 001580 005003          SCC          ;Z NOT SET
776 001582 005203          CLR      %3
777 001584 001401          COM      %3
778 001586 000000          BMI      .+4
779 001588 000240          ;TEST "NEG"
780 001590 000277          SCOPE
781 001592 005003          SCC          ;CLEAR
782 001594 005303          CLR      %3          ;ZERO MINUS 1=17777
783 001596 100401          DEC      %3
784 001598 000000          BMI      .+4
785 001600 000240          ;TEST "NEG"
786 001602 000277          SCOPE
787 001604 005003          SCC          ;000000
788 001606 005403          CLR      %3          ;000000
789 001608 001401          NEG      %3          ;Z NOT SET
790 001610 000000          BEQ      .+4        ;Z NOT SET
791 001612 000240          ;TEST "NEG"
792 001614 000277          SCOPE
793 001616 005003          SCC          ;000000
794 001618 005403          CLR      %3          ;000000
795 001620 001401          NEG      %3          ;Z NOT SET
796 001622 000000          BEQ      .+4        ;Z NOT SET
797 001624 000240          ;TEST "NEG"
798 001626 000277          SCOPE

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799	001646	000277	SCC		
800	001650	005003	CLR	%3	:000000
801	001652	005203	INC	%3	:000001
802	001654	005403	NEG	%3	:177777
803	001656	100401	BMI	.+4	
804	001660	000000	HLT		;N NOT SET
805			;TEST ADC		
806	001662	000240	SCOPE		
807					:CARRY=1
808	001664	005003	CLR	%3	:000000
809	001666	000261	SEC		:SET C
810	001670	005503	ADC	%3	:000001
811	001672	001001	BNE	.+4	
812	001674	000000	HLT		;Z NOT CLEARED
813			;TEST "ADC"		
814	001676	000240	SCOPE		
815	001700	000257	CCC		:CARRY=0
816	001702	005003	CLR	%3	:000000
817	001704	005503	ADC	%3	:ADD-CARRY=000000
818	001706	001401	BEQ	.+4	:Z NOT SET
819	001710	000000	HLT		:Z NOT SET
820			;TEST "SBC"		
821	001712	000240	SCOPE		
822					:CARRY=1
823	001714	005003	CLR	%3	:000000
824	001716	000261	SEC		:SET C
825	001720	005603	SBC	%3	:000000-1=177777
826	001722	100401	BMI	.+4	
827	001724	000000	HLT		;N NOT SET
828			;TEST TST		
829	001726	000240	SCOPE		
830	001730	005003	CLR	%3	:000000
831	001732	000277	SCC		:SET CODES
832	001734	005703	TST	%3	:N=0,Z=1
833	001736	100001	BPL	.+4	
834	001740	000000	HLT		;N WAS NOT CLEARED
835	001742	000240	SCOPE		
836			;BASIC TEST FOR REGISTER %3		
837					
838			;TEST "CLRB"		
839	001744	000240	SCOPE		
840	001746	000277	SCC		
841	001750	105003	CLRB	%3	:SHOULD SET Z
842	001752	001401	BEQ	.+4	:Z NOT SET
843	001754	000000	HLT		
844			;TEST "COMB"		
845	001756	000240	SCOPE		
846	001760	000277	SCC		
847	001762	105003	CLRB	%3	:000000
848	001764	105103	COMB	%3	:17777 N SHOULD BE SET
849	001766	100401	BMI	.+4	: "N" NOT SET
850	001770	000000	HLT		
851			;TEST "INCB"		
852	001772	000240	SCOPE		
853	001774	000277	SCC		
854	001776	105003	CLRB	%3	:CLEAR

855	002000	105103	COMB	%3	:COMPLIMENT
856	002002	105203	INCB	%3	:ALL ONES TO ZERO, AT Z
857	002004	001401	BEQ	+.4	:BRANCH ON Z
858	002006	000000	HLT		:Z NOT SET
859			;TEST "DECB"		
860	002010	000240	SCOPE		
861	002012	000277	SCC		
862	002014	105003	CLRB	%3	:CLEAR
863	002016	105303	DECB	%3	:ZERO MINUS 1=17777
864	002020	100401	BMI	+.4	
865	002022	000000	HLT		:N NOT SET
866			;TEST "NEGB"		
867	002024	000240	SCOPE		
868	002026	000277	SCC		
869	002030	105003	CLRB	%3	:000000
870	002032	105403	NEGB	%3	:000000
871	002034	001401	BEQ	+.4	:Z NOT SET
872	002036	000000	HLT		:Z NOT SET
873			;TEST "NEGB"		
874	002040	000240	SCOPE		
875	002042	000277	SCC		
876	002044	105003	CLRB	%3	:000000
877	002046	105203	INCB	%3	:000001
878	002050	105403	NEGB	%3	:177777
879	002052	100401	BMI	+.4	
880	002054	000000	HLT		:N NOT SET
881			;TEST ADCB		
882	002056	000240	SCOPE		
883					:CARRY=1
884	002060	105003	CLRB	%3	:000000
885	002062	000261	SEC		:SET C
886	002064	105503	ADCB	%3	:000001
887	002066	001001	BNE	+.4	
888	002070	000000	HLT		:Z NOT CLEARED
889			;TEST "ADCB"		
890	002072	000240	SCOPE		
891	002074	000257	CCC		:CARRY=0
892	002076	105003	CLRB	%3	:000000
893	002100	105503	ADCB	%3	:ADD-CARRY=000000
894	002102	001401	BEQ	+.4	:Z NOT SET
895	002104	000000	HLT		:Z NOT SET
896			;TEST "SBCB"		
897	002106	000240	SCOPE		
898					:CARRY=1
899	002110	105003	CLRB	%3	:000000
900	002112	000261	SEC		:SET C
901	002114	105603	SBCB	%3	:000000-1=177777
902	002116	100401	BMI	+.4	
903	002120	000000	HLT		:N NOT SET
904			;TEST TSTB		
905	002122	000240	SCOPE		
906	002124	105003	CLRB	%3	:000000
907	002126	000277	SCC		:SET CODES
908	002130	105703	TSTB	%3	:N=0, Z=1
909	002132	100001	BPL	+.4	
910	002134	000000	HLT		:N WAS NOT CLEARED

```

911 002136 000240          SCOPE
912
913
914
915          ;BASIC TEST FOR REGISTER X4
916
917          ;TEST "CLR"
918          SCOPE
919          SCC
920          CLR          %4          ;SHOULD SET Z
921          BEQ          .+4        ;Z NOT SET
922          HLT
923
924          ;TEST "COM"
925          SCOPE
926          SCC
927          CLR          %4          ;000000
928          COM          %4          ;17777 N SHOULD BE SET
929          BMI          .+4        ;"N" NOT SET
930          HLT
931
932          ;TEST "INC"
933          SCOPE
934          SCC
935          CLR          %4          ;CLEAR
936          COM          %4          ;COMPLIMENT
937          INC          %4          ;ALL ONES TO ZERO, AT Z
938          BEQ          .+4        ;BRANCH ON Z
939          HLT
940          ;Z NOT SET
941
942          ;TEST "DEC"
943          SCOPE
944          SCC
945          CLR          %4          ;CLEAR
946          DEC          %4          ;ZERO MINUS 1=17777
947          BMI          .+4
948          HLT
949          ;N NOT SET
950
951          ;TEST "NEG"
952          SCOPE
953          SCC
954          CLR          %4          ;000000
955          NEG          %4          ;000000
956          BEQ          .+4        ;Z NOT SET
957          HLT
958          ;Z NOT SET
959
960          ;TEST "NEG"
961          SCOPE
962          SCC
963          CLR          %4          ;000000
964          INC          %4          ;000001
965          NEG          %4          ;177777
966          BMI          .+4
967          HLT
968          ;N NOT SET
969
970          ;TEST ADC
971          SCOPE
972
973          CLR          %4          ;CARRY=1
974          SEC          %4          ;000000
975          ADC          %4          ;SET C
976          BNE          .+4        ;000001
977          HLT
978          ;Z NOT CLEARED

