

DR11C

DEVICE REGISTER TEST
CZDRCH0

AH-8648H-MC

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DEC 1978

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MADE IN USA

.REM %

IDENTIFICATION

PRODUCT CODE: AC-8647H-MC
PRODUCT NAME: CZDRCH0 DR11C DEVICE REGISTER
DATE : APRIL, 1977
MAINTAINER: DIAGNOSTIC GROUP

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1. ABSTRACT

THIS IS A LOGIC TEST OF THE DR11C. FOR THIS TEST TO OPERATE
A SPECIAL MAINTENANCE CABLE MUST BE CONNECTED (BC08R).
THIS TEST WILL CHECK UP TO 32 SEQUENTIAL DR11C'S.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 STANDARD COMPUTER

DR11C

BC08R FOR EACH DR11C

2.2 STORAGE

2.2.1 PROGRAM STORAGE - THE ROUTINE USES MEMORY
FROM 0000 TO 5200.

3. LOADING PROCEDURE

3.1 METHOD

ABSOLUTE LOADER

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTING

FOR SWITCHLESS PROCESSORS, THE PROGRAM WILL USE THE
CONTENTS OF LOCATION 176 AS THE VALUE OF THE SWITCHES
IF NO HARDWARE SWITCH REGISTER IS FOUND. THE PROGRAM
ALLOWS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER
THROUGH THE CONTROL G (^G) ROUTINE. LOCATION 174
WILL BE USED AS THE SOFTWARE DISPLAY REGISTER.

STARTING AT SA 200 ALL SWITCHES SHOULD BE DOWN OR ZERO.
(IF NOT ZERO, BIT 0 TO 8 WILL BE STARTING VECTOR.)

4.2 STARTING ADDRESS OR ADDRESSES

(A) 200 = START OF TEST--FOR NORMAL TESTING
(B) 204 = SPECIAL ENTRANCE --FOR TESTING UNIQUE DR11C
(C) 210 = RESTART--FOR STARTING AFTER SHUT DOWN

4.3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY.

SET SWITCH REGISTER TO STARTING ADDRESS.
LOAD ADDRESS.
PRESS START.
THE PROGRAM WILL STAY IN SECTION AND LOOP.

4.3.1 FOR SPECIAL ENTRANCE - SA204

1ST HALT SET SWITCH REGISTER EQUAL TO CSR ADDRESS OF DR11C
PRESS CONTINUE
2ND HALT SET SWITCH REGISTER EQUAL TO VECTOR ADDRESS OF DR11C
PRESS CONTINUE
RAISE SWITCH 10 TO '1' TO INHIBIT SEQUENCING TO NEXT DR11C

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

5.1.1 AT SA 200 .. THE INSTRUCTION AND LOGIC TEST.
WITH ALL SWITCHES DOWN THE PROGRAM WILL PRINT
OUT ON ERRORS AND CONTINUE IN TEST. (* WILL
BE PRINTED AT COMPLETION OF TESTING EACH DR11C)

5.1.2 SWITCH SETTINGS ARE

SW15 = 1 OR UP ... HALT ON ERROR
SW14 = 1 OR UP ... SCOPE LOOP
SW13 = 1 OR UP ... INHIBIT PRINTOUT
SW12 = 1 OR UP ... NOT USED
SW11 = 1 OR UP ... INHIBIT ITERATION LOOP
SW10 = 1 OR UP ... DO NOT ADVANCE TO NEXT DR11C
SW09 = 1 OR UP ... INHIBIT PRINTOUT OF DEVICE TESTED.

5.1.3

5.2. SUBROUTINE ABSTRACTS

5.2.1 BEGIN SA 200

5.2.2 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST
IN THE INSTRUCTION SECTION. IT RECORDS THE STARTING
ADDRESS OF EACH SUB-TEST AS IT IS BEING ENTERED.
IF A SCOPE LOOP IS REQUESTED, IT WILL JUMP TO THE
START OF THE SUBTEST THAT THE SCOPE LOOP IS RE-
QUESTED FOR.

5.2.3 HALT

IS A ROUTINE THAT PRINTS-OUT AN ADDRESS THAT TAGS
THE FAILING SUBTEST, AND THE INCORRECT DATA AT
THE TIME OF THE FAILURE. SEE 6.1

(5. OPERATING PROCEDURE CONT'D)

5.3 PROGRAM AND/OR OPERATOR ACTION

5.3.1 LOADING AND STARTING AT 200 WITH ALL SWITCHES DOWN IS THE INSTRUCTION AND LOGIC TEST. IF AN ERROR IS DETECTED HERE, THERE WILL BE A PRINTOUT. WHEN AN ERROR IS DETECTED AND IT IS NECESSARY TO SCOPE ON IT, PLACE SW15 UP TO HALT ON ERROR, THEN SW14 UP TO LOOP ON ERROR, THEN SW13 UP TO DELETE PRINTOUTS.

6. ERRORS

6.1 ERROR PRINTOUT

ARE IN A FOUR WORD FORMAT. THE 1ST IS THE PC+2 OF THE DETECTED ERROR. THE 2ND IS THE PROCESSOR STATUS REGISTER. THE 3RD IS DEVICE ADDRESS, THE 4TH IS VECTOR ADDRESS.

6.2 ERROR RECOVERY

DEPRESS CONTINUE TO RESTART SECTION

7. RESTRICTIONS

7.1 STARTING RESTRICTION

NONE

7.2 OPERATIONAL RESTRICTION

THE DR11C MUST HAVE THE BC08R CABLE TO RUN THIS TEST.

NOTE THAT THE DR11C HAS FLOATING VECTORS:

THE BELOW IS THE ASSIGNMENT OF FLOATING VECTORS, THE ASSIGNED SEQUENCES ARE:

1. STARTING AT 300 AND WORKING UPWARD ALL DC11'S WILL BE ASSIGNED.
2. THEN ANY EXTRA KL11 CALLED FOR (VT05, VT06, LC11)
3. THEN ANY DP11 CALLED FOR.
4. THEN ANY DM11 CALLED FOR.
5. THEN ANY DN11 CALLED FOR.
6. THEN ANY DM11BB CALLED FOR.
7. THEN ANY DR11A CALLED FOR.
8. THEN ANY DR11C CALLED FOR.

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THE DR11A AND DR11C DEVICE ADDRESSES WILL BE ASSIGNED IN THE USER AREA OF 767776 TO 764000. THE ASSIGNMENT OF ADDRESSES WILL START AT THE HIGH ADDRESS LIMIT AND PROCEED DOWNWARD. USERS AND SPECIAL SYSTEMS SHOULD START THEIR ASSIGNMENTS OF SPECIAL DEVICES AT THE LOW ADDRESS LIMIT AND WORK UP. AFTER ASSIGNING ALL DR11A'S, ASSIGN DR11C'S

767776 TO 767770 DR11C #0 ;ASSUMING NO DR11A'S
767766 TO 767760 DR11C #1

:

767706 TO 767700 DR11C #7

:

767606 TO 767600 DR11C #15

8. MISCELLANEOUS

WHERE THERE ARE MULTIPLE DR11C OR A SYSTEM AND IT IS DESIRED TO TEST ONLY ONE OF THEM. THIS MAY BE ACHIEVED BY USING THE SPECIAL STARTING ADDRESS AND PLACING SW10 ON A ONE (UP) TO INHIBIT SEQUENCING TO THE NEXT DR11C. SEE 4.3.1.

8.1 EXECUTION TIME

FOR EACH DR11C ABOUT 1 MINUTE

8.2 UNTESTED LOGIC

SIGNALS TO USER NOT TESTED:
'NEW DATA READY'
'DATA TRANSMITTED'
'INIT' TO THE USER

9. PROGRAM DESCRIPTION

THIS PROGRAM WHEN STARTED AT 200 CHECKS THE STANDARD DR11-C'S

THE PROGRAM THEN PERFORMES AN INCREMENTAL LOGIC CHECK FOR THE SELECTED DR11C.

THE DATA REGISTER IS TESTED TO SEE IF 'RESET' CLEARS IT, AND IF IT WILL HOLD ALL COMBINATIONS OF NUMBERS.

THE READ/WRITE BITS OF THE STATUS REGISTER ARE ALSO TESTED.

BOTH THE 'A' AND 'B' INTERRUPTS ARE TESTED TO SEE IF THEY INTERRUPT AT THE CORRECT BUS REQUEST LEVEL BR-5.

AT THE END OF THE TEST AN '*' IS TYPED AND ALSO THE ADDRESSES OF THE DR11-C CONTROL STATUS REGISTER AND IT'S SIDE INTERRUPT VECTOR IS TYPED (IF SELECTED VIA SWITCH 9.). THE PROGRAM THEN RETESTS THE UNIT (IF SELECTED VIA SWITCH 10) OR SCANS TO THE NEXT DR11-C. IF ANOTHER DR11-C IS ON THE SYSTEM THEN THE PROGRAM RESTARTS TESTING

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THE NEW DR11-C.

AFTER ALL DR11-C'S HAVE BEEN TESTED THE PROGRAM WILL
TYPE 'END PASS' AND RESTART TESTING WITH THE INITIAL DR11-C.

IF NO ERRORS OCCUR AND THREE DR11-C'S ARE AVAILABLE
AND SWITCH 9 IS DOWN THE PROGRAM WILL TYPE.

160000 770 *

157770 1000 *

157760 1010 *

/

ETC.

IF SWITCH 9 IS UP THEN

*

*

*

IF A POWER FAIL OCCURS THE PROGRAM WILL RESTART AT 'START'.

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287
288
289      10.      LISTING
290
291
292      %
293
294
295      ;GENERAL REGISTER LOGIC TEST
296
297      177776      PSW=177776
298      104000      HLT=104000
299      167770      CSR= 67770
300
301      000000      ;REGISTER DEFINITIONS
302                  R0=%0
303                  R1=%1
304                  R2=%2
305                  R3=%3
306                  R4=%4
307                  R5=%5
308                  SP=%6
309                  PC=%7
310
311      ;SWITCHES
312
313      001000      SW9=1000
314      002000      SW10=2000
315      004000      SW11=4000
316      020000      SW13=20000
317      040000      SW14=40000
318
319      .SBTTL BASIC DEFINITIONS
320
321      ;*INITIAL ADDRESS OF THE STACK POINTER *** 1200 ***
322      001200      STACK= 1200
323      .EQUIV EMT,ERROR      ;;BASIC DEFINITION OF ERROR CALL
324      .EQUIV IOT,SCOPE      ;;BASIC DEFINITION OF SCOPE CALL
325
326      ;*MISCELLANEOUS DEFINITIONS
327      000011      HT= 11      ;;CODE FOR HORIZONTAL TAB
328      000012      LF= 12      ;;CODE FOR LINE FEED
329      000015      CR= 15      ;;CODE FOR CARRIAGE RETURN
330      000200      CRLF= 200    ;;CODE FOR CARRIAGE RETURN-LINE FEED
331      177776      PS= 177776  ;;PROCESSOR STATUS WORD
332      .EQUIV PS,PSW
333      177774      STKLMT= 177774 ;;STACK LIMIT REGISTER
334      177772      PIRQ= 177772 ;;PROGRAM INTERRUPT REQUEST REGISTER
335      177570      DSWR= 177570 ;;HARDWARE SWITCH REGISTER
336      177570      DDISP= 177570 ;;HARDWARE DISPLAY REGISTER
337
338      ;*GENERAL PURPOSE REGISTER DEFINITIONS
339      000000      R0= %0      ;;GENERAL REGISTER
340      000001      R1= %1      ;;GENERAL REGISTER
341      000002      R2= %2      ;;GENERAL REGISTER
342      000003      R3= %3      ;;GENERAL REGISTER
  
