

# DH11

ECHO TEST

MD-11-DZDHJ-B

EP-DZDHJ-B-DL-A

OCT 1976

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FICHE 1 OF 1

Made In U.S.A.

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDHJ-S-C  
PRODUCT NAME: DH11 ECHO/CABLE TEST  
DATE CREATED: APRIL 1973  
REVISED: JANUARY 1975  
MAINTAINER: DIAGNOSTIC  
AUTHOR: GEORGE BAISLEY

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1. ABSTRACT  
THE DH11 ECHO CABLE DIAGNOSTIC IS DIVIDED INTO TWO TESTS.  
THE FIRST TEST (ECHO) IS A QUICK VERIFY TEST USING  
A TTY OR VTOS ETC.

THE SECOND TEST (CABLE TEST) IS A QUICK VERIFY TEST USING THE  
CABLE TERMINATOR (TEST CONNECTOR).

BOTH TESTS ASSUME 9 BITS/CHARACTER, NO PARITY GENERATION  
OR CHECKING, AND A DH PRIORITY LEVEL 5 (BR:5)

1.1 THE DH11 ECHO TEST VERIFIES THAT ALL CHARACTERS (0-377)  
WILL ECHO ON EACH LINE (0-17 OCTAL) WITH STANDARD DH11  
TERMINAL ATTACHMENTS TTY 33,35 OR VTOS ETC. USING ASCII  
ASYNCHRONOUS CODE

1.2 THE DH11 CABLE TEST VERIFIES THAT ALL CHARACTERS (0-377)  
ARE TRANSMITTED AND RECEIVED ON A PER LINE BASIS.  
THE LINE UNDER TEST MUST BE TERMINATED WITH THE TEST CONNECTOR !

2. REQUIREMENTS

PDP-11 FAMILY STANDARD COMPUTER WITH MINIMUM 4K MEMORY.  
DH11 ASYNCHRONOUS MULTIPLEXER.

2.1 FOR THE ECHO TEST  
TWO TERMINALS; ONE FOR CONSOLE, ONE FOR DH11 ECHO TEST.

2.2 FOR THE CABLE TEST  
ONE CONSOLE TERMINAL, ONE TEST CONNECTOR MINIMUM

3. STORAGE

THE PROGRAM LOADS INTO 4KW OF MEMORY WITH ABS LOADER

3. LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING ABSOLUTE BINARY TAPES  
IS TO BE USED.

4. STARTING PROCEDURE

CONTROL SWITCH SETTINGS

AFTER PROGRAM LOAD (INITIAL PROGRAM START)

ALL CONSOLE SWITCHES DOWN.

4.1 TO MODIFY DEVICE VECTOR AND CONTROL REGISTER ADDRESSES  
AFTER PROGRAM RESTART

SWDD=1

TO MODIFY DH11 LINE NUMBER AND BAUD RATE OF DH11 (WHILE RUNNING)

5402-1 MOMENTARILY- DO NOT LEAVE THIS SWITCH UP AFTER LINE # QUESTION)

4.2 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200

THE RESTART ADDRESS FOR ALL TESTS IS 000200

4.3 PROGRAM AND OR OPERATOR ACTION

4.3.1 INITIAL PROGRAM START

LOAD PROGRAM INTO MEMORY

LOAD ADDRESS 000200

CLEAR CONSOLE SWITCHES

PRESS START

4.3.2 THE PROGRAM WILL TYPE "DH11 ECHO CABLE TEST" (CR)

00DHJ-REVISION B (ONCE ONLY)

AND WILL TYPE "WHICH TEST ECHO OR CABLE (E OR C)" AND WILL  
WAIT FOR AN INPUT FROM THE CONSOLE TELETYPE KEYBOARD

TYPE IN THE TEST YOU INTEND TO RUN (E OR C) FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT CHARACTER IS TYPED, THE PROGRAM WILL TYPE ""  
AND WILL THEN REPEAT THE MESSAGE

4.3.3 THE PROGRAM WILL TYPE "VECTOR ADDRESS-" AND WAIT  
FOR AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT  
VECTOR FOR THE DH11 TO BE TESTED FOLLOWED BY A  
<CARRIAGE RETURN>.