```

```

967                                     ;TEST "ADC"
968 002266 000240                         SCOPE
969 002270 000257                         CCC
970 002272 005004                         CLR          %4
971 002274 005504                         ADC          %4
972 002276 001401                         BEQ         .+4
973 002300 000000                         HLT
974                                     ;TEST "SBC"
975 002302 000240                         SCOPE
976                                     ;
977 002304 005004                         CLR          %4
978 002306 000261                         SEC
979 002310 005604                         SBC          %4
980 002312 100401                         BMI         .+4
981 002314 000000                         HLT
982                                     ;TEST TST
983 002316 000240                         SCOPE
984 002320 005004                         CLR          %4
985 002322 000277                         SCC
986 002324 005704                         TST          %4
987 002326 100001                         BPL         .+4
988 002330 000000                         HLT
989 002332 000240                         SCOPE
990                                     ;BASIC TEST FOR REGISTER %4
991
992                                     ;TEST "CLRB"
993 002334 000240                         SCOPE
994 002336 000277                         SCC
995 002340 105004                         CLRB        %4
996 002342 001401                         BEQ         .+4
997 002344 000000                         HLT
998                                     ;TEST "COMB"
999 002346 000240                         SCOPE
1000 002350 000277                         SCC
1001 002352 105004                         CLRB        %4
1002 002354 105104                         COMB        %4
1003 002356 100401                         BMI         .+4
1004 002360 000000                         HLT
1005                                     ;TEST "INCB"
1006 002362 000240                         SCOPE
1007 002364 000277                         SCC
1008 002366 105004                         CLRB        %4
1009 002370 105104                         COMB        %4
1010 002372 105204                         INCB        %4
1011 002374 001401                         BEQ         .+4
1012 002376 000000                         HLT
1013                                     ;TEST "DECB"
1014 002400 000240                         SCOPE
1015 002402 000277                         SCC
1016 002404 105004                         CLRB        %4
1017 002406 105304                         DECB        %4
1018 002410 100401                         BMI         .+4
1019 002412 000000                         HLT
1020                                     ;TEST "NEGB"
1021 002414 000240                         SCOPE
1022 002416 000277                         SCC

```

```

;CARRY=0
;000000
;ADD-CARRY=000000
;Z NOT SET
;Z NOT SET

;CARRY=1
;000000
;SET C
;000000-1=177777

;N NOT SET

;000000
;SET CODES
;N=0,Z=1

;N WAS NOT CLEARED

;SHOULD SET Z
;Z NOT SET

;000000
;17777,N SHOULD BE SET
;N NOT SET

;CLEAR
;COMPLIMENT
;ALL ONES TO ZERO, AT Z
;BRANCH ON Z
;Z NOT SET

;CLEAR
;ZERO MINUS 1=17777

;N NOT SET

```

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1023	002420	105004	CLRB	%4	:000000
1024	002422	105404	NEGB	%4	:000000
1025	002424	001401	BEQ	.+4	:Z NOT SET
1026	002426	000000	HLT		:Z NOT SET
1027			;TEST "NEGB"		
1028	002430	000240	SCOPE		
1029	002432	000277	SCC		
1030	002434	105004	CLRB	%4	:000000
1031	002436	105204	INCB	%4	:000001
1032	002440	105404	NEGB	%4	:177777
1033	002442	100401	BMT	.+4	
1034	002444	000000	HLT		:N NOT SET
1035			;TEST ADCB		
1036	002446	000240	SCOPE		
1037					:CARRY=1
1038	002450	105004	CLRB	%4	:000000
1039	002452	000261	SEC		:SET C
1040	002454	105504	ADCB	%4	:000001
1041	002456	001001	BNE	.+4	
1042	002460	000000	HLT		:Z NOT CLEARED
1043			;TEST "ADCB"		
1044	002462	000240	SCOPE		
1045	002464	000257	CCC		:CARRY=0
1046	002466	105004	CLRB	%4	:000000
1047	002470	105504	ADCB	%4	:ADD-CARRY=000000
1048	002472	001401	BEQ	.+4	:Z NOT SET
1049	002474	000000	HLT		:Z NOT SET
1050			;TEST "SBCB"		
1051	002476	000240	SCOPE		
1052					:CARRY=1
1053	002500	105004	CLRB	%4	:000000
1054	002502	000261	SEC		:SET C
1055	002504	105604	SBCB	%4	:000000-1=177777
1056	002506	100401	BMT	.+4	
1057	002510	000000	HLT		:N NOT SET
1058			;TEST TSTB		
1059	002512	000240	SCOPE		
1060	002514	105004	CLRB	%4	:000000
1061	002516	000277	SCC		:SET CODES
1062	002520	105704	TSTB	%4	:N=0,Z=1
1063	002522	100001	BPL	.+4	
1064	002524	000000	HLT		:N WAS NOT CLEARED
1065	002526	000240	SCOPE		
1066					
1067					
1068			;BASIC TEST FOR REGISTER %5		
1069					
1070			;TEST "CLR"		
1071	002530	000240	SCOPE		
1072	002532	000277	SCC		
1073	002534	005005	CLR	%5	:SHOULD SET Z
1074	002536	001401	BEQ	.+4	:Z NOT SET
1075	002540	000000	HLT		
1076			;TEST "COM"		
1077	002542	000240	SCOPE		
1078	002544	000277	SCC		

1079	002546	005005	CLR	%5	;000000
1080	002550	005105	COM	%5	;17777 N SHOULD BE SET
1081	002552	100401	BMI	.+4	;N NOT SET
1082	002554	000000	HLT		
1083			;TEST "INC"		
1084	002556	000240	SCOPE		
1085	002560	000277	SCC		
1086	002562	005005	CLR	%5	;CLEAR
1087	002564	005105	COM	%5	;COMPLIMENT
1088	002566	005205	INC	%5	;ALL ONES TO ZERO, AT Z
1089	002570	001401	BEQ	.+4	;BRANCH ON Z
1090	002572	000000	HLT		;Z NOT SET
1091			;TEST "DEC"		
1092	002574	000240	SCOPE		
1093	002576	000277	SCC		
1094	002600	005005	CLR	%5	;CLEAR
1095	002602	005305	DEC	%5	;ZERO MINUS 1=17777
1096	002604	100401	BMI	.+4	
1097	002606	000000	HLT		;N NOT SET
1098			;TEST "NEG"		
1099	002610	000240	SCOPE		
1100	002612	000277	SCC		
1101	002614	005005	CLR	%5	;000000
1102	002616	005405	NEG	%5	;000000
1103	002620	001401	BEQ	.+4	;Z NOT SET
1104	002622	000000	HLT		;Z NOT SET
1105			;TEST "NEG"		
1106	002624	000240	SCOPE		
1107	002626	000277	SCC		
1108	002630	005005	CLR	%5	;000000
1109	002632	005205	INC	%5	;000001
1110	002634	005405	NEG	%5	;177777
1111	002636	100401	BMI	.+4	
1112	002640	000000	HLT		;N NOT SET
1113			;TEST ADC		
1114	002642	000240	SCOPE		
1115					;CARRY=1
1116	002644	005005	CLR	%5	;000000
1117	002646	000261	SEC		;SET C
1118	002650	005505	ADC	%5	;000001
1119	002652	001001	BNE	.+4	
1120	002654	000000	HLT		;Z NOT CLEARED
1121			;TEST "ADC"		
1122	002656	000240	SCOPE		
1123	002660	000257	CCC		;CARRY=0
1124	002662	005005	CLR	%5	;000000
1125	002664	005505	ADC	%5	;ADD-CARRY=000000
1126	002666	001401	BEQ	.+4	;Z NOT SET
1127	002670	000000	HLT		;Z NOT SET
1128			;TEST "SBC"		
1129	002672	000240	SCOPE		
1130					;CARRY=1
1131	002674	005005	CLR	%5	;00000
1132	002676	000261	SEC		;SET C
1133	002700	005605	SBC	%5	;000000-1=177777
1134	002702	100401	BMI	.+4	