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343	000004	R4=	%4	::GENERAL REGISTER
344	000005	R5=	%5	::GENERAL REGISTER
345	000006	R6=	%6	::GENERAL REGISTER
346	000007	R7=	%7	::GENERAL REGISTER
347	000006	SP=	%6	::STACK POINTER
348	000007	PC=	%7	::PROGRAM COUNTER
349				
350		;*PRIORITY LEVEL DEFINITIONS		
351	000000	PR0=	0	::PRIORITY LEVEL 0
352	000040	PR1=	40	::PRIORITY LEVEL 1
353	000100	PR2=	100	::PRIORITY LEVEL 2
354	000140	PR3=	140	::PRIORITY LEVEL 3
355	000200	PR4=	200	::PRIORITY LEVEL 4
356	000240	PR5=	240	::PRIORITY LEVEL 5
357	000300	PR6=	300	::PRIORITY LEVEL 6
358	000340	PR7=	340	::PRIORITY LEVEL 7
359				
360		;*SWITCH REGISTER SWITCH DEFINITIONS		
361	100000	SW15=	100000	
362	040000	SW14=	40000	
363	020000	SW13=	20000	
364	010000	SW12=	10000	
365	004000	SW11=	4000	
366	002000	SW10=	2000	
367	001000	SW09=	1000	
368	000400	SW08=	400	
369	000200	SW07=	200	
370	000100	SW06=	100	
371	000040	SW05=	40	
372	000020	SW04=	20	
373	000010	SW03=	10	
374	000004	SW02=	4	
375	000002	SW01=	2	
376	000001	SW00=	1	
377		.EQUIV	SW09,SW9	
378		.EQUIV	SW08,SW8	
379		.EQUIV	SW07,SW7	
380		.EQUIV	SW06,SW6	
381		.EQUIV	SW05,SW5	
382		.EQUIV	SW04,SW4	
383		.EQUIV	SW03,SW3	
384		.EQUIV	SW02,SW2	
385		.EQUIV	SW01,SW1	
386		.EQUIV	SW00,SW0	
387				
388		;*DATA BIT DEFINITIONS (BIT00 TO BIT15)		
389	100000	BIT15=	100000	
390	040000	BIT14=	40000	
391	020000	BIT13=	20000	
392	010000	BIT12=	10000	
393	004000	BIT11=	4000	
394	002000	BIT10=	2000	
395	001000	BIT09=	1000	
396	000400	BIT08=	400	
397	000200	BIT07=	200	
398	000100	BIT06=	100	

399	000040	BIT05= 40
400	000020	BIT04= 20
401	000010	BIT03= 10
402	000004	BIT02= 4
403	000002	BIT01= 2
404	000001	BIT00= 1
405		.EQUIV BIT09,BIT9
406		.EQUIV BIT08,BIT8
407		.EQUIV BIT07,BIT7
408		.EQUIV BIT06,BIT6
409		.EQUIV BIT05,BIT5
410		.EQUIV BIT04,BIT4
411		.EQUIV BIT03,BIT3
412		.EQUIV BIT02,BIT2
413		.EQUIV BIT01,BIT1
414		.EQUIV BIT00,BIT0

;*BASIC "CPU" TRAP VECTOR ADDRESSES

416		ERRVEC= 4	::TIME OUT AND OTHER ERRORS
417	000004	RESVEC= 10	::RESERVED AND ILLEGAL INSTRUCTIONS
418	000010	TBITVEC=14	::'T' BIT
419	000014	TRTVEC= 14	::TRACE TRAP
420	000014	BPTVEC= 14	::BREAKPOINT TRAP (BPT)
421	000014	IOTVEC= 20	::INPUT/OUTPUT TRAP (IOT) **SCOPE**
422	000020	PWRVEC= 24	::POWER FAIL
423	000024	EMTVEC= 30	::EMULATOR TRAP (EMT) **ERROR**
424	000030	TRAPVEC=34	::'TRAP' TRAP
425	000034	TKVEC= 60	::TTY KEYBOARD VECTOR
426	000060	TPVEC= 64	::TTY PRINTER VECTOR
427	000064	PIRQVEC=240	::PROGRAM INTERRUPT REQUEST VECTOR

.ENABLE ABS

430	000000	.-0
431	000000	.+2
432	000002	HALT
433	000004	.+2
434	000006	HALT
435	000010	.+2
436	000012	HALT
437	000014	.+2
438	000016	HALT
439	000020	.+2
440	000022	HALT
441	000024	.+2
442	000026	HALT
443	000030	.+2
444	000032	HALT
445	000034	.+2
446	000036	HALT
447	000040	.+2
448	000042	HALT
449	000044	.+2
450	000046	HALT
451	000050	.+2
452	000052	HALT
453	000054	.+2
454	000056	HALT

455	000060	000062	.+2
456	000062	000000	HALT
457	000064	000066	.+2
458	000066	000000	HALT
459	000070	000072	.+2
460	000072	000000	HALT
461	000074	000076	.+2
462	000076	000000	HALT
463	000100	000102	.+2
464	000102	000000	HALT
465	000104	000106	.+2
466	000106	000000	HALT
467	000110	000112	.+2
468	000112	000000	HALT
469	000114	000116	.+2
470	000116	000000	HALT
471	000120	000122	.+2
472	000122	000000	HALT
473	000124	000126	.+2
474	000126	000000	HALT
475	000130	000132	.+2
476	000132	000000	HALT
477	000134	000136	.+2
478	000136	000000	HALT
479	000140	000142	.+2
480	000142	000000	HALT
481	000144	000146	.+2
482	000146	000000	HALT
483	000150	000152	.+2
484	000152	000000	HALT
485	000154	000156	.+2
486	000156	000000	HALT
487	000160	000162	.+2
488	000162	000000	HALT
489	000164	000166	.+2
490	000166	000000	HALT
491	000170	000172	.+2
492	000172	000000	HALT
493	000174	000176	.+2
494	000176	000000	HALT
495	000200	000202	.+2
496	000202	000000	HALT
497	000204	000206	.+2
498	000206	000000	HALT
499	000210	000212	.+2
500	000212	000000	HALT
501	000214	000216	.+2
502	000216	000000	HALT
503	000220	000222	.+2
504	000222	000000	HALT
505	000224	000226	.+2
506	000226	000000	HALT
507	000230	000232	.+2
508	000232	000000	HALT
509	000234	000236	.+2
510	000236	000000	HALT

511	000240	000242	.+2
512	000242	000000	HALT
513	000244	000246	.+2
514	000246	000300	HALT
515	000250	000252	.+2
516	000252	000000	HALT
517	000254	000256	.+2
518	000256	000000	HALT
519	000260	000262	.+2
520	000262	000000	HALT
521	000264	000266	.+2
522	000266	000000	HALT
523	000270	000272	.+2
524	000272	000000	HALT
525	000274	000276	.+2
526	000276	000000	HALT
527	000300	000302	.+2
528	000302	000000	HALT
529	000304	000306	.+2
530	000306	000000	HALT
531	000310	000312	.+2
532	000312	000000	HALT
533	000314	000316	.+2
534	000316	000000	HALT
535	000320	000322	.+2
536	000322	000000	HALT
537	000324	000326	.+2
538	000326	000000	HALT
539	000330	000332	.+2
540	000332	000000	HALT
541	000334	000336	.+2
542	000336	000000	HALT
543	000340	000342	.+2
544	000342	000000	HALT
545	000344	000346	.+2
546	000346	000000	HALT
547	000350	000352	.+2
548	000352	000000	HALT
549	000354	000356	.+2
550	000356	000000	HALT
551	000360	000362	.+2
552	000362	000000	HALT
553	000364	000366	.+2
554	000366	000000	HALT
555	000370	000372	.+2
556	000372	000000	HALT
557	000374	000376	.+2
558	000376	000000	HALT
559	000400	000402	.+2
560	000402	000000	HALT
561	000404	000406	.+2
562	000406	000000	HALT
563	000410	000412	.+2
564	000412	000000	HALT
565	000414	000416	.+2
566	000416	000000	HALT

567	000420	000422	.+2
568	000422	000000	HALT
569	000424	000426	.+2
570	000426	000000	HALT
571	000430	000432	.+2
572	000432	000000	HALT
573	000434	000436	.+2
574	000436	000000	HALT
575	000440	000442	.+2
576	000442	000000	HALT
577	000444	000446	.+2
578	000446	000000	HALT
579	000450	000452	.+2
580	000452	000000	HALT
581	000454	000456	.+2
582	000456	000000	HALT
583	000460	000462	.+2
584	000462	000000	HALT
585	000464	000466	.+2
586	000466	000000	HALT
587	000470	000472	.+2
588	000472	000000	HALT
589	000474	000476	.+2
590	000476	000000	HALT
591	000500	000502	.+2
592	000502	000000	HALT
593	000504	000506	.+2
594	000506	000000	HALT
595	000510	000512	.+2
596	000512	000000	HALT
597	000514	000516	.+2
598	000516	000000	HALT
599	000520	000522	.+2
600	000522	000000	HALT
601	000524	000526	.+2
602	000526	000000	HALT
603	000530	000532	.+2
604	000532	000000	HALT
605	000534	000536	.+2
606	000536	000000	HALT
607	000540	000542	.+2
608	000542	000000	HALT
609	000544	000546	.+2
610	000546	000000	HALT
611	000550	000552	.+2
612	000552	000000	HALT
613	000554	000556	.+2
614	000556	000000	HALT
615	000560	000562	.+2
616	000562	000000	HALT
617	000564	000566	.+2
618	000566	000000	HALT
619	000570	000572	.+2
620	000572	000000	HALT
621	000574	000576	.+2
622	000576	000000	HALT

623	000600	000602	.+2
624	000602	000000	HALT
625	000604	000606	.+2
626	000606	000000	HALT
627	000610	000612	.+2
628	000612	000000	HALT
629	000614	000616	.+2
630	000616	000000	HALT
631	000620	000622	.+2
632	000622	000000	HALT
633	000624	000626	.+2
634	000626	000000	HALT
635	000630	000632	.+2
636	000632	000000	HALT
637	000634	000636	.+2
638	000636	000000	HALT
639	000640	000642	.+2
640	000642	000000	HALT
641	000644	000646	.+2
642	000646	000000	HALT
643	000650	000652	.+2
644	000652	000000	HALT
645	000654	000656	.+2
646	000656	000000	HALT
647	000660	000662	.+2
648	000662	000000	HALT
649	000664	000666	.+2
650	000666	000000	HALT
651	000670	000672	.+2
652	000672	000000	HALT
653	000674	000676	.+2
654	000676	000000	HALT
655	000700	000702	.+2
656	000702	000000	HALT
657	000704	000706	.+2
658	000706	000000	HALT
659	000710	000712	.+2
660	000712	000000	HALT
661	000714	000716	.+2
662	000716	000000	HALT
663	000720	000722	.+2
664	000722	000000	HALT
665	000724	000726	.+2
666	000726	000000	HALT
667	000730	000732	.+2
668	000732	000000	HALT
669	000734	000736	.+2
670	000736	000000	HALT
671	000740	000742	.+2
672	000742	000000	HALT
673	000744	000746	.+2
674	000746	000000	HALT
675	000750	000752	.+2
676	000752	000000	HALT
677	000754	000756	.+2
678	000756	000000	HALT

679 000760 000762
680 000762 000000
681 000764 000766
682 000766 000000
683 000770 000772
684 000772 000000
685 000774 000776
686 000776 000000
687 000020 000020
688 000020 004652
689 000022 000340
690 000024 005124
691 000026 000340
692 000030 004126
693 000032 000340
694 000034 006562
695 000036 000340
696 000046 000046
697 000046 004112
698 000052 000052
699 000052 000000
700 000174 000174
701 000174 000000
702 000176 000000
703 000200 000200
704 000200 000137 001250
705 000204 000137 001616
706 000210 000137 001726
707 001200
708
709
710
711 001200 167770
712 001202 167772
713 001204 167774
714 001206 167773
715 001210 000300
716 001212 000302
717 001214 000304
718
719
720
721 001216 177570
722 001220 177570
723 001222 167770
724 001224 167772
725 001226 167774
726 001230 167773
727
728 001232 000300
729 001234 000302
730 001236 000304
731 001240 000000
732
733 001242 000000
734 001244 000240

.+2
HALT
.+2
HALT
.+2
HALT
.+2
HALT
.-20
.SCOPE
340
PFAIL
340
.HLT
340
\$TRAP
340
.=46
\$ENDAD
.=52
0
.=174
DISPRE: 0
SWREG: 0
.=200
JMP @#START1 ;INITIAL START
JMP @#SPEC ;TO SELECT UNIQUE ADDRESS AND VECTOR
JMP @#START ;RESTART
.=1200
;THIS TABLE CONTAINS INITIAL REGISTER AND VECTOR ADDRESSES
RCSR: CSR
CSR+2
CSR+4
CSR+3
RCSR1: 300
302
304
;THIS TABLE CONTAINS REGISTER AND VECTOR ADDRESSES OF THE DR11-C UNDER TEST
SWR: 177570
DISPLA: 177570
DRCSR: 167770 ;ADDRESS OF DR11-C STATUS REGISTER
DROBUF: 167772 ;ADDRESS OF DR OUTPUT BUFFER REG.
DRIBUF: 167774 ;ADDRESS OF DR INPUT BUFFER REG.
DRBHIO: 167773 ;HIGH BYTE OF OUTPUT BUFFER REG.
DRVECA: 300 ;INTERRUPT VECTOR OF UNIT UNDER TEST
DRLVL: 302
DRVECB: 304 ;INTERRUPT VECTOR
XORFLG: 0
COUNT: 0 ;COUNT LOCATION
PL: 240 ;PRIORITY LEVEL