4.3.5 THE PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"  
AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER  
OF THE DH11 TO BE TESTED FOLLOWED BY <CARRIAGE RETURN>

IF AN INCORRECT ADDRESS IS TYPED, THE PROGRAM WILL  
TYPE "?" AND WILL THEN REPEAT THE MESSAGE

4.3.4 THE PROGRAM WILL TYPE "LINE NUMBER IN OCTAL-" AND  
WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE IN THE DH11 LINE NUMBER (IN OCTAL, FROM 0 TO 17)  
TO BE TESTED FOLLOWED BY <CARRIAGE RETURN>.

4.3.5 THE PROGRAM WILL TYPE "BAUD RATE-" AND WAIT FOR  
AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE IN THE APPROPRIATE D411 TERMINAL'S LINE  
SPEED FOLLOWED BY (CARRIAGE RETURN).  
(ANY LEGAL BAUD RATE IS ACCEPTABLE IN THE CABLE TEST) TRY 'EM ALL

IF AN INVALID BAUD RATE IS TYPED IN THE PROGRAM  
WILL TYPE "INVALID BAUD RATE" AND REPEAT THE MESSAGE.

- 4.3.6 THE PROGRAM WILL TYPE "ECHO" OR "CABLE" RESP. TO INDICATE THAT IT IS  
ABOUT TO START TESTING, AND THEN TESTING WILL BEGIN.

THE ECHO TEST WILL TYPE "TYPE A CHARACTER ON D411 TERMINAL"  
-TYPE OR TRANSMIT VIA PREPUNCHED TAPE ANY SEQUENCE OF CHARACTERS (EXCEPT \*C).  
A CONTROL C (\*C) WHEN TYPED ON THE D411 TERMINAL WILL CAUSE  
PROGRAM TO EXIT TO THE END OF PASS ROUTINE.

THE CABLE TEST REQUIRES NO ADDITIONAL OPERATOR INTERVENTION  
UNLESS TO RESELECT LINE #, BAUD RATE, ETC.

NOTE: TO CHANGE LINE NUMBER AND/OR BAUD RATE,  
SIMPLY MOMENTARILY RAISE SW02 (SW02=1).

- 4.4 PROGRAM RESTART WITH ALL SWITCHES DOWN

LOAD ADDRESS 000200

PRESS START

THE PROGRAM WILL TYPE "ECHO" OR "CABLE" RESPECTIVELY  
AND COMMENCE TESTING AS BEFORE.

- 4.5 PROGRAM RESTART WITH SW00=1

LOAD ADDRESS 000200

SET SW01=1

PRESS START

THE PROGRAM WILL PERFORM AS DESCRIBED IN 4.3.2 TO 4.3.6

5. OPERATING PROCEDURE

- 5.1 OPERATIONAL SWITCH SETTINGS

SW15=1, HALT ON ERROR  
SW14=1, LOOP ON CURRENT TEST (CABLE TEST ONLY)  
SW13=1, SUPPRESS ERROR TYPEOUT  
SW11=1, INHIBIT ITERATIONS (CABLE TEST ONLY)  
SW10=1, ESCAPE ON ERROR  
SW02=1, RESELECT LINE NUMBER AND BAUD RATE (MOMENTARILY)  
SW00=1, CHANGE PARAMETERS AT PROGRAM RESTART

- 5.2 ERRORS

6.1 ERROR HALTS

THE ERROR MESSAGE FORMAT FOR ALL ERROR TYPEOUTS IS AS FOLLOWS:

PC+2  
 MESSAGE

WHERE  
 PC+2 IS THE ADDRESS OF THE CALL TO THE ERROR HANDLER +2  
 MESSAGE IS AN ASCII MESSAGE DESCRIBING (BRIEFLY) THE FAILURE

6.1.1 ERROR DESCRIPTIONS

SEE LISTING FOR DETAILS OF ERRORS

NOTE: FOR SERIOUS TROUBLESHOOTING...USE THE REGULAR DH11 DIAGNOSTICS

6.2 ERROR RECOVERY

6.2.1 SWIS=0  
 IF THE PROGRAM IS RUN WITH SWIS=0, NO OPERATOR ACTION IS  
 REQUIRED TO CONTINUE TESTING.

6.2.2 SWIS=1  
 IF THE PROGRAM IS RUN WITH SWIS=1, TO CONTINUE TESTING AFTER  
 THE PROGRAM HAS HALTED, PRESS THE PROCESSOR CONSOLE  
 CONTINUE SWITCH.