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1135 002704 000000 HLT ;N NOT SET
1136 ;TEST TST
1137 002706 000240 SCOPE
1138 002710 005005 CLR %5 ;000000
1139 002712 000277 SCC ;SET CODES
1140 002714 005705 TST %5 ;N=0,Z=1
1141 002716 100001 BPL .+4 ;
1142 002720 000000 HLT ;N WAS NOT CLEARED
1143 002722 000240 SCOPE
1144 ;BASIC TEST FOR REGISTER %5
1145
1146 ;TEST "CLRB"
1147 002724 000240 SCOPE
1148 002726 000277 SCC
1149 002730 105005 CLRB %5 ;SHOULD SET Z
1150 002732 001401 BEQ .+4 ;Z NOT SET
1151 002734 000000 HLT
1152 ;TEST "COMB"
1153 002736 000240 SCOPE
1154 002740 000277 SCC
1155 002742 105005 CLRB %5 ;000000
1156 002744 105105 COMB %5 ;17777,N SHOULD BE SET
1157 002746 100401 BMI .+4 ;"N" NOT SET
1158 002750 000000 HLT
1159 ;TEST "INCB"
1160 002752 000240 SCOPE
1161 002754 000277 SCC
1162 002756 105005 CLRB %5 ;CLEAR
1163 002760 105105 COMB %5 ;COMPLIMENT
1164 002762 105205 INCB %5 ;ALL ONES TO ZERO, AT Z
1165 002764 001401 BEQ .+4 ;BRANCH ON Z
1166 002766 000000 HLT ;Z NOT SET
1167 ;TEST "DECB"
1168 002770 000240 SCOPE
1169 002772 000277 SCC
1170 002774 105005 CLRB %5 ;CLEAR
1171 002776 105305 DECB %5 ;ZERO MINUS 1=17777
1172 003000 100401 BMI .+4
1173 003002 000000 HLT ;N NOT SET
1174 ;TEST "NEGB"
1175 003004 000240 SCOPE
1176 003006 000277 SCC
1177 003010 105005 CLRB %5 ;000000
1178 003012 105405 NEGB %5 ;000000
1179 003014 001401 BEQ .+4 ;Z NOT SET
1180 003016 000000 HLT ;Z NOT SET
1181 ;TEST "NEGB"
1182 003020 000240 SCOPE
1183 003022 000277 SCC
1184 003024 105005 CLRB %5 ;000000
1185 003026 105205 INCB %5 ;000001
1186 003030 105405 NEGB %5 ;177777
1187 003032 100401 BMI .+4
1188 003034 000000 HLT ;N NOT SET
1189 ;TEST ADCB
1190 003036 000240 SCOPE
  
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1191                                     ;CARRY=1
1192 003040 105005                       CLRB   %5      ;000000
1193 003042 000261                       SEC    ;SET C
1194 003044 105505                       ADCB   %5      ;000001
1195 003046 001001                       BNE   .+4
1196 003050 000000                       HLT
                                     ;Z NOT CLEARED
1197 ;TEST "ADCB"
1198 003052 000240                       SCOPE
1199 003054 000257                       CCC
1200 003056 105005                       CLRB   %5      ;CARRY=0
1201 003060 105505                       ADCB   %5      ;000000
1202 003062 001401                       BEQ   .+4      ;ADD-CARRY=000000
1203 003064 000000                       HLT          ;Z NOT SET
1204 ;TEST "SBCB"
1205 003066 000240                       SCOPE
1206                                     ;CARRY=1
1207 003070 105005                       CLRB   %5      ;000000
1208 003072 000261                       SEC    ;SET C
1209 003074 105605                       SBCB   %5      ;000000-1=177777
1210 003076 100401                       BMI   .+4
1211 003100 000000                       HLT
                                     ;N NOT SET
1212 ;TEST TSTB
1213 003102 000240                       SCOPE
1214 003104 105005                       CLRB   %5      ;000000
1215 003106 000277                       SCC
1216 003110 105705                       TSTB   %5      ;SET ONES
1217 003112 100001                       BPL   .+4      ;N=0, Z=1
1218 003114 000000                       HLT          ;N WAS NOT CLEARED
1219 003116 000240                       SCOPE
1220
1221
1222 ;BASIC TEST FOR REGISTER %6
1223
1224 ;TEST "CLR"
1225 003120 000240                       SCOPE
1226 003122 000277                       SCC
1227 003124 005006                       CLR   %6      ;SHOULD SET Z
1228 003126 001401                       BEQ   .+4      ;Z NOT SET
1229 003130 000000                       HLT
1230 ;TEST "COM"
1231 003132 000240                       SCOPE
1232 003134 000277                       SCC
1233 003136 005006                       CLR   %6      ;000000
1234 003140 005106                       COM   %5      ;17777 N SHOULD BE SET
1235 003142 100401                       BMI   .+4      ;"N" NOT SET
1236 003144 000000                       HLT
1237 ;TEST "INC"
1238 003146 000240                       SCOPE
1239 003150 000277                       SCC
1240 003152 005006                       CLR   %6      ;CLEAR
1241 003154 005106                       COM   %6      ;COMPLIMENT
1242 003156 005206                       INC   %6      ;ALL ONES TO ZERO, AT Z
1243 003160 001401                       BEQ   .+4      ;BRANCH ON Z
1244 003162 000000                       HLT          ;Z NOT SET
1245 ;TEST "DEC"
1246 003164 000240                       SCOPE

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1247 003166 000277          SCC
1248 003170 005006          CLR          %6          ;CLEAR
1249 003172 005306          DEC          %6          ;ZERO MINUS 1=17777
1250 003174 100401          BMI          .+4
1251 003176 000000          HLT
1252          ;TEST "NEG"
1253 003200 000240          SCOPE
1254 003202 000277          SCC
1255 003204 005006          CLR          %6          ;000000
1256 003206 005406          NEG          %6          ;000000
1257 003210 001401          BEQ          .+4          ;Z NOT SET
1258 003212 000000          HLT          ;Z NOT SET
1259          ;TEST "NEG"
1260 003214 000240          SCOPE
1261 003216 000277          SCC
1262 003220 005006          CLR          %6          ;000000
1263 003222 005206          INC          %6          ;000001
1264 003224 005406          NEG          %6          ;177777
1265 003226 100401          BMI          .+4
1266 003230 000000          HLT          ;N NOT SET
1267          ;TEST ADC
1268 003232 000240          SCOPE
1269          ;CARRY=1
1270 003234 005006          CLR          %6          ;000000
1271 003236 000261          SEC          ;SET C
1272 003240 005506          ADC          %6          ;000001
1273 003242 001001          BNE          .+4
1274 003244 000000          HLT          ;Z NOT CLEARED
1275          ;TEST "ADC"
1276 003246 000240          SCOPE
1277 003250 000257          CCC
1278 003252 005006          CLR          %6          ;CARRY=0
1279 003254 005506          ADC          %6          ;000000
1280 003256 001401          BEQ          .+4          ;ADD-CARRY=000000
1281 003260 000000          HLT          ;Z NOT SET
1282          ;TEST "SBC"
1283 003262 000240          SCOPE
1284          ;CARRY=1
1285 003264 005006          CLR          %6          ;000000
1286 003266 000261          SEC          ;SET C
1287 003270 005606          SBC          %6          ;000000-1=177777
1288 003272 100401          BMI          .+4
1289 003274 000000          HLT          ;N NOT SET
1290          ;TEST TST
1291 003276 000240          SCOPE
1292 003300 005306          CLR          %6          ;000000
1293 003302 000277          SCC          ;SET CODES
1294 003304 005706          TST          %6          ;N=0,Z=1
1295 003306 100001          BPL          .+4
1296 003310 000000          HLT          ;N WAS NOT CLEARED
1297 003312 000240          SCOPE
1298          ;BASIC TEST FOR REGISTER %6
1299
1300          ;TEST "CLR"
1301 003314 000240          SCOPE
1302 003316 000277          SCC

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1303	003320	105006	CLRB	%6	; SHOULD SET Z
1304	003322	001401	BEQ	.+4	; Z NOT SET
1305	003324	000000	HLT		
1306			; TEST "COMB"		
1307	003326	000240	SCOPE		
1308	003330	000277	SCC		
1309	003332	105006	CLRB	%6	; 000000
1310	003334	105106	COMB	%6	; 17777, N SHOULD BE SET
1311	003336	100401	BMI	.+4	; "N" NOT SET
1312	003340	000000	HLT		
1313			; TEST "INCB"		
1314	003342	000240	SCOPE		
1315	003344	000277	SCC		
1316	003346	105006	CLRB	%6	; CLEAR
1317	003350	105106	COMB	%6	; COMPLIMENT
1318	003352	105206	INCB	%6	; ALL ONES TO ZERO, AT Z
1319	003354	001401	BEQ	.+4	; BRANCH ON Z
1320	003356	000000	HLT		; Z NOT SET
1321			; TEST "DECB"		
1322	003360	000240	SCOPE		
1323	003362	000277	SCC		
1324	003364	105006	CLRB	%6	; CLEAR
1325	003366	105306	DECB	%6	; ZERO MINUS 1=17777
1326	003370	100401	BMI	.+4	
1327	003372	000000	HLT		; N NOT SET
1328			; TEST "NEGB"		
1329	003374	000240	SCOPE		
1330	003376	000277	SCC		
1331	003400	105006	CLRB	%6	; 000000
1332	003402	105406	NEGB	%6	; 000000
1333	003404	001401	BEQ	.+4	; Z NOT SET
1334	003406	000000	HLT		; Z NOT SET
1335			; TEST "NEGB"		
1336	003410	000240	SCOPE		
1337	003412	000277	SCC		
1338	003414	105006	CLRB	%6	; 000000
1339	003416	105206	INCB	%6	; 000001
1340	003420	105406	NEGB	%6	; 177777
1341	003422	100401	BMI	.+4	
1342	003424	000000	HLT		; N NOT SET
1343			; TEST ADCB		
1344	003426	000240	SCOPE		
1345					; CARRY=1
1346	003430	105006	CLRB	%6	; 000000
1347	003432	000261	SEC		; SET C
1348	003434	105506	ROCB	%6	; 000001
1349	003436	001001	BNE	.+4	
1350	003440	000000	HLT		; Z NOT CLEARED
1351			; TEST "ADCB"		
1352	003442	000240	SCOPE		
1353	003444	000257	CCC		; CARRY=0
1354	003446	105006	CLRB	%6	; 000000
1355	003450	105506	ROCB	%6	; ADD-CARRY=000000
1356	003452	001401	BEQ	.+4	; Z NOT SET
1357	003454	000000	HLT		; Z NOT SET
1358			; TEST "SBCB"		