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735 001246 000000      PASCNT: 0                      ;NUMBER OF PASSES COMPLETED
736
737 001250      START1:
738      .SBTTL INITIALIZE THE COMMON TAGS
739 001250 012706 001200      MOV      #STACK,SP          ;;SETUP THE STACK POINTER
740      ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
741      ;;EQUAL TO A '-1', SETUP FOR A SOFTWARE SWITCH REGISTER.
742 001254 013746 000004      MOV      @#ERRVEC,-(SP)      ;;SAVE ERROR VECTOR
743 001260 012737 001314 000004      MOV      #64$,@#ERRVEC  ;;SET UP ERROR VECTOR
744 001266 012767 177570 177722      MOV      #DSWR,SWR      ;;SETUP FOR A HARDWARE SWICH REGISTER
745 001274 012767 177570 177716      MOV      #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
746 001302 022777 177777 177706      CMP      #-1,@SWR      ;;TRY TO REFERENCE HARDWARE SWR
747 001310 001012      BNE      66$      ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
748      ;;AND THE HARDWARE SWR IS NOT -1
749 001312 000403      BR      65$      ;;BRANCH IF NO TIMEOUT
750 001314 012716 001322      64$: MOV      #65$,(SP)      ;;SET UP FOR TRAP RETURN
751 001320 000002      RTI
752 001322 012767 000176 177666      65$: MOV      #SWREG,SWR      ;;POINT TO SOFTWARE SWR
753 001330 012767 000174 177662      MOV      #DISPREG,DISPLAY
754 001336 012637 000004      66$: MOV      (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
755
756 001342 023737 000042 000046      CMP      @#42,@#46
757 001350 001433      BEQ      3$      ;YES, SKIP TITLE
758      .SBTTL TYPE PROGRAM NAME
759      ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
760 001352 005227 177777      INC      #-1      ;;FIRST TIME?
761 001356 001027      BNE      67$      ;;BRANCH IF NO
762 001360 104401 001416      TYPE      ,68$      ;;TYPE ASCIZ STRING
763      .SBTTL GET VALUE FOR SOFTWARE SWITCH REGISTER
764 001364 005737 000042      TST      @#42      ;;ARE WE RUNNING UNDER XXDP/ACT?
765 001370 001006      BNE      69$      ;;BRANCH IF YES
766 001372 026727 177620 000176      CMP      SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
767 001400 001005      BNE      70$      ;;BRANCH IF NO
768 001402 104405      GTSWR      ;;GET SOFT-SWR SETTINGS
769 001404 000403      BR      70$
770 001406 112767 000001 005144      69$: MOVB      #1,$AUTOB      ;;SET AUTO-MODE INDICATOR
771 001414      70$:
772 001414 000410      BR      67$      ;;GET OVER THE ASCIZ
773      ;;68$: .ASCIZ <CRLF>#MD-11-DZDRC-G#<CRLF>
774 001436      67$:
775 001436 000463      BR      8$      ;SKIP INTERRUPT VECTOR SIZER IF
776      ;IN AUTOMATIC MODE
777      ;SIZE FOR INTERRUPT VECTOR IF IN AUTOMATIC MODE.
778
779 001440 012700 000302      3$: MOV      #302,R0      ;SET UP FLOATING VECTOR AREA
780 001444 010060 177776      4$: MOV      R0,-2(R0)
781 001450 012720 000003      MOV      #3,(R0)+
782 001454 005720      TST      (R0)+
783 001456 022700 000776      CMP      #776,R0
784 001462 100370      BPL      4$
785 001464 012737 001516 000014      MOV      #5$,@#14      ;SET UP BPT
786 001472 012737 000340 000016      MOV      #340,@#16      ;SET UP BPT PSW
787 001500 012777 000101 177472      MOV      #101,@RCSR      ;FORCE AN INTERRUPT
788 001506 000240      NOP
789 001510 000240      NOP
790 001512 000000      HALT      ;NO INTERRUPT OCCURRED

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791 001514 000423          BR      6$
792 001516 162716 000004    5$: SUB      #4,(SP)          ;FIGURE OUT INTERRUPT VECTOR
793 001522 011637 001210    MOV      (SP),@#RCSR1        ;PUT IT IN TABLE
794 001526 013737 001210    001212 MOV      @#RCSR1,@#RCSR1+2
795 001534 062737 000002    001212 ADD      #2,@#RCSR1+2          ;FILL IN NEXT TABLE ENTRY
796 001542 013737 001210    001214 MOV      @#RCSR1,@#RCSR1+4
797 001550 062737 000004    001214 ADD      #4,@#RCSR1+4          ;FILL IN LAST TABLE ENTRY
798 001556 012737 000016    000114 MOV      #16,@#14        ;RESTORE BPT
799 001564 012700 000302    6$: MOV      #302,R0          ;SET UP TRAP CATCHER
800 001570 010060 177776    7$: MOV      R0,-2(R0)
801 001574 005020          CLR      (R0)+
802 001576 005720          TST      (R0)+
803 001600 022700 000776    CMP      #776,R0
804 001604 100371          BPL      7$
805 001606 004767 000020    8$: JSR      PC,FIRST
806 001612 000137 001726    JMP      @#START
807 001616 012706 001200    SPEC: MOV      #STACK,%6
808 001622 004767 000004    JSR      PC,FIRST
809 001626 000167 003360    JMP      SPEC0
810 001632 013746 000004    FIRST: MOV      @#4,-(%6)
811 001636 012737 001712    000004 MOV      #XORA,@#4
812 001644 012737 000031    177060 MOV      #31,@#177060
813 001652 012637 000004    MOV      (%6)+,@#4
814 001656 012737 177777    001240 MOV      #-1,@#XORFLG
815 001664 012701 160000    MOV      #160000,R1
816 001670 004737 005246    JSR      PC,@#SPEC1
817 001674 012701 000770    MOV      #770,R1
818 001700 004737 005276    JSR      PC,@#SPEC2
819 001704 104401          TYPE
820 001706 006640          MESS1
821 001710 000207          RTS      PC
822 001712 022626          XORA: CMP      (%6)+,(%6)+
823 001714 012637 000004    MOV      (%6)+,@#4
824 001720 005037 001240    CLR      @#XORFLG
825 001724 000207          RTS      PC
826                                     ;INITIALIZE ADDRESS AND VECTORS
827 001726 012700 001200    START: MOV      #RCSR,R0          ;GET ADDRESS OF FIRST POSSIBLE DR11-C'S
828 001732 012701 001222    MOV      #DRCSR,R1
829 001736 012021          MOV      (R0)+,(R1)+          ;LOAD INITIAL TEST ADDRESSES
830 001740 012021          MOV      (R0)+,(R1)+
831 001742 012021          MOV      (R0)+,(R1)+
832 001744 012021          MOV      (R0)+,(R1)+
833 001746 012021          MOV      (R0)+,(R1)+
834 001750 012021          MOV      (R0)+,(R1)+
835 001752 012021          MOV      (R0)+,(R1)+
836 001754 012706 001200    RSTART: MOV      #STACK,%6          ;SET UP STACK
837 001760 012767 002010    003004 MOV      #BEGIN,RETURN          ;SET SCOPE RETURN
838 001766 005037 004770    CLR      @#SCOPEF
839
840                                     ;DOES RESET CLEAR REGISTER?
841 001772 104406          CKSWR
842 001774 032777 001000    177214 BIT      #SW9,@SWR
843 002002 001002          BNE      BEGIN
844 002004 004737 005010          JSR      PC,@#MOREID
845 002010 016705 177206    BEGIN: MOV      DRCSR,R5          ;GET ADDRESS OF STATUS REGISTER
846 002014 012777 000240    175754 MOV      #240,@PSW          ;SET PRIORITY LEVEL 6

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847	002022	012737	002060	000004		MOV	#1\$,@#4	;SET TIME OUT TRAP VECTOR
848	002030	012767	000010	002730		MOV	#10,ICOUNT	
849	002036	012777	177777	177160		MOV	#-1,@DROBUF	;PRESET OUTPUT BUFFER
850	002044	000005				RESET		;CLEAR DATA REGISTER
851	002046	017700	177152			MOV	@DROBUF,%0	;GET RESULT OF RESET
852	002052	001403				BEQ	2\$	
853	002054	104000				HLT		;DATA REGISTER NOT CLEAR
854	002056	000401				BR	2\$	
855	002060	104000			1\$:	HLT		;ERROR! TIMED OUT WHEN REFERENCING DROBUF.
856	002062	012706	001200		2\$:	MOV	#STACK,SP	;RESET STACK POINTER
857	002066	012737	000006	000004		MOV	#6,@#4	;RESTORE TIME OUT TRAP
858								
859	002074	000004				SCOPE		
860	002076	012767	004000	002662		MOV	#4000,ICOUNT	
861	002104	012777	177777	177112		MOV	#-1,@DROBUF	;ALL ONES TO REGISTER
862	002112	017700	177106			MOV	@DROBUF,%0	
863	002116	022700	177777			CMP	#-1,%0	
864	002122	001401				BEQ	+.4	
865	002124	104000				HLT		;REG WILL NOT HOLD ONES
866								
867	002126	000004				SCOPE		
868	002130	012767	000010	002630		MOV	#10,ICOUNT	
869	002136	012777	177777	177060		MOV	#-1,@DROBUF	
870	002144	000005				RESET		;SET DATA TO ALL ONES
871	002146	005777	177054			TST	@DRIBUF	;SHOULD CLEAR REGISTER
872	002152	001401				BEQ	+.4	
873	002154	104000				HLT		;REG FAILED TO CLEAR
874								
875	002156	000004				SCOPE		
876	002160	012767	004000	002600		MOV	#4000,ICOUNT	
877	002166	012777	052525	177030		MOV	#52525,@DROBUF	
878	002174	017700	177024			MOV	@DROBUF,%0	
879	002200	022700	052525			CMP	#52525,%0	
880	002204	001401				BEQ	+.4	
881	002206	104000				HLT		;DATA NOT=52525
882								
883	002210	000004				SCOPE		
884	002212	012777	125252	177004		MOV	#125252,@DROBUF	
885	002220	017700	177000			MOV	@DROBUF,%0	
886	002224	022700	125252			CMP	#125252,%0	
887	002230	001401				BEQ	+.4	
888	002232	104000				HLT		;DATA NOT=125252
889								
890								;TEST RELIABILITY OF DR11-C OUTPUT BUFFER REGISTER
891	002234	000004				SCOPE		
892	002236	012737	000040	004766		MOV	#40,@#ICOUNT	
893	002244	010502			BUFTST:	MOV	R5,R2	;GET ADDRESS OF DRCSR
894	002246	005722				TST	(R2)+	;R2=ADDRESS OF OUTPUT BUFFER REG.
895	002250	012703	000401			MOV	#401,R3	;LOAD CONSTANT
896	002254	012704	000400		1\$:	MOV	#256.,R4	;SET COUNT
897	002260	005000				CLR	R0	;PRESET EXPECTED RESULT
898	002262	005012				CLR	(R2)	;CLEAR REGISTER
899	002264	060300			2\$:	ADD	R3,R0	
900	002266	060312				ADD	R3,(R2)	
901	002270	021200				CMP	(R2),R0	
902	002272	001401				BEQ	+.4	