6.2.3 ILLEGAL INTERRUPTS

IF AN INTERRUPT OCCURS TO A VECTOR ADDRESS NOT SELECTED  
 DURING PROGRAM INITIALIZATION, THE PROGRAM WILL HALT IN THE  
 TRAPCATCHER. THE ADDRESS AT WHICH THE PROGRAM HALTS IS 2  
 GREATER THAN THE ADDRESS TO WHICH THE INTERRUPT OCCURRED.  
 THE PROGRAM MUST BE RESTARTED AT 200 TO RECOVER FROM THIS  
 ERROR.

7. RESTRICTIONS

NONE

8. MISCELLANEOUS

- THE ECHO TEST DOES NOT ENABLE AUTO-ECHO
- BAUD RATE 134.5 HAS BEEN ROUNDED OFF TO 135

9. PROGRAM DESCRIPTION

BOTH TESTS CHECK OUT THE DH11 IN AN "ONLINE" FUNCTION:  
 ONE LINE AT A TIME AT THE FOLLOWING ASYNCHRONOUS BAUD  
 RATES: 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 9600.

10. LISTING

:DH11 ECHO CABLE TEST  
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:STARTING PROCEDURE  
:LOAD PROGRAM  
:LOAD ADDRESS 000200  
:PRESS START  
:PROGRAM WILL TYPE DH11 ECHO/CABLE TEST  
:PROGRAM WILL TYPE WHICH TEST- ECHO OR CABLE  
:TYPE IN E OR C RESPECTIVELY  
:PROGRAM WILL TYPE "VECTOR ADDRESS-"  
:TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR  
:FOR THE DH11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>  
:PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"  
:TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER  
:FOR THE DH11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>  
:PROGRAM WILL TYPE "LINE NUMBER-"  
:TYPE IN THE LINE NUMBER TO BE TESTED (IN OCTAL)  
:FOLLOWED BY <CARRIAGE RETURN>  
:PROGRAM WILL TYPE "BAUD RATE-"  
:TYPE IN THE BAUD RATE OF THE DH11 TERMINAL  
:FOLLOWED BY <CARRIAGE RETURN>  
:THE FOLLOWING BAUD RATES ARE ACCEPTED IN DECIMAL

- 50
- 75
- 110
- 135 (ROUNDED OFF 134.5)
- 150
- 200
- 300
- 600
- 1200
- 1800
- 2400
- 4800
- 9600

:ALL OTHERS ARE REJECTED

:PROGRAM WILL TYPE "ECHO" OR "CABLE TEST" TO INDICATE THAT TESTING HAS STARTED  
:AT THE END OF A PASS, PROGRAM WILL TYPE " DZCHJB "  
:AND THEN RESUME TESTING

:SWITCH REGISTER OPTIONS

100000	SW15=100000	=1, HALT ON ERROR
040000	SW14=40000	=1, LOOP ON CURRENT TEST
020000	SW13=20000	=1, INHIBIT ERROR TIMEOUT
010000	SW12=10000	
004000	SW11=4000	=1, INHIBIT ITERATIONS
002000	SW10=2000	=1, ESCAPE TO NEXT TEST ON ERROR
001000	SW09=1000	=1, LOOP WITH CURRENT DATA
000400	SW08=400	
000100	SW06=100	
000040	SW05=40	
000020	SW04=20	

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000024 000024 . =21  
000024 004774  
000026 000340  
000026 002566  
000026 000340  
000034 002770  
000036 000340  
000200 000200 . =200  
000200 000137 001100

PFAIL :POWER FAIL HANDLER  
340 :SERVICE AT LEVEL 7  
ERRORS :ERROR HANDLER  
340 :SERVICE AT LEVEL 7  
TRPSRV :GENERAL HANDLER DISPATCH SERVICE  
340 :SERVICE AT LEVEL 7  
JMP START :GO TO START OF PROGRAM

:DEFINITIONS FOR TRAP SUBROUTINE CALLS  
:POINTERS TO SUBROUTINES CAN BE FOUND STARTING  
:AT LOCATION "TRPTAB"

104400  
104401  
104402  
104403  
104404  
104405  
104406  
104407  
104410  
104411  
104412  
104413  
001100 . =1100