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1359 003456 000240          SCOPE
1360                                     ;CARRY=1
1361 003460 105006          CLRB   %6          ;00000
1362 003462 000261          SEC    %6          ;SET C
1363 003464 105606          SBCB   %6          ;000000-1=177777
1364 003466 100401          BMI    .+4
1365 003470 000000          HLT
1366                                     ;N NOT SET
1367 003472 000240          ;TEST TSTB
1368                                     SCOPE
1369 003474 105006          CLRB   %6          ;000000
1370 003500 000277          SCC    %6          ;SET CODES
1371 003502 100001          TSTB   %6          ;N=0,Z=1
1372 003504 000000          BPL    .+4
1373 003506 000240          HLT
1374                                     ;N WAS NOT CLEARED
1375                                     SCOPE
1376                                     ;BASIC TEST FOR REGISTER TEMP
1377
1378                                     ;TEST "CLR"
1379 003510 000240          SCOPE
1380 003512 000277          SCC
1381 003514 005067 002024    CLR    TEMP
1382 003520 001401          BEQ    .+4          ;SHOULD SET Z
1383 003522 000000          HLT          ;Z NOT SET
1384                                     ;TEST "COM"
1385 003524 000240          SCOPE
1386 003526 000277          SCC
1387 003530 005067 002010    CLR    TEMP
1388 003534 005167 002004    COM    TEMP
1389 003540 100401          BMI    .+4          ;000000
1390 003542 000000          HLT          ;17777,N SHOULD BE SET
1391                                     ;TEST "INC"          ;"N" NOT SET
1392 003544 000240          SCOPE
1393 003546 000277          SCC
1394 003550 005067 001770    CLR    TEMP
1395 003554 005167 001764    COM    TEMP
1396 003560 005267 001760    INC    TEMP
1397 003564 001401          BEQ    .+4          ;CLEAR
1398 003566 000000          HLT          ;COMPLIMENT
1399                                     ;TEST "DEC"          ;ALL ONES TO ZERO, AT Z
1400 003570 000240          SCOPE
1401 003572 000277          SCC
1402 003574 005067 001744    CLR    TEMP
1403 003600 005367 001740    DEC    TEMP
1404 003604 100401          BMI    .+4          ;BRANCH ON Z
1405 003606 000000          HLT          ;Z NOT SET
1406                                     ;TEST "NEG"
1407 003610 000240          SCOPE
1408 003612 000277          SCC
1409 003614 005067 001724    CLR    TEMP
1410 003620 005467 001720    NEG    TEMP
1411 003624 001401          BEQ    .+4          ;CLEAR
1412 003626 000000          HLT          ;ZERO MINUS 1=17777
1413                                     ;TEST "NEG"
1414 003630 000240          SCOPE

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1415 003632 000277          SCC
1416 003634 005067 001704  CLR      TEMP      ;000000
1417 003640 005267 001700  INC      TEMP      ;000001
1418 003644 005467 001674  NEG      TEMP      ;177777
1419 003650 100401          BHI
1420 003652 000000          HLT      .+4      ;N NOT SET
1421          ;TEST ADC
1422 003654 000240          SCOPE
1423          ;CARRY=1
1424 003656 005067 001662  CLR      TEMP      ;000000
1425 003662 000261          SEC      ;SET C
1426 003664 005567 001654  ADC      TEMP      ;000001
1427 003670 001001          BNE      .+4
1428 003672 000000          HLT
1429          ;Z NOT CLEARED
1430          ;TEST "ADC"
1431 003674 000240          SCOPE
1432 003676 000257          CCC
1433 003700 005067 001640  CLR      TEMP      ;CARRY=0
1434 003704 005567 001634  ADC      TEMP      ;000000
1435 003710 001401          BEQ      .+4      ;Z NOT SET
1436 003712 000000          HLT      ;Z NOT SET
1437          ;TEST "SBC"
1438 003714 000240          SCOPE
1439 003716 005067 001622  CLR      TEMP      ;CARRY=1
1440 003722 000261          SEC      ;000000
1441 003724 005667 001614  SBC      TEMP      ;SET C
1442 003730 100401          BMI      .+4      ;000000-1=177777
1443 003732 000000          HLT
1444          ;N NOT SET
1445          ;TEST TST
1446 003734 000240          SCOPE
1447 003736 005067 001602  CLR      TEMP      ;000000
1448 003742 000277          SCC
1449 003744 005767 001574  TST      TEMP      ;SET CODES
1450 003750 100001          BPL      .+4      ;N=0,Z=1
1451 003752 000000          HLT
1452 003754 000240          SCOPE      ;N WAS NOT CLEARED
1453          ;BASIC TEST FOR REGISTER TEMP
1454          ;TEST "CLRB"
1455 003756 000240          SCOPE
1456 003760 000277          SCC
1457 003762 105067 001556  CLRB    TEMP      ;SHOULD SET Z
1458 003766 001401          BEQ      .+4      ;Z NOT SET
1459 003770 000000          HLT
1460          ;TEST "COMB"
1461 003772 000240          SCOPE
1462 003774 000277          SCC
1463 003776 105067 001542  CLRB    TEMP      ;000000
1464 004002 105167 001536  COMB    TEMP      ;17777,N SHOULD BE SET
1465 004006 100401          BMI      .+4      ;"N" NOT SET
1466 004010 000000          HLT
1467          ;TEST "INCB"
1468 004012 000240          SCOPE
1469 004014 000277          SCC
1470 004016 105067 001522  CLRB    TEMP      ;CLEAR

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1471	004022	105167	001516	COMB	TEMP		
1472	004026	105267	001512	INCB	TEMP		;COMPLIMENT
1473	004032	001401		BEQ	.+4		;ALL ONES TO ZERO, AT Z
1474	004034	000000		HLT			;BRANCH ON Z
1475							;Z NOT SET
1476	004036	000240		;TEST "DECB"			
1477	004040	000277		SCOPE			
1478	004042	105067	001476	SCC			
1479	004046	105367	001472	CLRB	TEMP		;CLEAR
1480	004052	100401		DECB	TEMP		;ZERO MINUS 1=17777
1481	004054	000000		BMI	.+4		
1482				HLT			;N NOT SET
1483	004056	000240		;TEST "NEGB"			
1484	004050	000277		SCOPE			
1485	004052	105067	001456	SCC			
1486	004056	105467	001452	CLRB	TEMP		;000000
1487	004072	001401		NEGB	TEMP		;000000
1488	004074	000000		BEQ	.+4		;Z NOT SET
1489				HLT			;Z NOT SET
1490	004076	000240		;TEST "NEGB"			
1491	004100	000277		SCOPE			
1492	004102	105067	001436	SCC			
1493	004106	105267	001432	CLRB	TEMP		;000000
1494	004112	105467	001426	INCB	TEMP		;000001
1495	004116	100401		NEGB	TEMP		;177777
1496	004120	000000		BMI	.+4		
1497				HLT			;N NOT SET
1498	004122	000240		;TEST ADCB			
1499				SCOPE			
1500	004124	105067	001414	CLRB	TEMP		;CARRY=1
1501	004130	000261		SEC			;000000
1502	004132	105567	001406	ADCB	TEMP		;SET C
1503	004136	001001		BNE	.+4		;000001
1504	004140	000000		HLT			;Z NOT CLEARED
1505				;TEST "ADCB"			
1506	004142	000240		SCOPE			
1507	004144	000257		CCC			;CARRY=0
1508	004146	105067	001372	CLRB	TEMP		;000000
1509	004152	105567	001366	ADCB	TEMP		;ADD-CARRY=000000
1510	004156	001401		BEQ	.+4		;Z NOT SET
1511	004160	000000		HLT			;Z NOT SET
1512				;TEST "SBCB"			
1513	004162	000240		SCOPE			
1514							;CARRY=1
1515	004164	105067	001354	CLRB	TEMP		;000000
1516	004170	000261		SEC			;SET C
1517	004172	105667	001346	SBCB	TEMP		;000000-1=177777
1518	004176	100401		BMI	.+4		
1519	004200	000000		HLT			;N NOT SET
1520				;TEST TSTB			
1521	004202	000240		SCOPE			
1522	004204	105767	001334	CLRB	TEMP		;000000
1523	004210	000277		SCC			;SET CODES
1524	004212	105767	001326	TSTB	TEMP		;N=0,Z=1
1525	004216	100001		BPL	.+4		
1526	004220	000000		HLT			;N WAS NOT CLEARED