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903 002274 104000          HLT
904 002276 005304          DEC      R4
905 002300 001371          BNE      2$
906 002302 006303          ASL      R3
907 002304 001363          BNE      1$
908
909                      ;TEST THAT BYTE REFERENCE TO DROBUF AFFECT PROPER BYTE ONLY
910
911 002306 000004          SCOPE
912 002310 012777 177777 176706 TAG: MOV      #-1,@DROBUF
913 002316 105077 176702          CLRB      @DROBUF          ;CLEAR LOW BYTE
914 002322 017700 176676          MOV      @DROBUF,%0
915 002326 022700 177400          CMP      #177400,%0
916 002332 001401          BEQ      .+4
917 002334 104000          HLT          ;BYTE LOW FAILED TO CLEAR
918
919 002336 000004          SCOPE
920 002340 012777 177777 176656 MOV      #-1,@DROBUF
921 002346 105077 176656          CLRB      @DRBHIO          ;CLEAR HIGH BYTE
922 002352 017700 176646          MOV      @DROBUF,%0
923 002356 022700 000377          CMP      #377,%0
924 002362 001401          BEQ      .+4
925 002364 104000          HLT          ;HIGH BYTE CLEAR FAILED
926
927 002366 000004          SCOPE
928 002370 005037 002440          CLR      @#2$
929 002374 012704 002440          MOV      #2$,R4
930 002400 005077 176620          CLR      @DROBUF
931 002404 105077 176620          CLRB      @DRBHIO
932 002410 105277 176614          1$: INCB      @DRBHIO          ;INCREMENT HIGH BYTE
933 002414 105264 000001          INCB      1(R4)
934 002420 027714 176600          CMP      @DROBUF,(R4)
935 002424 001401          BEQ      .+4
936 002426 104000          HLT          ;HIGH BYTE HAS BAD DATA
937 002430 105764 000001          TSTB      1(R4)
938 002434 001402          BEQ      3$
939 002436 000764          BR      1$
940 002440 000000          2$: .WORD      0
941 002442 000004          3$: SCOPE
942                      ;CONTROL STATUS REGISTER (DRCSR) TESTS.
943 002444 005015          CLR      (R5)
944 002446 011500          MOV      (R5),R0
945 002450 001401          BEQ      .+4
946 002452 104000          HLT
947 002454 012715 000140          MOV      #140,@R5          ;INTERRUPT ENABLE FOR A+B
948 002460 011500          MOV      @R5,%0
949 002462 022700 000140          CMP      #140,%0          ;ENABLE BITS
950 002466 001401          BEQ      .+4
951 002470 104000          HLT
952
953 002472 000004          SCOPE
954 002474 012767 000010 002264 MOV      #10,ICOUNT
955 002502 012715 000140          MOV      #140,@R5          ;SET INTERRUPT ENABLE FLOPS
956 002506 000005          RESET          ;CLEAR THOSE FLOPS
957 002510 011500          MOV      @R5,%0
958 002512 001401          BEQ      .+4

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959	002514	104000		HLT		;RESET DID NOT CLEAR INTERRUPT ENABLE BITS
960						
961	002516	000004		SCOPE		
962	002520	052715	000001	BIS	#1,@R5	;SHOULD SET REQ A ALSO
963	002524	021527	000201	CMP	@R5,#201	.
964	002530	001401		BEQ	+.4	
965	002532	104000		HLT		
966	002534	005015		CLR	@R5	
967						
968	002536	000004		SCOPE		
969	002540	052715	000002	BIS	#2,@R5	;SHOULD SET REQ B
970	002544	021527	100002	CMP	@R5,#100002	.
971	002550	001401		BEQ	+.4	
972	002552	104000		HLT		
973	002554	005015		CLR	@R5	
974						
975	002556	000004		SCOPE		
976	002560	052737	000340 177776	BIS	#340,@PSW	
977	002566	052715	177777	BIS	#-1,@R5	
978	002572	022715	100343	CMP	#100343,(R5)	
979	002576	001401		BEQ	+.4	
980	002600	104000		HLT		
981	002602	042715	000003	BIC	#3,@R5	
982	002606	022715	000140	CMP	#140,@R5	
983	002612	001401		BEQ	+.4	
984	002614	104000		HLT		;WRONG BITS SET
985						
986	002616	000004		SCOPE		
987	002620	012737	000340 177776	MOV	#340,@PSW	
988	002626	052715	000003	BIS	#3,@R5	
989	002632	000005		RESET		
990	002634	005715		TST	@R5	
991	002636	001401		BEQ	+.4	
992	002640	104000		HLT		;RESET DID NOT CLEAR
993						
994	002642	000004		SCOPE		
995	002644	012767	004000 002114	MOV	#4000,ICOUNT	
996	002652	005015		CLR	@R5	
997	002654	005215		INC	@R5	
998	002656	105715		TSTB	@R5	
999	002660	100401		BMI	+.4	
1000	002662	104000		HLT		;BIT 0 DID NOT SET BIT 7
1001						
1002	002664	000004		SCOPE		
1003	002666	012715	000002	MOV	#2,@R5	
1004	002672	005715		TST	@R5	
1005	002674	100401		BMI	+.4	
1006	002676	104000		HLT		;BIT 1 DID NOT SET BIT 15
1007						
1008				;TEST EXTERNAL TRANSFERS - CABLE MUST BE CONNECTED		
1009	002700	000004		SCOPE		
1010	002702	005077	176316	CLR	@DROBUF	
1011	002706	017777	176314 176310	MOV	@DRIBUF,@DROBUF	;TEST TRANSFER OF ZERO
1012	002714	001401		BEQ	+.4	
1013	002716	104000		HLT		;NOT EQUAL TO ZERO
1014						

1015	002720	000004			SCOPE	
1016	002722	012777	177777	176274	MOV	#-1,@DROBUF
1017	002730	017777	176272	176266	MOV	@DRIBUF,@DROBUF ;MOV ALL ONES
1018	002736	022777	177777	176260	CMP	#-1,@DROBUF
1019	002744	001401			BEQ	+.4
1020	002746	104000			HLT	;NOT ALL ONES
1021						
1022	002750	000004			SCOPE	
1023	002752	005067	002010		CLR	ICOUNT
1024	002756	005000			CLR	%0
1025	002760	010077	176240		MOV	%0,@DROBUF ;TEST ALL NUMBERS
1026	002764	017777	176236	176232	MOV	@DRIBUF,@DROBUF
1027	002772	020077	176226		CMP	%0,@DROBUF
1028	002776	001401			BEQ	+.4
1029	003000	104000			HLT	;ERROR - CHECK %0 FOR GOOD
1030	003002	005200			INC	%0 ;DROBUF FOR BAD
1031	003004	001403			BEQ	TST9
1032	003006	005077	176212		CLR	@DROBUF
1033	003012	000762			BR	TST6
1034	003014	000004			TST9:	SCOPE
1035	003016	012737	000005	004766	MOV	#5,@ICOUNT
1036						;TEST DATA FROM BLACK BOX (NOT CONNECTED)
1037	003024	012777	177777	176172	MOV	#-1,@DROBUF
1038	003032	017777	176166	176166	MOV	@DROBUF,@DRIBUF ;STATIC LINES EQUAL ONES
1039	003040	017700	176162		MOV	@DRIBUF,%0 ;DATA REGISTER TO %0
1040	003044	022700	177777		CMP	#-1,%0
1041	003050	001401			BEQ	+.4
1042	003052	104000			HLT	;REG 0 SHOULD ALL ONES
1043						
1044						;READY BIT IS IN A ONE STATE
1045	003054	000004			SCOPE	
1046	003056	012715	000003		MOV	#3,@R5 ;CSRO AND CSR1
1047	003062	011500			MOV	(R5),R0
1048	003064	022700	100203		CMP	#100203,R0
1049	003070	001401			BEQ	+.4
1050	003072	104000			HLT	
1051						
1052						;CAN WE RAISE INTERRUPT 'A'
1053	003074	000004			SCOPE	
1054	003076	052737	000340	177776	BIS	#340,@PSW ;LOCK OUT INTERRUPTS
1055	003104	012706	001200		MOV	#STACK,%6
1056	003110	012777	003132	176114	MOV	#TST4,@DRVECA ;INTERRUPT RETURN POINTER
1057	003116	012715	000101		MOV	#101,@R5 ;INTERRUPT ENABLE AND CSRO
1058	003122	005037	177776		CLR	@PSW
1059	003126	000240			NOP	
1060	003130	104000			HLT	;NO 'A' INTERRUPT
1061	003132	005015			TST4:	CLR @R5
1062	003134	016777	176074	176070	MOV	DRLVL,@DRVECA ;MOVE .+2 TO 'A' INTERRUPT VECTOR
1063						
1064						;RAISE INTERRUPT 'B'
1065	003142	000004			SCOPE	
1066	003144	012706	001200		MOV	#STACK,%6
1067	003150	052737	000340	177776	BIS	#340,@PSW
1068	003156	012777	003202	176052	MOV	#TST5,@DRVECB
1069	003164	012715	000042		MOV	#42,@R5 ;IE AND CSR1
1070	003170	042737	000377	177776	BIC	#377,@PSW

1071	003176	000240			NOP	
1072	003200	104000			HLT	;NO B INTERRUPT
1073	003202	005015			TST5: CLR @R5	
1074						
1075					;TEST FOR INTERRUPT FROM DEVICE	
1076	003204	016777	176034	176022	MOV PL,@DRLVL	
1077	003212	042737	000340	177776	BIC #340,@PSW	;PROCESSOR LEVEL ZERO
1078	003220	012777	003252	176004	MOV #TINT1,@DRVECA	
1079	003226	012706	001200		MOV #STACK,%6	;STACK POINTER
1080	003232	042777	000100	175762	BIC #100,@DRCSR	;CLEAR INTERRUPT ENABLE
1081	003240	052777	000101	175754	BIS #101,@DRCSR	;SET INTERRUPT ENABLE-AND CSRO
1082	003246	000240			NOP	
1083	003250	104000			HLT	;NO DEVICE INTERRUPT OCCURED
1084	003252	000004			TINT1: SCOPE	
1085						
1086					;TEST FOR INTERRUPT FROM THE DEVICE	
1087	003254	042737	000340	177776	BIC #340,@PSW	
1088	003262	052737	000040	177776	BIS #040,@PSW	;SET TO PRIORITY LEVEL 1
1089	003270	012777	003322	175734	MOV #TINT2,@DRVECA	;INTERRUPT VECTOR ADDRESS
1090	003276	012706	001200		MOV #STACK,%6	;SET UP STACK POINTER
1091	003302	042777	000100	175712	BIC #100,@DRCSR	;CLEAR INTERRUPT ENABLE
1092	003310	052777	000101	175704	BIS #101,@DRCSR	;SET INTERRUPT ENABLE-AND CSRO
1093	003316	000240			NOP	
1094	003320	104000			HLT	;NO DEVICE INTERRUPT OCCURED
1095						
1096	003322	000004			TINT2: SCOPE	
1097	003324	042737	000340	177776	BIC #340,@PSW	
1098	003332	052737	000100	177776	BIS #100,@PSW	;SET TO PRIORITY LEVEL 2
1099	003340	012777	003372	175664	MOV #TINT3,@DRVECA	;INTERRUPT VECTOR ADDRESS
1100	003346	012706	001200		MOV #STACK,%6	;SET UP STACK POINTER
1101	003352	042777	000100	175642	BIC #100,@DRCSR	;CLEAR INTERRUPT ENABLE
1102	003360	052777	000101	175634	BIS #101,@DRCSR	;SET INTERRUPT ENABLE-AND CSRO
1103	003366	000240			NOP	
1104	003370	104000			HLT	;NO DEVICE INTERRUPT OCCURED
1105						
1106	003372	000004			TINT3: SCOPE	
1107					;TEST FOR INTERRUPT FROM THE DEVICE	
1108	003374	042737	000340	177776	BIC #340,@PSW	
1109	003402	052737	000140	177776	BIS #140,@PSW	;SET TO PRIORITY LEVEL 3
1110	003410	012777	003442	175614	MOV #TINT4,@DRVECA	;INTERRUPT VECTOR ADDRESS
1111	003416	012706	001200		MOV #STACK,%6	;SET UP STACK POINTER
1112	003422	042777	000100	175572	BIC #100,@DRCSR	;CLEAR INTERRUPT ENABLE
1113	003430	052777	000101	175564	BIS #101,@DRCSR	;SET INTERRUPT ENABLE-AND CSRO
1114	003436	000240			NOP	
1115	003440	104000			HLT	;NO DEVICE INTERRUPT OCCURED
1116	003442	000004			TINT4: SCOPE	
1117						
1118					;TEST FOR INTERRUPT FROM DEVICE	
1119	003444	042737	000340	177776	BIC #340,@PSW	
1120	003452	052737	000200	177776	BIS #200,@PSW	;RAISE PROCESSOR PRIORITY TO LEVEL 4
1121	003460	012777	003522	175544	MOV #TINT5,@DRVECA	;IN CASE OF INTERRUPT
1122	003466	012706	001200		MOV #STACK,%6	;SET STACK POINTER
1123	003472	042777	000100	175522	BIC #100,@DRCSR	;CLEAR INTERRUPT ENABLE
1124	003500	052777	000101	175514	BIS #101,@DRCSR	;SET INTERRUPT ENABLE AND CSRO
1125	003506	000240			NOP	;LET INTERRUPT OCCUR
1126	003510	042777	000100	175504	BIC #100,@DRCSR	