SCOPE=TRAP+0 :SCOPE LOOP AND ITERATION HANDLER  
TYPE=TRAP+1 :TELETYPE OUTPUT ROUTINE  
OCTASC=TRAP+2 :OCTAL TO ASCII CONVERSION  
INSTR=TRAP+3 :INPUT ASCII STRING  
INSTER=TRAP+4 :STRING INPUT ERROR  
PARAM=TRAP+5 :CONVERT STRING TO OCTAL, CHECK LIMITS  
SAVOSP=TRAP+6 :SAVE RC-R5, PC  
RESO5=TRAP+7 :RESTORE RC-R5  
SCOPE1=TRAP+10 :CHECK FOR FREEZE ON CURRENT DATA  
PARAMD=TRAP+11 :CONVERT DECIMAL STRING TO OCTAL  
PAWCH=TRAP+12 :SET FLAG ECHO OR CABLE  
SAVOS=TRAP+13 :SAVE RD - R5

:PROGRAM INITIALIZATION  
:LOCK OUT INTERRUPTS  
:SET UP PROCESSOR STACK  
:SET UP POWER FAIL VECTOR  
:CLEAR PROGRAM FLAGS AND COUNTS  
:TYPE TITLE MESSAGE

001100  
001100 012737 000340 177776  
001106 012706 001100  
001112 012737 004774 000024  
001120 012737 001100 004700  
001126 005037 004736  
001132 005037 004674  
001136 005037 004676  
001142 005037 004672  
001146 005037 004742  
001152 005237 004732  
001156 001003  
001160 104401 005136  
001164 000404  
001166 032737 000001 177570  
001174 001471  
001176 012701 000300

STACK:  
START: MOV #340,PS :LOCK OUT INTERRUPTS  
MOV #STACK,SP :SET UP PROCESSOR STACK  
MOV #PFAIL,2#24 :SET UP POWER FAIL TRAP  
MOV #START,RETJRN :SET UP IN CASE OF POWER FAIL  
CLR STFLG :CLEAR TEST START FLAG  
CLR PASCNT :CLEAR PASS COUNT  
CLR ERRCNT :CLEAR ERROR COUNT  
CLR ERRFLG :CLEAR ERROR FLAG  
CLR LAST :CLEAR LAST ERROR PC  
INC INIFLG :SET UP FOR ONCE ONLY TYPE OUT  
BNE VEC1 :DITTO  
TYPE ,MTITLE :TYPE TITLE  
BR VEC2  
VEC1: BIT #SW00,SWR :IF SW00=1, GET NEW VECTOR  
BEQ BEGIN :AND CSR  
VEC2: MOV #300,R1