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1527 004222 000240          SCOPE
1528
1529          ;TEST MIX OF .WORD AND .BYTE INSTRUCTIONS
1530 004224 005000          CLR          %0          ;DATA=000000
1531 004226 005100          COM          %0          ;DATA=177777, CLR .EVEN
1532 004230 105000          CLRB         %0          ;DATA=177400
1533 004232 005700          TST          %0          ;TEST .WORD, SHOULD BE NEGATIVE
1534 004234 100401          BMI          .+4
1535 004236 000000          HLT
1536 004240 105700          TSTB         %0          ;.WORD NOT NEGATIVE
1537 004242 100001          BPL          .+4          ;TEST LSB, SHOULD BE ZERO
1538 004244 000000          HLT
1539 004246 000240          SCOPE          ;N SET, NOT ZERO
1540 004250 005000          CLR          %0          ;DATA=000000
1541 004252 005100          COM          %0          ;DATA=177777
1542 004254 105000          CLRB         %0          ;DATA=177400
1543 004256 005100          COM          %0          ;DATA=000377
1544 004260 100001          BPL          .+4
1545 004262 000000          HLT
1546 004264 105200          INCB
1547 004266 001401          BEQ          .+4          ;N NOT CLEARED
1548 004270 000000          HLT          ;DATA=000000
1549 004272 000240          SCOPE          ;Z NOT SET, INCB FAILED
1550 004274 005000          CLR          %0          ;DATA=000000
1551 004276 005100          COM          %0          ;DATA=177777
1552 004300 105000          CLRB         %0          ;DATA=177400
1553 004302 005100          COM          %0          ;DATA 000377
1554 004304 005200          INC          %0          ;DATA 000400
1555 004306 001001          BNE          .+4          ;Z SHOULD NOT BE SET
1556 004310 000000          HLT          ;Z WAS SET
1557 004312 105700          TSTB         %0          ;LSB IS ZERO
1558 004314 001401          BEQ          .+4          ;SHOULD BRANCH
1559 004316 000000          HLT          ;LS.BYTE NOT ZERO
1560 004320 000240          SCOPE
1561
1562          ;TEST MIX OF .WORD AND .BYTE INSTRUCTIONS
1563 004322 005001          CLR          %1          ;DATA=000000
1564 004324 005101          COM          %1          ;DATA=177777, CLR .EVEN
1565 004326 105001          CLRB         %1          ;DATA=177400
1566 004330 005701          TST          %1          ;TEST .WORD, SHOULD BE NEGATIVE
1567 004332 100401          BMI          .+4
1568 004334 000000          HLT
1569 004336 105701          TSTB         %1          ;.WORD NOT NEGATIVE
1570 004340 100001          BPL          .+4          ;TEST LSB, SHOULD BE ZERO
1571 004342 000000          HLT
1572 004344 000240          SCOPE          ;N SET, NOT ZERO
1573 004346 005001          CLR          %1          ;DATA=000000
1574 004350 005101          COM          %1          ;DATA=177777
1575 004352 105001          CLRB         %1          ;DATA=177400
1576 004354 005101          COM          %1          ;DATA=000377
1577 004356 100001          BPL          .+4
1578 004360 000000          HLT
1579 004362 105201          INCB         %1          ;N NOT CLEARED
1580 004364 001401          BEQ          .+4          ;DATA=000000
1581 004366 000000          HLT
1582 004370 000240          SCOPE          ;Z NOT SET, INCB FAILED

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1583	004372	005001	CLR	%1	; DATA=000000
1584	004374	005101	COM	%1	; DATA=177777
1585	004376	105001	CLR8	%1	; DATA=177400
1586	004400	005101	COM	%1	; DATA 000377
1587	004402	005201	INC	%1	; DATA 000400
1588	004404	001001	BNE	.+4	; Z SHOULD NOT BE SET
1589	004406	000000	HLT		; Z WAS SET
1590	004410	105701	TSTB	%1	; LSB IS ZERO
1591	004412	001401	BEQ	.+4	; SHOULD BRANCH
1592	004414	000000	HLT		; LS.BYTE NOT ZERO
1593	004416	000240	SCOPE		
1594					
1595					
1596	004420	005002	CLR	%2	; DATA=000000
1597	004422	005102	COM	%2	; DATA=177777, CLR .EVEN
1598	004424	105002	CLR8	%2	; DATA=177400
1599	004426	005702	TST	%2	; TEST .WORD, SHOULD BE NEGATIVE
1600	004430	100401	BMI	.+4	
1601	004432	000000	HLT		; .WORD NOT NEGATIVE
1602	004434	105702	TSTB	%2	; TEST LSB, SHOULD BE ZERO
1603	004436	100001	BPL	.+4	
1604	004440	000000	HLT		; N SET, NOT ZERO
1605	004442	000240	SCOPE		
1606	004444	005002	CLR	%2	; DATA=000000
1607	004446	005102	COM	%2	; DATA=177777
1608	004450	105002	CLR8	%2	; DATA=177400
1609	004452	005102	COM	%2	; DATA=000377
1610	004454	100001	BPL	.+4	
1611	004456	000000	HLT		; N NOT CLEARED
1612	004460	105202	INCB	%2	; DATA=000000
1613	004462	001401	BEQ	.+4	
1614	004464	000000	HLT		; Z NOT SET, INCB FAILED
1615	004466	000240	SCOPE		
1616	004470	005002	CLR	%2	; DATA=000000
1617	004472	005102	COM	%2	; DATA=177777
1618	004474	105002	CLR8	%2	; DATA=177400
1619	004476	005102	COM	%2	; DATA 000377
1620	004500	005202	INC	%2	; DATA 000400
1621	004502	001001	BNE	.+4	; Z SHOULD NOT BE SET
1622	004504	000000	HLT		; Z WAS SET
1623	004506	105702	TSTB	%2	; LSB IS ZERO
1624	004510	001401	BEQ	.+4	; SHOULD BRANCH
1625	004512	000000	HLT		; LS.BYTE NOT ZERO
1626	004514	000240	SCOPE		
1627					
1628					
1629	004516	005003	CLR	%3	; DATA=000000
1630	004520	005103	COM	%3	; DATA=177777, CLR .EVEN
1631	004522	105003	CLR8	%3	; DATA=177400
1632	004524	005703	TST	%3	; TEST .WORD, SHOULD BE NEGATIVE
1633	004526	100401	BMI	.+4	
1634	004530	000000	HLT		; .WORD NOT NEGATIVE
1635	004532	105703	TSTB	%3	; TEST LSB, SHOULD BE ZERO
1636	004534	100001	BPL	.+4	
1637	004536	000000	HLT		; N SET, NOT ZERO
1638	004540	000240	SCOPE		

1639	004542	005003	CLR	%3	;DATA=000000
1640	004544	005103	COM	%3	;DATA=177777
1641	004546	105003	CLRB	%3	;DATA=177400
1642	004550	005103	COM	%3	;DATA=000377
1643	004552	100001	BPL	.+4	
1644	004554	000000	HLT		;N NOT CLEARED
1645	004556	105203	INCB	%3	;DATA=000000
1646	004560	001401	BEQ	.+4	
1647	004562	000000	HLT		;Z NOT SET, INCB FAILED
1648	004564	000240	SCOPE		
1649	004566	005003	CLR	%3	;DATA=000000
1650	004570	005103	COM	%3	;DATA=177777
1651	004572	105003	CLRB	%3	;DATA=177400
1652	004574	005103	COM	%3	;DATA 000377
1653	004576	005203	INC	%3	;DATA 000400
1654	004600	001001	BNE	.+4	;Z SHOULD NOT BE SET
1655	004602	000000	HLT		;Z WAS SET
1656	004604	105703	TSTB	%3	;LSB IS ZERO
1657	004606	001401	BEQ	.+4	;SHOULD BRANCH
1658	004610	000000	HLT		;LS.BYTE NOT ZERO
1659	004612	000240	SCOPE		