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1127 003516 000240      NOP
1128 003520 104000      HLT                    ;NO DEVICE INTERRUPT OCCURED
1129 003522 000004      TINT5: SCOPE
1130
1131                    ;TEST FOR NO INTERRUPT FROM DEVICE (HIGHEST PROCESSOR PRIORITY)
1132 003524 052737 000340 177776      BIS      #340,@#PSW      ;RAISE PROCESSOR PRIORITY TO HIGHEST LEVEL
1133 003532 012777 003572 175472      MOV      #TINT6,@DRVECA ;IN CASE OF INTERRUPT
1134 003540 012706 001200      MOV      #STACK,%6      ;SET STACK POINTER
1135 003544 042777 000100 175450      BIC      #100,@DRCSR    ;CLEAR INTERRUPT ENABLE
1136 003552 052777 000101 175442      BIS      #101,@DRCSR
1137 003560 000240      NOP
1138 003562 042777 000100 175432      BIC      #100,@DRCSR
1139 003570 000401      BR      .+4                    ;WITH NO INTERRUPT, BRANCH OVER HALT
1140 003572 104000      TINT6: HLT                    ;INTERRUPT OCCURED
1141 003574 000004      SCOPE
1142
1143                    ;TEST FOR NO INTERRUPT FROM DEVICE
1144 003576 042737 000340 177776      BIC      #340,@#PSW
1145 003604 052737 000240 177776      BIS      #240,@#PSW      ;RAISE PROCESSOR PRIORITY TO LEVEL 5
1146 003612 012777 003652 175412      MOV      #TINT7,@DRVECA ;IN CASE OF INTERRUPT
1147 003620 012706 001200      MOV      #STACK,%6      ;SET STACK POINTER
1148 003624 042777 000100 175370      BIC      #100,@DRCSR    ;CLEAR INTERRUPT ENABLE
1149 003632 052777 000101 175362      BIS      #101,@DRCSR    ;SET INTERRUPT ENABLE AND CSRO
1150 003640 000240      NOP
1151 003642 042777 000100 175352      BIC      #100,@DRCSR    ;DON'T LEAVE IT SET
1152 003650 000401      BR      .+4                    ;WITH NO INTERRUPT, BRANCH OVER HALT
1153 003652 104000      TINT7: HLT                    ;INTERRUPT OCCURED
1154 003654 000004      SCOPE
1155
1156                    ;TEST FOR NO INTERRUPT FROM DEVICE
1157 003656 042737 000340 177776      BIC      #340,@#PSW
1158 003664 052737 000300 177776      BIS      #300,@#PSW      ;RAISE PROCESSOR PRIORITY TO LEVEL 6
1159 003672 012777 003732 175332      MOV      #TINT8,@DRVECA ;IN CASE OF INTERRUPT
1160 003700 012706 001200      MOV      #STACK,%6      ;SET STACK POINTER
1161 003704 042777 000100 175310      BIC      #100,@DRCSR    ;CLEAR INTERRUPT ENABLE
1162 003712 052777 000101 175302      BIS      #101,@DRCSR    ;SET INTERRUPT ENABLE-AND CSRO
1163 003720 042777 000100 175274      BIC      #100,@DRCSR    ;DON'T LEAVE IT SET
1164 003726 000240      NOP
1165 003730 000401      BR      .+4                    ;WITH NO INTERRUPT, BRANCH OVER HALT
1166 003732 104000      TINT8: HLT                    ;INTERRUPT OCCURED
1167 003734 000004      SCOPE
1168
1169 003736 016777 175272 175266      MOV      DRLVL,@DRVECA ;FOR FALSE INTERRUPT
1170 003744 005077 175262      CLR      @DRVECA
1171
1172                    ;END OF TEST ROUTINE
1173 003750 012777 000052 000356      END: MOV      #'*,@TDBR      ;TYPE '*'
1174 003756 105777 000354      1$: TSTB      @TCSR
1175 003762 100375      BPL      1$
1176 003764 005077 000344      CLR      @TDBR
1177 003770 105777 000342      2$: TSTB      @TCSR
1178 003774 100375      BPL      2$
1179 003776 104406      CKSWR
1180 004000 032777 002000 175210      BIT      #SW10,@SWR      ;LOOP ON SELECTED DR?
1181 004006 001402      BEQ      4$
1182 004010 000137 001754      JMP      @#RSTART      ;REPEAT TEST ON DR11C SELECTED

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1183 ;STEP TO NEXT DR11-C
1184 004014 012700 000010 4$: MOV #10,R0 ;STEPPING CONSTANT
1185 004020 012737 004072 000004 MOV #5$,@#4 ;SET TIME OUT TRAP
1186 004026 160005 SUB R0,R5 ;STEP TO NEXT DR11-C ADDRESS
1187 004030 005715 TST (R5) ;WILL TIME OUT IF NOT AVAILABLE
1188 004032 012705 001222 MOV #DRCSR,R5 ;SET TABLE POINTER
1189 004036 160025 SUB R0,(R5)+
1190 004040 160025 SUB R0,(R5)+
1191 004042 160025 SUB R0,(R5)+
1192 004044 160025 SUB R0,(R5)+
1193 004046 060025 ADD R0,(R5)+
1194 004050 060025 ADD R0,(R5)+
1195 004052 060025 ADD R0,(R5)+
1196 004054 000137 001754 JMP @#RSTART ;RESTART TEST USING NEXT DR11-C
1197 004060 104406 CKSWR
1198 004062 032777 001000 175126 BIT #SW9,@SWR
1199 004070 001004 BNE 8$
1200 004072 104401 5$: TYPE ;TYPE 'END PASS'
1201 004074 006675 MESS3
1202 004076 005267 175144 INC PASCNT ;KEEP TRACK OF PASSES COMPLETED
1203 004102 013700 000042 8$: MOV @#42,RC
1204 004106 001405 BEQ END1
1205 004110 000005 RESET
1206 004112 004710 $ENDAD: JSR PC,(R0)
1207 004114 000240 NOP
1208 004116 000240 NOP
1209 004120 000240 NOP
1210 004122 000137 001726 END1: JMP @#START
1211
1212 ;ENTERED WITH SYSTEM TRAP CALL(HLT)
1213 ;PRINT OUT THE ERROR PC AND STATUS REGISTER
1214 004126 104406 .HLT: CKSWR
1215 004130 037727 175062 020000 BIT @SWR,#SW13 ;TEST FOR INHIBIT PRINT OUT
1216 004136 001401 BEQ .+4 ;BRANCH TO PRINT
1217 004140 000002 RTI ;INHIBIT, RETURN TO MAIN STREAM
1218 004142 012667 000172 MOV (6)+,SAVPC ;PC OF FAILING ROUTINE
1219 004146 012667 000170 MOV (6)+,SAVCC ;CC OF ERROR CONDITION
1220 004152 024646 CMP -(6),-(6) ;REPOSITION THE STACK
1221 004154 105777 000156 TSTB @TCSR ;WAIT FOR FLAG
1222 004160 100375 BPL .-4 ;IF NOT UP.
1223 004162 012777 000215 000144 MOV #215,@TDBR ;CR
1224 004170 105777 000142 TSTB @TCSR
1225 004174 100375 BPL .-4
1226 004176 012777 000212 000130 MOV #212,@TDBR ;LINE FEED
1227 004204 105777 000126 TSTB @TCSR
1228 004210 100375 BPL .-4
1229 004212 010267 000110 MOV %2,SAVR2 ;SAVE R2
1230 004216 010367 000106 MOV %3,SAVR3 ;SAVE R3
1231 004222 010467 000104 MOV %4,SAVR4 ;SAVE R4
1232 004226 016702 000106 MOV SAVPC,%2
1233 004232 004767 000106 JSR %7,PRTAB ;PRINT OCTAL NUMBER
1234 004236 012777 000240 000070 MOV #240,@TDBR
1235 004244 105777 000066 TSTB @TCSR ;SPACE BETWEEN WORD,
1236 004250 100375 BPL .-4
1237 004252 016702 000064 MOV SAVCC,%2
1238 004256 004767 000062 JSR %7,PRTAB ;PRINT OCTAL NUMBER

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1239	004262	004767	000522		JSR	%7,MOREID	:DEVICE ADDRESS AND VECTORS
1240	004266	016702	000034		MOV	SAVR2,%2	:RESTORE REGISTERS
1241	004272	016703	000032		MOV	SAVR3,%3	
1242	004276	016704	000030		MOV	SAVR4,%4	
1243	004302	023737	000042	000046	CMP	@#42,@#46	:ARE WE IN ACT-11 AUTO MODE?
1244	004310	001404			BEQ	1\$	:HALT ON ERROR IF YES
1245	004312	104406			CKSWR		
1246	004314	005777	174676		TST	@SWR	:TEST FOR HALT SWITCH
1247	004320	100001			BPL	.+4	
1248	004322	000000		1\$:	HALT		:HALT ON ERROR SET
1249	004324	000002			RTI		:RETURN TO MAIN STREAM
1250	004326	000000		SAVR2:	0		
1251	004330	000000		SAVR3:	0		
1252	004332	000000		SAVR4:	0		
1253	004334	177566		TDBR:	177566		:DATA
1254	004336	177564		TCSR:	177564		:STATUS
1255	004340	000000		SAVPC:	0		
1256	004342	000000		SAVCC:	0		
1257							
1258	004344	005067	000252		PRTAB:	CLR BINCT	
1259	004350	005067	000244		CLR	WGTCT	
1260	004354	012704	004626		MOV	#LIST,%4	:GET LIST ADDRESS
1261	004360	012767	000005	000236	MOV	#5,ASCNT	
1262	004366	012767	000007	000220	MOV	#7,SEVEN	
1263	004374	012767	000001	000214	MOV	#1,DECM1	
1264	004402	105777	177730		WAIT1:	TSTB @TCSR	
1265	004406	100375			BPL	WAIT1	
1266	004410	005702			TST	%2	
1267	004412	100404			BMI	MINUS	:NEG SIGN PRINT 1
1268	004414	012777	000260	177712	MOV	#260,@TDBR	:POS SIGN PRINT 0
1269	004422	000403			BR	STAR	
1270	004424	012777	000261	177702	MINUS:	MOV #261,@TDBR	
1271	004432	016703	000156		STAR:	MOV SEVEN,%3	:PUT MASK IN R3
1272	004436	010267	000150		MOV	%2,TOODLE	:GET READY TO DOODLE NUMBER IN TOODLE
1273	004442	005167	000144		COM	TOODLE	:COMPENSATES FOR COMPLEMENT DURING BIC
1274	004446	046703	000140		BIC	TOODLE,%3	:AND IN OCTAL CHARACTER
1275	004452	001410			BEQ	WRTSC	:ZERO, WRITE 0 IN LIST
1276	004454	066767	000136	000136	MKNUM:	ADD DECM1,WGTCT	:COUNT UP TO
1277	004462	005267	000134		INC	BINCT	:AND RECORD
1278	004466	026703	000126		CMP	WGTCT,%3	:SAME BINARY WEIGHT
1279	004472	001370			BNE	MKNUM	:KEEP COUNTN
1280	004474	062767	000260	000120	WRTOC:	ADD #260,BINCT	:ADD ASCII PREFIX
1281	004502	016724	000114		MOV	BINCT,(4)+	:WRITE ASCII CHAR IN LIST
1282	004506	066767	000102	000102	ADD	SEVEN,DECM1	:EXPAND BINARY WEIGHT
1283	004514	005067	000100		CLR	WGTCT	
1284	004520	005067	000076		CLR	BINCT	
1285	004524	005367	000074		DEC	ASCNT	
1286	004530	001410			BEQ	XLIST	:5 CHAR IN LIST
1287	004532	012703	000003		MOV	#3,%3	:SET X3 FOR ADD LOOP
1288	004536	066767	000052	000050	MOADD:	ADD SEVEN,SEVEN	:MAKING SEVENTY BY SEVEN
1289	004544	005303			DEC	%3	
1290	004546	001373			BNE	MOADD	
1291	004550	000730			BR	STAR	:NX SEVEN SET GET NX OCTAL
1292	004552	012767	000005	000044	XLIST:	MOV #5,ASCNT	:SEND 5 CHAR TO TTY
1293	004560	105777	177552		WAIT2:	TSTB @TCSR	
1294	004564	100375			BPL	WAIT2	