;TEST MIX OF .WORD AND .BYTE INSTRUCTIONS

1662	004614	005004	CLR	%4	;DATA=000000
1663	004616	005104	COM	%4	;DATA=177777, CLR .EVEN
1664	004620	105004	CLRB	%4	;DATA=177400
1665	004622	005704	TST	%4	;TEST .WORD, SHOULD BE NEGATIVE
1666	004624	100401	BMI	.+4	
1667	004626	000000	HLT		; .WORD NOT NEGATIVE
1668	004630	105704	TSTB	%4	;TEST LSB, SHOULD BE ZERO
1669	004632	100001	BPL	.+4	
1670	004634	000000	HLT		;N SET, NOT ZERO
1671	004636	000240	SCOPE		
1672	004640	005004	CLR	%4	;DATA=000000
1673	004642	005104	COM	%4	;DATA=177777
1674	004644	105004	CLRB	%4	;DATA=177400
1675	004646	005104	COM	%4	;DATA=000377
1676	004650	100001	BPL	.+4	
1677	004652	000000	HLT		;N NOT CLEARED
1678	004654	105204	INCB	%4	;DATA=000000
1679	004656	001401	BEQ	.+4	
1680	004660	000000	HLT		;Z NOT SET, INCB FAILED
1681	004662	000240	SCOPE		
1682	004664	005004	CLR	%4	;DATA=000000
1683	004666	005104	COM	%4	;DATA=177777
1684	004670	105004	CLRB	%4	;DATA=177400
1685	004672	005104	COM	%4	;DATA 000377
1686	004674	005204	INC	%4	;DATA 000400
1687	004676	001001	BNE	.+4	;Z SHOULD NOT BE SET
1688	004700	000000	HLT		;Z WAS SET
1689	004702	105704	TSTB	%4	;LSB IS ZERO
1690	004704	001401	BEQ	.+4	;SHOULD BRANCH
1691	004706	000000	HLT		;LS.BYTE NOT ZERO
1692	004710	000240	SCOPE		

;TEST MIX OF .WORD AND .BYTE INSTRUCTIONS

1693
1694

1695	004712	005005	CLR	%5	; DATA=000000
1696	004714	005105	COM	%5	; DATA=177777, CLR .EVEN
1697	004716	105005	CLRB	%5	; DATA=177400
1698	004720	005705	TST	%5	; TEST .WORD, SHOULD BE NEGATIVE
1699	004722	100401	BMI	.+4	
1700	004724	000000	HLT		; .WORD NOT NEGATIVE
1701	004726	105705	TSTB	%5	; TEST LSB, SHOULD BE ZERO
1702	004730	100001	BPL	.+4	
1703	004732	000000	HLT		; N SET, NOT ZERO
1704	004734	000240	SCOPE		
1705	004736	005005	CLR	%5	; DATA=000000
1706	004740	005105	COM	%5	; DATA=177777
1707	004742	105005	CLRB	%5	; DATA=177400
1708	004744	005105	COM	%5	; DATA=000377
1709	004746	100001	BPL	.+4	
1710	004750	000000	HLT		; N NOT CLEARED
1711	004752	105205	INCB	%5	; DATA=000000
1712	004754	001401	BEQ	.+4	
1713	004756	000000	HLT		; Z NOT SET, INCB FAILED
1714	004760	000240	SCOPE		
1715	004762	005005	CLR	%5	; DATA=000000
1716	004764	005105	COM	%5	; DATA=177777
1717	004766	105005	CLRB	%5	; DATA=177400
1718	004770	005105	COM	%5	; DATA 000377
1719	004772	005205	INC	%5	; DATA 000400
1720	004774	001001	BNE	.+4	; Z SHOULD NOT BE SET
1721	004776	000000	HLT		; Z WAS SET
1722	005000	105705	TSTB	%5	; LSB IS ZERO
1723	005002	001401	BEQ	.+4	; SHOULD BRANCH
1724	005004	000000	HLT		; LS.BYTE NOT ZERO
1725	005006	000240	SCOPE		
1726					
1727					
1728	005010	005006	CLR	%6	; DATA=000000
1729	005012	005106	COM	%6	; DATA=177777, CLR .EVEN
1730	005014	105006	CLRB	%6	; DATA=177400
1731	005016	005706	TST	%6	; TEST .WORD, SHOULD BE NEGATIVE
1732	005020	100401	BMI	.+4	
1733	005022	000000	HLT		; .WORD NOT NEGATIVE
1734	005024	105706	TSTB	%6	; TEST LSB, SHOULD BE ZERO
1735	005026	100001	BPL	.+4	
1736	005030	000000	HLT		; N SET, NOT ZERO
1737	005032	000240	SCOPE		
1738	005034	005006	CLR	%6	; DATA=000000
1739	005036	005106	COM	%6	; DATA=177777
1740	005040	105006	CLRB	%6	; DATA=177400
1741	005042	005106	COM	%6	; DATA=000377
1742	005044	100001	BPL	.+4	
1743	005046	000000	HLT		; N NOT CLEARED
1744	005050	105206	INCB	%6	; DATA=000000
1745	005052	001401	BEQ	.+4	
1746	005054	000000	HLT		; Z NOT SET, INCB FAILED
1747	005056	000240	SCOPE		
1748	005060	005006	CLR	%6	; DATA=000000
1749	005062	005106	COM	%6	; DATA=177777
1750	005064	105006	CLRB	%6	; DATA=177400

;TEST MIX OF .WORD AND .BYTE INSTRUCTIONS

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1751	005066	005106		COM	%6	;DATA 000377
1752	005070	005206		INC	%6	;DATA 000400
1753	005072	001001		BNE	.+4	;Z SHOULD NOT BE SET
1754	005074	000000		HLT		;Z WAS SET
1755	005076	105706		TSTB	%6	;LSB IS ZERO
1756	005100	001401		BEQ	.+4	;SHOULD BRANCH
1757	005102	000000		HLT		;LS.BYTE NOT ZERO
1758	005104	000240		SCOPE		
1759						
1760				;TEST MIX OF .WORD AND .BYTE INSTRUCTIONS		
1761	005106	005067	000432	CLR	TEMP	;DATA=000000
1762	005112	005167	000426	COM	TEMP	;DATA=177777, CLR .EVEN
1763	005116	105067	000422	CLRB	TEMP	;DATA=177400
1764	005122	005767	000416	TST	TEMP	;TEST .WORD, SHOULD BE NEGATIVE
1765	005126	100401		BMI	.+4	
1766	005130	000000		HLT		; .WORD NOT NEGATIVE
1767	005132	105767	000406	TSTB	TEMP	;TEST LSB, SHOULD BE ZERO
1768	005136	100001		BPL	.+4	
1769	005140	000000		HLT		;N SET, NOT ZERO
1770	005142	000240		SCOPE		
1771	005144	005067	000374	CLR	TEMP	;DATA=000000
1772	005150	005167	000370	COM	TEMP	;DATA=177777
1773	005154	105067	000364	CLRB	TEMP	;DATA=177400
1774	005160	005167	000360	COM	TEMP	;DATA=000377
1775	005164	100001		BPL	.+4	
1776	005166	000000		HLT		;N NOT CLEARED
1777	005170	105267	000350	INCB	TEMP	;DATA=000000
1778	005174	001401		BEQ	.+4	
1779	005176	000000		HLT		;Z NOT SET, INCA FAILED
1780	005200	000240		SCOPE		
1781	005202	005067	000336	CLR	TEMP	;DATA=000000
1782	005206	005167	000332	COM	TEMP	;DATA=177777
1783	005212	105067	000326	CLRB	TEMP	;DATA=177400
1784	005216	005167	000322	COM	TEMP	;DATA 000377
1785	005222	005267	000316	INC	TEMP	;DATA 000400
1786	005226	001001		BNE	.+4	;Z SHOULD NOT BE SET
1787	005230	000000		HLT		;Z WAS SET
1788	005232	105767	000306	TSTB	TEMP	;LSB IS ZERO
1789	005236	001401		BEQ	.+4	;SHOULD BRANCH
1790	005240	000000		HLT		;LS.BYTE NOT ZERO
1791	005242	000240		SCOPE		
1792						
1793				;BASIC TEST FOR REGISTER TEMP+1		
1794						
1795				;TEST "CLRB"		
1796	005244	000240		SCOPE		
1797	005246	000277		SCC		
1798	005250	105067	000271	CLRB	TEMP+1	; SHOULD SET Z
1799	005254	001401		BEQ	.+4	;Z NOT SET
1800	005256	000000		HLT		
1801				;TEST "COMB"		
1802	005260	000240		SCOPE		
1803	005262	000277		SCC		
1804	005264	105067	000255	CLRB	TEMP+1	; 000000
1805	005270	105167	000251	COMB	TEMP+1	; 17777 N SHOULD BE SET
1806	005274	100401		BMI	.+4	; "N" NOT SET

1807	005276	000000		HLT			
1808				;TEST "INCB"			
1809	005300	000240		SCOPE			
1810	005302	000277		SCC			
1811	005304	105067	000235	CLRB	TEMP+1		;CLEAR
1812	005310	105167	000231	COMB	TEMP+1		;COMPLIMENT
1813	005314	105267	000225	INCB	TEMP+1		;ALL ONES TO ZERO, AT Z
1814	005320	001401		BEQ	.+4		;BRANCH ON Z
1815	005322	000000		HLT			;Z NOT SET
1816				;TEST "DECB"			
1817	005324	000240		SCOPE			
1818	005326	000277		SCC			
1819	005330	105067	000211	CLRB	TEMP+1		;CLEAR
1820	005334	105367	000205	DECB	TEMP+1		;ZERO MINUS 1=17777
1821	005340	100401		BMI	.+4		
1822	005342	000000		HLT			;N NOT SET
1823				;TEST "NEGB"			
1824	005344	000240		SCOPE			
1825	005346	000277		SCC			
1826	005350	105067	000171	CLRB	TEMP+1		;000000
1827	005354	105467	000165	NEGB	TEMP+1		;000000
1828	005360	001401		BEQ	.+4		;Z NOT SET
1829	005362	000000		HLT			;Z NOT SET
1830				;TEST "NEGB"			
1831	005364	000240		SCOPE			
1832	005366	000277		SCC			
1833	005370	105067	000151	CLRB	TEMP+1		;000000
1834	005374	105267	000145	INCB	TEMP+1		;000001
1835	005400	105467	000141	NEGB	TEMP+1		;177777
1836	005404	100401		BMI	.+4		
1837	005406	000000		HLT			;N NOT SET
1838				;TEST ADCB			
1839	005410	000240		SCOPE			
1840							;CARRY=1
1841	005412	105067	000127	CLRB	TEMP+1		;000000
1842	005416	000261		SEC			;SET C
1843	005420	105567	000121	ADCB	TEMP+1		;000001
1844	005424	001001		BNE	.+4		
1845	005426	000000		HLT			;Z NOT CLEARED
1846				;TEST "ADCB"			
1847	005430	000240		SCOPE			
1848	005432	000257		CCC			;CARRY=0
1849	005434	105067	000105	CLRB	TEMP+1		;000000
1850	005440	105567	000101	ADCB	TEMP+1		;ADD-CARRY=000000
1851	005444	001401		BEQ	.+4		;Z NOT SET
1852	005446	000000		HLT			;Z NOT SET
1853				;TEST "SBCB"			
1854	005450	000240		SCOPE			
1855							;CARRY=1
1856	005452	105067	000067	CLRB	TEMP+1		;000000
1857	005456	000261		SEC			;SET C
1858	005460	105667	000061	SBCB	TEMP+1		;000000-1=177777
1859	005464	100401		BMI	.+4		
1860	005466	000000		HLT			;N NOT SET
1861				;TEST TSTB			
1862	005470	000240		SCOPE			

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1863	005472	105067	000047		CLRB	TEMP+1		;000000
1864	005476	000277			SCC			;SET CODES
1865	005500	105767	000041		TSTB	TEMP+1		;N=0,Z=1
1866	005504	100001			BPL	.+4		
1867	005506	000000			HLT			;N WAS NOT CLEARED
1868	005510	000240			SCOPE			
1869								
1870	005512	005267	000032		INC	TEMP+4		
1871	005516	001402			BEG	.+6		
1872	005520	000167	172454		JMP	BEGIN		
1873	005524	012737	000207	177566	MOV	#207, @#177566		
1874	005532	105737	177564		TSTB	@#177564		
1875	005536	100375			BPL	.-4		
1876	005540	000167	172434		JMP	BEGIN		
1877	005544	000000			TEMP	:0		
1878	005546	000000				0		
1879	005550	000000				0		
1880		000001			.END			

BEGIN 000200
HLT = 000000

295#	1872	1876											
289#	305	312	320	327	334	342	350	357	365	372	381	388	
396	403	410	418	426	433	441	448	459	466	474	481	488	
496	504	511	519	526	535	542	550	557	564	572	580	587	
595	602	613	620	628	635	642	650	658	665	673	680	689	
696	704	711	718	726	734	741	749	756	767	774	782	789	
796	804	812	819	827	834	843	850	858	865	872	880	888	
895	903	910	921	928	936	943	950	958	966	973	981	988	
997	1004	1012	1019	1026	1034	1042	1049	1057	1064	1075	1082	1090	
1097	1104	1112	1120	1127	1135	1142	1151	1158	1166	1173	1180	1188	
1196	1203	1211	1218	1229	1236	1244	1251	1258	1266	1274	1281	1289	
1296	1305	1312	1320	1327	1334	1342	1350	1357	1365	1372	1383	1390	
1398	1405	1412	1420	1428	1435	1443	1450	1459	1466	1474	1481	1488	
1496	1504	1511	1519	1526	1535	1538	1545	1548	1556	1559	1568	1571	
1578	1581	1589	1592	1601	1604	1611	1614	1622	1625	1634	1637	1644	
1647	1655	1658	1667	1670	1677	1680	1688	1691	1700	1703	1710	1713	
1721	1724	1733	1736	1743	1746	1754	1757	1766	1769	1776	1779	1787	
1790	1800	1807	1815	1822	1829	1837	1845	1852	1860	1867			

SCOPE = 000240

290#	301	307	314	322	329	336	344	352	359	367	373	377	
383	390	398	405	412	420	428	435	443	449	455	461	468	
476	483	490	498	506	513	521	527	531	537	544	552	559	
566	574	582	589	597	603	609	615	622	630	637	644	652	
660	667	675	681	685	691	698	706	713	720	728	736	743	
751	757	763	769	776	784	791	798	806	814	821	829	835	
839	845	852	860	867	874	882	890	897	905	911	917	923	
930	938	945	952	960	968	975	983	989	993	999	1006	1014	
1021	1028	1036	1044	1051	1059	1065	1071	1077	1084	1092	1099	1106	
1114	1122	1129	1137	1143	1147	1153	1160	1168	1175	1182	1190	1198	
1205	1213	1219	1225	1231	1239	1246	1253	1260	1268	1276	1283	1291	
1297	1301	1307	1314	1322	1329	1336	1344	1352	1359	1367	1373	1379	
1385	1392	1400	1407	1414	1422	1430	1437	1445	1451	1455	1461	1468	
1476	1483	1490	1498	1506	1513	1521	1527	1539	1549	1560	1572	1582	
1593	1605	1615	1626	1638	1648	1659	1671	1681	1692	1704	1714	1725	
1737	1747	1758	1770	1780	1791	1796	1802	1809	1817	1824	1831	1839	
1847	1854	1862	1868										

SR = 177570
TEMP = 005544

291#	1381*	1387*	1388*	1394*	1395*	1396*	1402*	1403*	1409*	1410*	1416*	1417*	1418*
1424*	1426*	1432*	1433*	1439*	1441*	1446*	1448	1457*	1463*	1464*	1470*	1471*	
1472*	1478*	1479*	1485*	1486*	1492*	1493*	1494*	1500*	1502*	1508*	1509*	1515*	
1517*	1522*	1524	1761*	1762*	1763*	1764	1767	1771*	1772*	1773*	1774*	1777*	
1781*	1782*	1783*	1784*	1785*	1788	1798*	1804*	1805*	1811*	1812*	1813*	1819*	
1820*	1826*	1827*	1833*	1834*	1835*	1841*	1843*	1849*	1850*	1856*	1858*	1863*	
1855	1870*	1877#											