1295	004566	014477	177542		MOV	-(4),@TDBR	
1296	004572	005367	000026		DEC	ASCNT	
1297	004576	001401			BEQ	HDFHM	;FINISH PRINTING GET NXT NUM
1298	004600	000767			BR	WAIT2	
1299	004602	105777	177530		HDFHM:	TSTB @TCSR	
1300	004606	100375			BPL	:-4	
1301	004610	000207			RTS	%7	;HEAD FOR HOME
1302	004612	000000			TOODLE:	0	
1303	004614	000000			SEVEN:	0	
1304	004616	000000			DECML:	0	
1305	004620	000000			WGTCT:	0	
1306	004622	000000			BINCT:	0	
1307	004624	000000			ASCNT:	0	
1308	004626	000000			LIST:	0	
1309	004630	000000				0	
1310	004632	000000				0	
1311	004634	000000				0	
1312	004636	000000				0	
1313							;SCOPE LOOP ROUTINE ENTERED BY USER TRAP
1314	004640	022606			SCOPEB:	CMP (6)+,%6	;REPOSITION THE STACK
1315	004642	012637	177776		MOV	(6)+,@PSW	
1316	004646	000177	000120		JMP	@RETURN	;SCOPE RETURN
1317							
1318							;SCOPE OR/AND ITERATION LOOP FOR EACH TEST 4000 TIMES
1319	004652	104406			.SCOPE:	CKSWR	
1320	004654	032777	040000	174334	BIT	#SW14,@SWR	;TEST SR FOR SCOPE
1321	004662	001366			BNE	SCOPEB	;YES SCOPE
1322	004664	005737	001240		TST	@XORFLG	
1323	004670	100012			BPL	1\$	
1324	004672	013746	000004		MOV	@#4,-(%6)	
1325	004676	012737	005000	000004	MOV	#XOR,@#4	
1326	004704	012737	000031	177060	MOV	#31,@#177060	
1327	004712	012637	000004		MOV	(%6)+,@#4	
1328	004716	104406			1\$:	CKSWR	
1329	004720	032777	004000	174270	BIT	#SW11,@SWR	;NO - TEST FOR ITERATION
1330	004726	001014			BNE	SCOPEA	;INHIBIT ITERATION
1331	004730	005767	174312		TST	PASCNT	;ARE WE IN FIRST PASS?
1332	004734	001411			BEQ	SCOPEA	;BRANCH IF YES; INHIBIT ITERATIONS
1333	004736	026767	000026	000022	CMP	SCOPEF,ICOUNT	
1334	004744	001403			BEQ	SCOPEG	;EXIT - DONE
1335	004746	005267	000016		INC	SCOPEF	;INCREMENT COUNT
1336	004752	000732			BR	SCOPEB	;LOOP SOME MORE
1337	004754	005067	000010		SCOPEG:	CLR SCOPEF	;CLEAR COUNT
1338	004760	011667	000006		SCOPEA:	MOV @%6,RETURN	;SAVE SCOPE RETURN POINTER
1339	004764	000002			RTI		;RETURN INLINE-NEXT TEST
1340	004766	004000			ICOUNT:	4000	
1341	004770	000000			SCOPEF:	0	;COUNT LOCATION FOR ITERATION LOOP
1342	004772	002010			RETURN:	BEGIN	;ADDRESS OF LAST TEST
1343	004774	000167	173200		JMP	200	
1344							
1345	005000	022626			XOR:	CMP (%6)+,(%6)+	
1346	005002	012637	000004		MOV	(%6)+,@#4	
1347	005006	000714			BR	SCOPEB	
1348							;FRINT DEVICE ADDRESS AND VECTOR
1349	005010	012777	000240	177316	MOREID:	MOV #240,@TDBR	
1350	005016	105777	177314		TSTB	@TCSR	

1351	005022	100375		BPL	.-4	
1352	005024	013702	001222	MOV	@DRCSR,%2	
1353	005030	004767	177310	JSR	%7,PRTAB	
1354	005034	J12777	000240	MOV	#240,@TDBR	177272
1355	005042	105777	177270	TSTB	@TCSR	
1356	005046	100375		BPL	.-4	
1357	005050	016702	174156	MOV	DRVFCA,%2	
1358	005054	004767	177264	JSR	%7,PRTAB	
1359	005060	012777	000215	MOV	#215,@TDBR	177246
1360	005066	105777	177244	TSTB	@TCSR	
1361	005072	100375		BPL	.-4	
1362	005074	012777	000212	MOV	#212,@TDBR	177232
1363	005102	105777	177230	TSTB	@TCSR	
1364	005106	100375		BPL	.-4	
1365	005110	005077	177220	CLR	@TDBR	
1366	005114	105777	177216	TSTB	@TCSR	
1367	005120	100375		BPL	.-4	
1368	005122	000207		RTS	%7	;BACK TO PRINT
1369						
1370						;ENTER HERE FOR POWER FAIL
1371						
1372	005124	010046		PFAIL: MOV	%0,-(6)	;SAVE REGISTER OR STACK
1373	005126	010146		MOV	%1,-(6)	;WHEN POWERING DOWN
1374	005130	010246		MOV	%2,-(6)	
1375	005132	010346		MOV	%3,-(6)	
1376	005134	010446		MOV	%4,-(6)	
1377	005136	010546		MOV	%5,-(6)	
1378	005140	016746	172660	MOV	24,-(6)	
1379	005144	010637	005160	MOV	%6,@SAVR6	;STORE STACK POSITION
1380	005150	012737	005162	MOV	#RESTAR,@#24	
1381	005156	000000		HALT		;HALT ON POWER DOWN NORMAL
1382	005160	000000		SAVR6: 0		;STACK IS SAVED HERE
1383	005162	016706	177772	RESTAR: MOV	SAVR6,%6	;RESTORE REGISTER OFF STACK
1384	005166	012667	172632	MOV	(6)+,%24	;WHEN POWERING UP
1385	005172	012605		MOV	(6)+,%5	
1386	005174	012604		MOV	(6)+,%4	
1387	005176	012603		MOV	(6)+,%3	
1388	005200	012602		MOV	(6)+,%2	
1389	005202	012601		MOV	(6)+,%1	
1390	005204	012600		MOV	(6)+,%0	
1391	005206	000137	001754	JMP	@RSTART	
1392						
1393						;ENTER HERE FOR UNIQUE SELECTION OF DR11C
1394						
1395	005212	000000		SPEC0: HALT		;PLACE ADDRESS OF DR11-C CONTROL STATUS
1396	005214	104406		CKSWR		
1397	005216	017701	173774	MOV	@SWR,R1	
1398	005222	004737	005246	JSR	PC,@SPEC1	
1399	005226	000000		HALT		
1400	005230	104406		CKSWR		
1401	005232	017701	173760	MOV	@SWR,R1	
1402	005236	004737	005276	JSR	PC,@SPEC2	
1403	005242	000137	001726	JMP	@RSTART	
1404						
1405	005246	012700	001200	SPEC1: MOV	#RCSR,R0	;SET TABLE ADDRESS
1406	005252	010120		MOV	R1,(R0)+	;LOAD INTO TABLE STARTING AT RCSR

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1407 005254 062701 000002      ADD    #2,R1      ;STEP TO ADDRESS OF DROUTBUF
1408 005260 010120      MOV    R1,(R0)+    ;LOAD INTO TABLE
1409 005262 062701 000002      ADD    #2,R1      ;STEP TO ADDRESS OF DRINBUF
1410 005266 010120      MOV    R1,(R0)+    ;LOAD INTO TABLE
1411 005270 005301      DEC     R1          ;FORM ADDRESS OF DROUTBUF+1
1412 005272 010120      MOV    R1,(R0)+    ;LOAD INTO TABLE
1413 005274 000207      RTS     PC
1414
1415 005276 012700 001210      SPEC2: MOV    #RCSR1,R0
1416 005302 010120      MOV    R1,(R0)+    ;LOAD INTO TABLE
1417 005304 005721      TST     (R1)+
1418 005306 010120      MOV    R1,(R0)+
1419 005310 005721      TST     (R1)+
1420 005312 010120      MOV    R1,(R0)+
1421 005314 000207      RTS     PC
1422
1423      .LIST    ME
1424 005316      TYP:
1425      .SBTTL   TYPE ROUTINE
1426
1427      ;*****
1428      ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
1429      ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
1430      ;*NOTE1:      $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
1431      ;*NOTE2:      $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
1432      ;*NOTE3:      $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
1433      ;*
1434      ;*CALL:
1435      ;*1) USING A TRAP INSTRUCTION
1436      ;*      TYPE      ,MESADR      ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
1437      ;*OR
1438      ;*      TYPE
1439      ;*      MESADR
1440      ;*
1441
1442 005316 105767 000223      $TYPE: TSTB    $TPFLG      ;;IS THERE A TERMINAL?
1443 005322 100002      BPL     1$          ;;BR IF YES
1444 005324 000000      HALT    ;          ;;HALT HERE IF NO TERMINAL
1445 005326 000407      BR      3$          ;;LEAVE
1446 005330 010046      1$:    MOV    R0,-(SP)      ;;SAVE R0
1447 005332 017600 000002      MOV    @2(SP),R0      ;;GET ADDRESS OF ASCIZ STRING
1448 005336 112046      2$:    MOVB   (R0)+,-(SP)      ;;PUSH CHARACTER TO BE TYPED ONTO STACK
1449 005340 001005      BNE     4$          ;;BR IF IT ISN'T THE TERMINATOR
1450 005342 005726      TST     (SP)+          ;;IF TERMINATOR POP IT OFF THE STACK
1451 005344 012600      60$:   MOV    (SP)+,R0      ;;RESTORE R0
1452 005346 062716 000002      3$:    ADD    #2,(SP)      ;;ADJUST RETURN PC
1453 005352 000002      RTI          ;;RETURN
1454 005354 122716 000011      4$:    CMPB   #HT,(SP)      ;;BRANCH IF <HT>
1455 005360 001430      BEQ     8$          ;
1456 005362 122716 000200      CMPB   #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
1457 005366 001006      BNE     5$          ;
1458 005370 005726      TST     (SP)+          ;;POP <CR><LF> EQUIV
1459 005372 104401      TYPE          ;;TYPE A CR AND LF
1460 005374 005547      $CRLF
1461 005376 105067 000130      CLRB   $CHARCNT      ;;CLEAR CHARACTER COUNT
1462 005402 000755      BR      2$          ;;GET NEXT CHARACTER

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1463 005404 004767 000056      5$: JSR PC,$TYPEC      ;;GO TYPE THIS CHARACTER
1464 005410 126726 000130      6$: CMPB $FILLC,(SP)+      ;;IS IT TIME FOR FILLER CHARS.?
1465 005414 001350              BNE 2$              ;;IF NO GO GET NEXT CHAR.
1466 005416 0167 000120          MOV $NULL,-(SP)      ;;GET # OF FILLER CHARS. NEEDED
1467                                ;;AND THE NULL CHAR.
1468 005422 105366 000001      7$: DECB 1(SP)          ;;DOES A NULL NEED TO BE TYPED?
1469 005426 002770              BLT 6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
1470 005430 004767 000032          JSR PC,$TYPEC      ;;GO TYPE A NULL
1471 005434 105367 000072          DECB $CHARCNT      ;;DO NOT COUNT AS A COUNT
1472 005440 000770              BR 7$              ;;LOOP
1473
1474                                ;HORIZONTAL TAB PROCESSOR
1475
1476 005442 112716 000040      8$: MOVB #' ,(SP)      ;;REPLACE TAB WITH SPACE
1477 005446 004767 000014      9$: JSR PC,$TYPEC      ;;TYPE A SPACE
1478 005452 132767 000007 000052 BITB #7,$CHARCNT      ;;BRANCH IF NOT AT
1479 005460 001372              BNE 9$              ;;TAB STOP
1480 005462 005726              TST (SP)+            ;;POP SPACE OFF STACK
1481 005464 000724              BR 2$              ;;GET NEXT CHARACTER
1482 005466 105777 000044      $TYPEC: TSTB @ $TPS      ;;WAIT UNTIL PRINTER IS READY
1483 005472 100375              BPL $TYPEC
1484 005474 116677 000002 000036 MOVB 2(SP),@ $TPB      ;;LOAD CHAR TO BE TYPED INTO DATA REG.
1485 005502 122766 000015 000002 CMPB #CR,2(SP)      ;;IS CHARACTER A CARRIAGE RETURN?
1486 005510 001003              BNE 1$              ;;BRANCH IF NO
1487 005512 105067 000014          CLRB $CHARCNT      ;;YES--CLEAR CHARACTER COUNT
1488 005516 000406              BR $TYPEX          ;;EXIT
1489 005520 122766 000012 000002 1$: CMPB #LF,2(SP)      ;;IS CHARACTER A LINE FEED?
1490 005526 001402              BEQ $TYPEX          ;;BRANCH IF YES
1491 005530 105227              INCB (PC)+          ;;COUNT THE CHARACTER
1492 005532 000000              $CHARCNT: .WORD 0      ;;CHARACTER COUNT STORAGE
1493 005534 000207              $TYPEX: RTS PC
1494
1495 005536 177564              $TPS: .WORD 177564      ;;TTY PRINTER STATUS REG. ADDRESS
1496 005540 177566              $TPB: .WORD 177566      ;;TTY PRINTER BUFFER REG. ADDRESS
1497 005542 000              $NULL: .BYTE 0          ;;CONTAINS NULL CHARACTER FOR FILLS
1498 005543 002              $FILLS: .BYTE 2          ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
1499 005544 012              $FILLC: .BYTE 12         ;;INSERT FILL CHARS. AFTER A 'LINE FEED'
1500 005545 000              $TPFLG: .BYTE 0          ;;'TERMINAL AVAILABLE' FLAG (BIT<07>=0=YES)
1501 005546 077              $QUES: .ASCII '?'        ;;QUESTION MARK
1502 005547 015              $CRLF: .ASCII <15>      ;;CARRIAGE RETURN
1503 005550 000012          $LF: .ASCII <12>         ;;LINEFEED
1504                                .SBTTL BINARY TO OCTAL (ASCII) AND TYPE
1505
1506                                ;*****
1507                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
1508                                ;*OCTAL (ASCII) NUMBER AND TYPE IT.
1509                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
1510                                ;*CALL:
1511                                ;*      MOV NUM,-(SP)      ;;NUMBER TO BE TYPED
1512                                ;*      TYPOS      ;;CALL FOR TYPEOUT
1513                                ;*      .BYTE N          ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
1514                                ;*      .BYTE M          ;;M=1 OR 0
1515                                ;*                                ;;1-TYPE LEADING ZEROS
1516                                ;*                                ;;0=SUPPRESS LEADING ZEROS
1517                                ;*
1518                                ;*$TYPON---ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST

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1519      ;*$TYPOS OR $TYPOC
1520      ;*CALL:
1521      ;*      MOV      NUM,-(SP)      ;;NUMBER TO BE TYPED
1522      ;*      TYPON      ;;CALL FOR TYPEOUT
1523      ;*
1524      ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
1525      ;*CALL:
1526      ;*      MOV      NUM,-(SP)      ;;NUMBER TO BE TYPED
1527      ;*      TYPOC      ;;CALL FOR TYPEOUT
1528      ;*
1529      005552 017646 000000      000211 $TYPOS: MOV      @ (SP),-(SP)      ;;PICKUP THE MODE
1530      005556 116667 000001      MOV      1(SP), $OFILL      ;;LOAD ZERO FILL SWITCH
1531      005564 112667 000207      MOV      (SP)+, $OMODE+1      ;;NUMBER OF DIGITS TO TYPE
1532      005570 062716 000002      ADD      #2, (SP)      ;;ADJUST RETURN ADDRESS
1533      005574 000406      BR      $TYPON
1534      005576 112767 000001 000171 $TYPOC: MOV      #1, $OFILL      ;;SET THE ZERO FILL SWITCH
1535      005604 112767 000006 000165      MOV      #6, $OMODE+1      ;;SET FOR SIX(6) DIGITS
1536      005612 112767 000005 000154 $TYPON: MOV      #5, $OCNT      ;;SET THE ITERATION COUNT
1537      005620 010346      MOV      R3, -(SP)      ;;SAVE R3
1538      005622 010446      MOV      R4, -(SP)      ;;SAVE R4
1539      005624 010546      MOV      R5, -(SP)      ;;SAVE R5
1540      005626 116704 000145      MOV      $OMODE+1, R4      ;;GET THE NUMBER OF DIGITS TO TYPE
1541      005632 005404      NEG      R4
1542      005634 062704 000006      ADD      #6, R4      ;;SUBTRACT IT FOR MAX. ALLOWED
1543      005640 110467 000132      MOV      R4, $OMODE      ;;SAVE IT FOR USE
1544      005644 116704 000125      MOV      $OFILL, R4      ;;GET THE ZERO FILL SWITCH
1545      005650 016605 000012      MOV      12(SP), R5      ;;PICKUP THE INPUT NUMBER
1546      005654 005003      CLR      R3      ;;CLEAR THE OUTPUT WORD
1547      005656 006105      1$: ROL      R5      ;;ROTATE MSB INTO 'C'
1548      005660 000404      BR      3$      ;;GO DO MSB
1549      005662 006105      2$: ROL      R5      ;;FORM THIS DIGIT
1550      005664 006105      ROL      R5
1551      005666 006105      ROL      R5
1552      005670 010503      MOV      R5, R3
1553      005672 006103      3$: ROL      R3      ;;GET LSB OF THIS DIGIT
1554      005674 105367 000076      DECB      $OMODE      ;;TYPE THIS DIGIT?
1555      005700 100016      BPL      7$      ;;BR IF NO
1556      005702 042703 177770      BIC      #177770, R3      ;;GET RID OF JUNK
1557      005706 001002      BNE      4$      ;;TEST FOR 0
1558      005710 005704      TST      R4      ;;SUPPRESS THIS 0?
1559      005712 001403      BEQ      5$      ;;BR IF YES
1560      005714 005204      4$: INC      R4      ;;DON'T SUPPRESS ANYMORE 0'S
1561      005716 052703 000060      BIS      #'0, R3      ;;MAKE THIS DIGIT ASCII
1562      005722 052703 000040      5$: BIS      #' , R3      ;;MAKE ASCII IF NOT ALREADY
1563      005726 110367 000040      MOV      R3, 8$      ;;SAVE FOR TYPING
1564      005732 104401 005772      TYPE      , 8$      ;;GO TYPE THIS DIGIT
1565      005736 105367 000032      7$: DECB      $OCNT      ;;COUNT BY 1
1566      005742 003347      BGT      2$      ;;BR IF MORE TO DO
1567      005744 002402      BLT      6$      ;;BR IF DONE
1568      005746 005204      INC      R4      ;;INSURE LAST DIGIT ISN'T A BLANK
1569      005750 000744      BR      2$      ;;GO DO THE LAST DIGIT
1570      005752 012605      6$: MOV      (SP)+, R5      ;;RESTORE R5
1571      005754 012604      MOV      (SP)+, R4      ;;RESTORE R4
1572      005756 012603      MOV      (SP)+, R3      ;;RESTORE R3
1573      005760 016666 000002 000004      MOV      2(SP), 4(SP)      ;;SET THE STACK FOR RETURNING
1574      005766 012616      MOV      (SP)+, (SP)

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1575	005770	000002			RTI		::RETURN
1576	005772	000			8\$: .BYTE 0		::STORAGE FOR ASCII DIGIT
1577	005773	000			.BYTE 0		::TERMINATOR FOR TYPE ROUTINE
1578	005774	000			\$OCNT: .BYTE 0		::OCTAL DIGIT COUNTER
1579	005775	000			\$OFILL: .BYTE C		::ZERO FILL SWITCH
1580	005776	000000			\$OMODE: .WORD 0		::NUMBER OF DIGITS TO TYPE
1581					.SBTTL TTY INPUT ROUTINE		
1582							
1583					::*****		
1584	006000	177560			\$TKS: .WORD 177560		::TTY KBD STATUS
1585	006002	177562			\$TKB: .WORD 177562		::TTY KBD BUFFER
1586					.ENABL LSB		
1587							
1588					::*****		
1589					::*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.		
1590					::*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL		
1591					::*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL		
1592					::*WHEN OPERATING IN TTY FLAG MODE.		
1593	006004	022767	000176	173204	\$CKSWR: CMP #SWREG,SWR		::IS THE SOFT-SWR SELECTED?
1594	006012	001074			BNE 15\$		::BRANCH IF NO
1595	006014	105777	177760		TSTB @TKS		::CHAR THERE?
1596	006020	100071			BPL 15\$		::IF NO, DON'T WAIT AROUND
1597	006022	117746	177754		MOVB @TKB,-(SP)		::SAVE THE CHAR
1598	006026	042716	177600		BIC #^C177,(SP)		::STRIP-OFF THE ASCII
1599	006032	022726	000007		CMP #7,(SP)+		::IS IT A CONTROL G?
1600	006036	001062			BNE 15\$		::NO, RETURN TO USER
1601	006040	126727	000514	000001	CMPB \$AUTOB,#1		::ARE WE RUNNING IN AUTO-MODE?
1602	006046	001456			BEQ 15\$		::BRANCH IF YES
1603							
1604	006050	104401	006531		\$GTSWR: TYPE , \$CNTLG		::ECHO THE CONTROL-G (^G)
1605	006054	104401	006536		TYPE , \$MSWR		::TYPE CURRENT CONTENTS
1606	006060	016746	172112		MOV SWREG,-(SP)		::SAVE SWREG FOR TYPEOUT
1607	006064	104402			TYPOC		::GO TYPE--OCTAL ASCII(ALL DIGITS)
1608	006066	104401	006547		TYPE , \$MNEW		::PROMPT FOR NEW SWR
1609	006072	005046			19\$: CLR -(SP)		::CLEAR COUNTER
1610	006074	005046			CLR -(SP)		::THE NEW SWR
1611	006076	105777	177676		7\$: TSTB @TKS		::CHAR THERE?
1612	006102	100375			BPL 7\$		::IF NOT TRY AGAIN
1613							
1614	006104	117746	177672		MOVB @TKB,-(SP)		::PICK UP CHAR
1615	006110	042716	177600		BIC #^C177,(SP)		::MAKE IT 7-BIT ASCII
1616							
1617							
1618							
1619	006114	021627	000025		9\$: CMP (SP),#25		::IS IT A CONTROL-U?
1620	006120	001005			BNE 10\$		::BRANCH IF NOT
1621	006122	104401	006524		TYPE , \$CNTLU		::YES, ECHO CONTROL-U (^U)
1622	006126	062706	000006		20\$: ADD #6,SP		::IGNORE PREVIOUS INPUT
1623	006132	000757			BR 19\$		::LET'S TRY IT AGAIN
1624							
1625							
1626	006134	021627	000015		10\$: CMP (SP),#15		::IS IT A <CR>?
1627	006140	001022			BNE 16\$		::BRANCH IF NO
1628	006142	005766	000004		TST 4(SP)		::YES, IS IT THE FIRST CHAR?
1629	006146	001403			BEQ 11\$		::BRANCH IF YES
1630	006150	016677	000002	173040	MOV 2(SP),@SWR		::SAVE NEW SWR

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1631 006156 062706 000006      11$: ADD #6,SP      ;;CLEAR UP STACK
1632 006162 104401 005547      14$: TYPE ,SCRLF    ;;ECHO <CR> AND <LF>
1633 006166 126727 C00367 000001      CMPB $INTAG,#1  ;;RE-ENABLE TTY KBD INTERRUPTS?
1634 006174 001003      BNE 15$      ;;BRANCH IF NOT
1635 006176 012777 000100 177574      MOV #100,@$TKS  ;;RE-ENABLE TTY KBD INTERRUPTS
1636 006204 000002      15$: RTI      ;;RETURN
1637 006206 004767 177254      16$: JSR PC,$TYPEC  ;;ECHO CHAR
1638 006212 021627 000060      CMP (SP),#60      ;;CHAR < 0?
1639 006216 002420      BLT 18$      ;;BRANCH IF YES
1640 006220 021627 000067      CMP (SP),#67      ;;CHAR > 7?
1641 006224 003015      BGT 18$      ;;BRANCH IF YES
1642 006226 042726 000060      BIC #60,(SP)+    ;;STRIP-OFF ASCII
1643 006232 005766 000002      TST 2(SP)      ;;IS THIS THE FIRST CHAR
1644 006236 001403      BEQ 17$      ;;BRANCH IF YES
1645 006240 006316      ASL (SP)      ;;NO, SHIFT PRESENT
1646 006242 006316      ASL (SP)      ;;CHAR OVER TO MAKE
1647 006244 006316      ASL (SP)      ;;ROOM FOR NEW ONE.
1648 006246 005266 000002      17$: INC 2(SP)      ;;KEEP COUNT OF CHAR
1649 006252 056616 177776      BIS -2(SP),(SP)  ;;SET IN NEW CHAR
1650 006256 000707      BR 7$      ;;GET THE NEXT ONE
1651 006260 104401 005546      18$: TYPE ,SQUES    ;;TYPE ?<CR><LF>
1652 006264 000720      BR 20$      ;;SIMULATE CONTROL-U
1653      .DSABL LSB
1654
1655
1656      ;*****
1657      ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
1658      ;*CALL:
1659      ;* RDCHR      ;;INPUT A SINGLE CHARACTER FROM THE TTY
1660      ;* RETURN HERE ;;CHARACTER IS ON THE STACK
1661      ;*           ;;WITH PARITY BIT STRIPPED OFF
1662      ;*
1663      ;
1664 006266 011646      $RDCHR: MOV (SP),-(SP)      ;;PUSH DOWN THE PC
1665 006270 016666 000004 000002      MOV 4(SP),2(SP)  ;;SAVE THE PS
1666 006276 105777 177476      1$: TSTB @$TKS      ;;WAIT FOR
1667 006302 100375      BPL 1$      ;;A CHARACTER
1668 006304 117766 177472 000004      MOVB @$TKB,4(SP)  ;;READ THE TTY
1669 006312 042766 177600 000004      BIC #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
1670 006320 026627 000004 000023      CMP 4(SP),#23      ;;IS IT A CONTROL-S?
1671 006326 001013      BNE 3$      ;;BRANCH IF NO
1672 006330 105777 177444      2$: TSTB @$TKS      ;;WAIT FOR A CHARACTER
1673 006334 100375      BPL 2$      ;;LOOP UNTIL ITS THERE
1674 006336 117746 177440      MOVB @$TKB,-(SP)      ;;GET CHARACTER
1675 006342 042716 177600      BIC #^C177,(SP)      ;;MAKE IT 7-BIT ASCII
1676 006346 022627 000021      CMP (SP)+,#21      ;;IS IT A CONTROL-Q?
1677 006352 001366      BNE 2$      ;;IF NOT DISCARD IT
1678 006354 000750      BR 1$      ;;YES, RESUME
1679 006356 026627 000004 000140      3$: CMP 4(SP),#140      ;;IS IT UPPER CASE?
1680 006364 002407      BLT 4$      ;;BRANCH IF YES
1681 006366 026627 000004 000175      CMP 4(SP),#175      ;;IS IT A SPECIAL CHAR?
1682 006374 003003      BGT 4$      ;;BRANCH IF YES
1683 006376 042766 000040 000004      BIC #40,4(SP)      ;;MAKE IT UPPER CASE
1684 006404 000002      4$: RTI      ;;GO BACK TO USER
1685      ;*****
1686      ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY

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1687      ;*CALL:
1688      ;*      RDLIN      ;;INPUT A STRING FROM THE TTY
1689      ;*      RETURN HERE  ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
1690      ;*      ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
1691
1692 006406 010346      $RDLIN: MOV      R3,-(SP)      ;;SAVE R3
1693 006410 012703 006514 1$:      MOV      #$TTYIN,R3      ;;GET ADDRESS
1694 006414 022703 006524 2$:      CMP      #$TTYIN+8.,R3      ;;BUFFER FULL?
1695 006420 101405      BLOS      4$      ;;BR IF YES
1696 006422 104407      RDCHR      ;;GO READ ONE CHARACTER FROM THE TTY
1697 006424 112613      MOV      (SP)+,(R3)      ;;GET CHARACTER
1698 006426 122713 000177 10$:      CMP      #177,(R3)      ;;IS IT A RUBOUT
1699 006432 001003      BNE      3$      ;;SKIP IF NOT
1700 006434 104401 005546 4$:      TYPE      ,SQUES      ;;TYPE A '?'
1701 006440 000763      BR      1$      ;;CLEAR THE BUFFER AND LOOP
1702 006442 111367 000044 3$:      MOV      (R3),9$      ;;ECHO THE CHARACTER
1703 006446 104401 006512      TYPE      ,9$
1704 006452 122723 000015      CMP      #15,(R3)+      ;;CHECK FOR RETURN
1705 006456 001356      BNE      2$      ;;LOOP IF NOT RETURN
1706 006460 105063 177777      CLRB      -1(R3)      ;;CLEAR RETURN (THE 15)
1707 006464 104401 005550      TYPE      ,SLF      ;;TYPE A LINE FEED
1708 006470 012603      MOV      (SP)+,R3      ;;RESTORE R3
1709 006472 011646      MOV      (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
1710 006474 016666 000004 000002      MOV      4(SP),2(SP)      ;;FIRST ASCII CHARACTER ON IT
1711 006502 012766 006514 000004      MOV      #$TTYIN,4(SP)
1712 006510 000002      RTI      ;;RETURN
1713 006512      000      9$:      .BYTE      0      ;;STORAGE FOR ASCII CHAR. TO TYPE
1714 006513      000      .BYTE      0      ;;TERMINATOR
1715 006514 000010      .BLKB      8.      ;;RESERVE 8 BYTES FOR TTY INPUT
1716 006524 052536 005015      000      $CNTLU: .ASCIIZ /'^U/<15><12>      ;;CONTROL 'U'
1717 006531      136 006507 000012      $CNTLG: .ASCIIZ /'^G/<15><12>      ;;CONTROL 'G'
1718 006536 005015 053523 020122      $MSWR: .ASCIIZ <15><12>/SWR = /
1719 006544 020075      000
1720 006547      040 047040 053505      $MNEW: .ASCIIZ / NEW - /
1721 006554 036440 000040
1722 006560      000
1723 006561      000
1724
1725
1726      ;*****
1727      ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE 'TRAP' INSTRUCTION
1728      ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
1729      ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
1730      ;*GO TO THAT ROUTINE.
1731
1732 006562 010046      $TRAP: MOV      R0,-(SP)      ;;SAVE R0
1733 006564 016600 000002      MOV      2(SP),R0      ;;GET TRAP ADDRESS
1734 006570 005740      TST      -(R0)      ;;BACKUP BY 2
1735 006572 111000      MOV      (R0),R0      ;;GET RIGHT BYTE OF TRAP
1736 006574 006300      ASL      R0      ;;POSITION FOR INDEXING
1737 006576 016000 006616      MOV      $TRPAD(R0),R0      ;;INDEX TO TABLE
1738 006602 000200      RTS      R0      ;;GO TO ROUTINE
1739
1740
1741      ;;THIS IS USE TO HANDLE THE 'GETPRI' MACRO
1742

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1743 006604 011646 $TRAP2: MOV (SP),-(SP) ;;MOVE THE PC DOWN
1744 006606 016666 000004 000002 MOV 4(SP),2(SP) ;;MOVE THE PSW DOWN
1745 006614 000002 RTI ;;RESTORE THE PSW
1746
1747 .SBTTL TRAP TABLE
1748
1749 ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
1750 ;*BY THE 'TRAP' INSTRUCTION.
1751
1752 : ROUTINE
1753 : -----
1754 006616 006604 $TRPAD: .WORD $TRAP2
1755 006620 005316 $TYPE ;;CALL=TYPE TRAP+1(104401) TTY TYPEOUT ROUTINE
1756 006622 005576 $TYPOC ;;CALL=TYPOC TRAP+2(104402) TYPE OCTAL NUMBER (WITH LEADING ZEROS)
1757 006624 005552 $TYPOS ;;CALL=TYPOS TRAP+3(104403) TYPE OCTAL NUMBER (NO LEADING ZEROS)
1758 006626 005612 $TYPON ;;CALL=TYPON TRAP+4(104404) TYPE OCTAL NUMBER (AS PER LAST CALL)
1759
1760 006630 006054 $GTSWR ;;CALL=GTSWR TRAP+5(104405) GET SOFT-SWR SETTING
1761
1762 006632 006004 $CKSWR ;;CALL=CKSWR TRAP+6(104406) TEST FOR CHANGE IN SOFT-SWR
1763 006634 006266 $RDCHR ;;CALL=RDCHR TRAP+7(104407) TTY TYPEIN CHARACTER ROUTINE
1764 006636 006406 $RDLIN ;;CALL=RDLIN TRAP+10(104410) TTY TYPEIN STRING ROUTINE
1765 006640 005015 047531 020125 MESS1: .ASCIZ <15><12>'YOU ARE ON AN XOR TESTER'<15><12>
1766 006646 051101 020105 047117
1767 006654 040440 020116 047530
1768 006662 020122 042524 052123
1769 006670 051105 005015 000
1770 006675 105 042116 050040 MESS3: .ASCIZ /END PASS/<15><12>
1771 006702 051501 006523 000012
1772 000001 .END

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[illegible]

[illegible]

SPEC0	005212	809	1395#													
SPEC1	005246	816	1398	1405#												
SPEC2	005276	818	1402	1415#												
STACK =	001200	322#	739	807	836	856	1055	1066	1079	1090	1100	1111	1122	1134		
		1147	1160													
STAR	004432	1269	1271#	1291												
START	001726	706	806	827#	1210	1403										
START1	001250	704	737#													
STKLMT=	177774	333#														
SWR	001216	721#	744*	746	752*	766	842	1180	1198	1215	1246	1320	1329	1397		
		1401	1593	1630*												
SWREG	000176	702#	752	766	1593	1606										
SW0	= 000001	386#														
SW00	= 000001	376#	386													
SW01	= 000002	375#	385													
SW02	= 000004	374#	384													
SW03	= 000010	373#	383													
SW04	= 000020	372#	382													
SW05	= 000040	371#	381													
SW06	= 000100	370#	380													
SW07	= 000200	369#	379													
SW08	= 000400	368#	378													
SW09	= 001000	367#	377													
SW1	= 000002	385#														
SW10	= 002000	313#	366#	1180												
SW11	= 004000	314#	365#	1329												
SW12	= 010000	364#														
SW13	= 020000	315#	363#	1215												
SW14	= 040000	316#	362#	1320												
SW15	= 100000	361#														
SW2	= 000004	384#														
SW3	= 000010	383#														
SW4	= 000020	382#														
SW5	= 000040	381#														
SW6	= 000100	380#														
SW7	= 000200	379#														
SW8	= 000400	378#														
SW9	= 001000	312#	377#	842	1198											
TAG	002310	912#														
TBITVE=	000014	419#														
TCSR	004336	1174	1177	1221	1224	1227	1235	1254#	1264	1293	1299	1350	1355	1360		
		1363	1366													
TDBR	004334	1173*	1176*	1223*	1226*	1234*										

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0037

TRTVEC=	000014	420#																	
TST4	003132	1056	1061#																
TST5	003202	1068	1073#																
TST6	002760	1025#	1033																
TST9	003014	1031	1034#																
TYP	005316	1424#																	
TYPE =	104401	762	819	1200	1459	1564	1604	1605	1608	1621	1632	1651	1700	1703					
		1707	1755#																
		1607	1756#																
TYPOC =	104402																		
TYPON =	104404	1758#																	
TYPOS =	104403	1757#																	
WAIT1	004402	1264#	1265																
WAIT2	004560	1293#	1294	1298															
WGTCT	004620	1259*	1276*	1278	1283*	1305#													
WRTOC	004474	1275	1280#																
XLIST	004552	1286	1292#																
XOR	005000	1325	1345#																
XORA	001712	811	822#																
XORFLG	001240	731#	814*	824*	1322														
\$AUTOB	006560	770*	1601	1722#															
\$CHARC	005532	1461*	1471*	1478	1487*	1492#													
\$CKSWR	006004	1593#	1762																
\$CMTAG=	***** U	739																	
\$CNTLG	006531	1604	1717#																
\$CNTLU	006524	1621	1716#																
\$CRLF	005547	1460	1502#	1632	1716														
\$ENDAD	004112	697	1206#																
\$FILLC	005544	1464	1499#																
\$FILLS	005543	1498#																	
\$GTSWR	006054	1605#	1760																
\$INTAG	006561	1633	1723#																
\$LF	005550	1503#	1707	1716															
\$MAIL =	***** U	756	766	1448															
\$MNEW	006547	1608	1720#																
\$MSWR	006536	1605	1718#																
\$NULL	005542	1466	1497#																
\$OCNT	005774	1536*	1565*	1578#															
\$OMODE	005776	1531*	1535*	1540	1543*	1554*	1580#												
\$QUES	005546	1501#	1651	1700	1716														
\$RDCHR	006266	1664#	1763																
\$RDDEC=	***** U	1765																	
\$RDLIN	006406	1692#	1764																
\$RDOCT=	***** U	1765																	
\$RDSZ =	000010	1685#																	
\$R2A =	***** U	1765																	
\$SAVRE=	***** U	1765																	
\$SETUP=	000100	429#	740	762	763	1588	1722												
\$STUP =	177777	429#																	
\$TKB	006002	1585#	1597	1614	1668	1674													
\$TKS	006000	1584#	1595	1611	1635*	1666	1672												
\$TPB	005540	1484*	1496#																
\$TPFLG	005545	1442	1500#																
\$TPS	005536	1482	1495#																
\$TRAP	006562	69#	1732#																
\$TRAP2	006604	1743#	1754																
\$TRP =	000011	1747#	1756#	1757#	1758#	1759#	1760	1761#	1762	1763#	1764#	1765#							

[illegible]

[illegible]

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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0040

.SRDDE	1#		
.SRDOC	1#		
.SREAD	1#	319#	1581
.SR2AZ	1#		
.SSAVE	1#		
.SSB2D	1#		
.SSB2O	1#		
.SSCOP	1#		
.SSIZE	1#		
.SSUPR	1#		
.STRAP	1#	319#	1724
.STYPB	1#		
.STYPD	1#		
.STYPE	1#	319#	1424
.STYPO	1#	1504	
.S4OCA	1#		
.1170	1#		

. ABS. 006710 000

ERRORS DETECTED: 0

CZDRCH.BIN,CZDRCH.LST/CRF/SOL=CZDRCH.SML,CZDRCH.P11
RUN-TIME: 8 10 .6 SECONDS
RUN-TIME RATIO: 110/20=5.4
CORE USED: 32K (63 PAGES)