= 005552

256#	257	259	261	263	265	267	269	271	273	275	277	279	
281	283	285	287	292#	304	311	319	326	333	341	349	356	
364	371	380	387	395	402	409	417	425	432	440	447	458	
465	473	480	487	495	503	510	518	525	534	541	549	556	
563	571	579	586	594	601	612	619	627	634	641	649	657	
664	672	679	688	695	703	710	717	725	733	740	748	755	
766	773	781	788	795	803	811	818	826	833	842	849	857	
864	871	879	887	894	902	909	920	927	935	942	949	957	
965	972	980	96	996	1003	1011	1018	1025	1033	1041	1048	1056	
1063	1074	1081	1089	1096	1103	1111	1119	1126	1134	1141	1150	1157	
1165	1172	1179	1187	1195	1202	1210	1217	1228	1235	1243	1250	1257	
1265	1273	1280	1288	1295	1304	1311	1319	1326	1333	1341	1349	1356	
1364	1371	1382	1389	1397	1404	1411	1419	1427	1434	1442	1449	1458	

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DOCA.P11 CROSS REFERENCE TABLE -- MACRO NAMES

.SS320	18
.SSCOP	18
.SSIZE	18
.SSUPR	18
.STRAP	18
.STYP8	18
.STYPD	18
.STYPE	18
.STYPO	18
.S4OCA	18
.1170	18

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 DOCA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

ADC	348 1433	355	502	509	656	663	810	817	964	971	1118	1125	1272	1279	1426
ADCB	424 1509	431	578	585	732	739	886	893	1040	1047	1194	1201	1348	1355	1502
BEO	324 586 871	319 612 894	1850 333 627	356 641 935	380 664 949	395 688 972	409 703 996	432 717 1011	458 740 1025	473 766 1048	487 781 1074	510 795 1089	534 818 1103	549 842 1126	563 857 1150
	1165 1458 1723	1179 1473 1745	1202 1487 1756	1228 1510 1778	1243 1547 1789	1257 1558 1799	1280 1580 1814	1304 1591 1828	1319 1613 1851	1333 1624 1871	1356 1646 1871	1382 1657 1871	1397 1679 1871	1411 1690 1871	1434 1712 1871
BMI	311 594 879	326 619 902	341 634 927	364 649 942	387 672 957	402 695 980	417 710 1003	440 725 1018	465 748 1033	480 773 1056	495 788 1081	518 803 1096	541 826 1111	556 849 1134	571 864 1157
	1172 1465 1859	1187 1480 1859	1210 1495 1859	1235 1518 1859	1250 1534 1859	1265 1567 1859	1288 1600 1859	1311 1633 1859	1326 1666 1859	1341 1699 1859	1364 1732 1859	1389 1765 1859	1404 1806 1859	1419 1821 1859	1442 1836 1859
BNE	349 1503	425 1555	503 1588	579 1621	657 1654	733 1687	811 1720	897 1753	965 1786	1041 1844	1119	1195	1273	1349	1427
BPL	371 1525	447 1537	525 1544	601 1570	679 1577	755 1603	833 1610	909 1636	987 1643	1063 1669	1141	1217	1295	1371	1449
	1768 353 1507	1775 429 1507	1866 507 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507	1875 583 1507
CCC	353 1507	429 1507	507 1507	583 1507	661 1507	737 1507	815 1507	891 1507	969 1507	1045 1507	1123	1199	1277	1353	1431
CLR	303 482 765	309 500 771	316 508 778	324 515 786	331 522 793	338 611 800	346 617 808	354 624 816	361 632 823	368 639 830	457 646 919	463 654 925	470 662 932	478 669 940	485 676 947
	954 1227 1416	962 1233 1424	970 1240 1432	977 1248 1439	984 1255 1446	1073 1262 1530	1079 1270 1540	1086 1278 1550	1094 1285 1563	1101 1292 1573	1108 1381 1583	1116 1387 1596	1124 1394 1606	1131 1402 1616	1138 1409 1629
CLRB	1639 379 568	1649 385 576	1662 392 584	1672 400 591	1682 407 598	1695 414 687	1705 422 693	1715 430 700	1728 437 708	1738 444 715	1748 533 722	1761 539 730	1771 546 738	1781 554 745	1781 561 752
	841 1030 1303	847 1038 1309	854 1046 1316	862 1053 1324	869 1060 1331	876 1149 1338	884 1155 1346	892 1162 1354	899 1170 1361	906 1177 1368	995 1184 1457	1001 1192 1463	1008 1200 1470	1016 1207 1478	1023 1214 1485
	1492 1641 1804	1500 1651 1811	1508 1664 1819	1515 1674 1826	1522 1684 1833	1532 1697 1841	1542 1707 1849	1552 1717 1856	1565 1730 1863	1575 1740 1863	1585 1750 1863	1598 1763 1863	1608 1773 1863	1618 1783 1863	1631 1798 1863
COM	310 1395	317 1531	464 1541	471 1543	618 1551	625 1553	772 1564	779 1574	926 1576	933 1584	1080 1586	1087 1597	1234 1607	1241 1609	1388 1617
	1619 1718	1630 1729	1640 1739	1642 1741	1650 1749	1652 1751	1663 1762	1673 1772	1675 1774	1683 1782	1685 1784	1696 1784	1706 1784	1708 1784	1716 1784
COMB	386 1471	393 1805	540 1812	547 1812	694 1812	701 1812	848 1812	855 1812	1002 1812	1009 1812	1156 1812	1163 1812	1310 1812	1317 1812	1464 1812
DEC	325 401	479 555	623 709	787 863	941 1017	1095 1171	1249 1325	1403 1479	1820 1820	1820 1820	1820 1820	1820 1820	1820 1820	1820 1820	1820 1820
DECB	259 268	260 289	262 262	264 264	266 266	268 268	270 270	272 272	274 274	274 274	276 276	278 278	280 280	282 282	286 286
HALT	259 268	260 289	262 262	264 264	266 266	268 268	270 270	272 272	274 274	274 274	276 276	278 278	280 280	282 282	286 286
INC	318 1417	339 1554	472 1587	493 1620	626 1653	647 1686	780 1719	801 1752	934 1785	955 1870	1088 1870	1109 1870	1242 1870	1263 1870	1396 1870
INCB	394 1493	415 1546	548 1579	569 1612	702 1645	723 1678	856 1711	877 1744	1010 1777	1031 1813	1164 1834	1185 1834	1318 1834	1339 1834	1472 1834
JMP	1872	1876													
MOV	1873														
NEG	332 1418	340	486	494	640	648	794	802	948	956	1102	1110	1256	1264	1410

NEGB	408	416	562	570	716	724	870	878	1024	1032	1178	1186	1332	1340	1486
	1494	1827	1835												
SBC	363	517	671	825	979	1133	1287	1441							
SBCB	439	593	747	901	1055	1209	1363	1517	1858						
SCC	302	308	315	323	330	337	369	378	384	391	399	406	413	445	456
	462	469	477	484	491	523	532	538	545	553	560	567	599	610	616
	623	631	638	645	677	686	692	699	707	714	721	753	764	770	777
	785	792	799	831	840	846	853	861	868	875	907	918	924	931	939
	946	953	985	994	1000	1007	1015	1022	1029	1061	1072	1078	1085	1093	1100
	1107	1139	1148	1154	1161	1169	1176	1183	1215	1226	1232	1239	1247	1254	1261
	1293	1302	1308	1315	1323	1330	1337	1369	1380	1386	1393	1401	1408	1415	1447
	1456	1462	1469	1477	1484	1491	1523	1797	1803	1810	1818	1825	1832	1864	
SEC	347	362	423	438	501	516	577	592	655	670	731	746	809	824	885
	900	963	978	1039	1054	1117	1132	1193	1208	1271	1286	1347	1362	1425	1440
TST	1501	1516	1842	1857											
	370	524	678	832	986	1140	1294	1448	1533	1566	1599	1632	1665	1698	1731
TSTB	1764														
	446	600	754	908	1062	1216	1370	1524	1536	1557	1569	1590	1602	1623	1635
	1656	1668	1689	1701	1722	1734	1755	1767	1788	1865	1874				
.ENABL	1														
.END	1880														
.LIST	1														
.MACR	294	295	1529												
.MACRO	1														
.NLIST	1														
.REF	1														
.REPT	257														

ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0

*.DOCA.SEQ/SOL/CRF/PAGNUM/NL:TOC=SYSMAC.CO,DOCA.P11
 RUN-TIME: 26 32 1 SECONDS
 RUN-TIME RATIO: 244/60=4.0
 CORE USED: 34K (67 PAGES)