439	001202	012702	000302		MOV	#302,R2		
440	001206	012703	000004		MOV	#4,R3		
441	001212	010211		18:	MOV	R2,(R1)	:RESTORE TRAPCATCHER	
442	001214	005012			CLR	(R2)	:IN FLOATING VECTOR AREA	
443	001216	060301			ADD	R3,R1		
444	001220	060302			ADD	R3,R2		
445	001222	020127	001000		CMP	R1,#1000		
446	001226	001371			BNE	18		
447	001230	104403			INSTR		:INPUT WHICH TEST YOU ARE RUNNING	
448	001232	005545			MWHICH		:ECHO OR CABLE	
449	001234	104412			PARMCH		:SET FLAG	
450	001236	004734			WCHFLG		:THIS FLAG	
451	001240	104403			INSTR		:INPUT ADDRESS OF DEVICE VECTOR	
452	001242	005214			MVECTOR		:MESSAGE "VECTOR ADDRESS--"	
453	001244	104405			PARAM		:CONVERT STRING TO OCTAL	
454	001246	000300			300		:LOW LIMIT	
455	001250	000770			770		:HIGH LIMIT	
456	001252	004660			DHARVEC		:LOCATIONS TO BE FILLED	
457	001254	003		.BYTE	3		:LSB MASK	
458	001255	004		.BYTE	4		:NUMBER OF LOCATIONS	
459	001256	104403			INSTR		:INPUT ADDRESS OF DEVICE CSR	
460	001260	005237			MREGAD		:MESSAGE "CONTROL REGISTER ADDRESS--"	
461	001262	104405			PARAM		:CONVERT STRING TO OCTAL	
462	001264	000300			0		:LOW LIMIT	
463	001266	177776			177776		:HIGH LIMIT	
464	001270	004636			DHSCR		:LOCATIONS TO BE FILLED	
465	001272	007		.BYTE	7		:LSB MASK	
466	001273	010		.BYTE	10		:NUMBER OF LOCATIONS	
467	001274	012777	004000	003334	MOV	#BIT11,DHSCR	:MASTER CLEAR INTERFACE	
468	001302	005037	004736		CLR	STFLG	:CLEAR PROGRAM START FLAG	
469	001306	104403			INSTR		:INPUT LINE NUMBER	
470	001310	005433			MLINE		:MESSAGE "LINE NUMBER--"	
471	001312	104405			PARAM		:CONVERT STRING TO OCTAL	
472	001314	000000			0		:LOW LIMIT	
473	001316	000017			17		:HIGH LIMIT	
474	001320	004756			LINENJ		:LOCATION TO BE FILLED	
475	001322	000		.BYTE	0		:LSB MASK	
476	001323	001		.BYTE	1		:NUMBER OF LOCATIONS	
477	001324	104403		BAUD:	INSTR		:INPUT BAUD RATE	
478	001326	005465			MSPEED		:MESSAGE "BAUD RATE--"	
479	001330	104411			PARAMD		:CONVERT DECIMAL STRING TO OCTAL	
480	001332	000062			50.		:LOW LIMIT	
481	001334	022600			9600.		:HIGH LIMIT	
482	001336	004752			LINESP		:LOCATION TO BE FILLED	
483	001340	000		.BYTE	0		:LSB MASK	
484	001341	001		.BYTE	1		:NUMBER OF LOCATIONS	
485	001342	004537	004052		JSR	RS,SET		
486	001346	013737	004654	004656	MOV	DHSSR,DHSLR	:SET UP ADDRESS OF SILC	
487	001354	005237	004656		INC	DHSLR	:STATUS REGISTER HIGH BYTE	
488								
489								
490	001360	012737	000340	177776	BEGIN:	MOV	#340,PS	:LOCK OUT INTERRUPTS
491	001366	012706	001100		MOV	#STACK,SP	:SET UP PROCESSOR STACK	
492	001372	005037	004740		CLR	LOCKUP	:CLEAR TIMEOUT	
493	001376	005737	004734		TST	WCHFLG	:ECHO OR CABLE TEST	
494	001402	001413			BEG	28	:ECHO	

```

495 001404 012737 001770 004700
496 001412 005737 004736
497 001416 001017
498 001420 005137 004736
499 001424 104401 005642
500 001430 000412
501 001432 012737 001462 004700 2$:
502 001440 005737 004736
503 001444 001004
504 001446 005137 004736
505 001452 104401 005614
506 001456 000177 003216 1$:
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511 001462 012737 000340 177776 TEST1:
512 001470 012737 001274 004702
513 001476 012737 002374 004670
514 001504 052777 004000 003124
515 001512 013777 004760 003116
516 001520 013777 004754 003114
517
518 001526 012777 000000 003120
519 001534 012777 004772 003102
520
521 001542 052777 100000 003066
522 001550 012777 001612 003102
523 001556 013777 004764 003076
524 001564 013737 004766 177776
525 001572 104401 005504
526 001576 032737 000004 177570 DELAY:
527 001604 001774
528 001606 000137 001274
529
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531
532 001612 105777 003020 INTSVC:
533 001616 100401
534 001620 104000
535 001622 005777 003012
536 001626 100401
537 001630 104001
538 001632 017737 003002 004770
539 001640 113737 004770 004772
540 001646 113737 004770 005710
541 001654 042737 177600 005710
542 001662 042737 170377 004770
543 001670 000337 004770
544 001674 023737 004756 004770
545 001702 001401
546 001704 104002
547 001706 012777 177777 002732
548 001714 032777 100000 002714
49 001722 001001
550 001724 104003

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MOV #TEST2,RETJRN ;CABLE TEST
TST STFLG ;ARE YOU LOOPING ?
BNE IS ;YES
COM STFLG ;NO
TYPE ,MCABLE ;TYPE CABLE TEST
BR IS
MOV #TEST1,RETURN ;SET UP ECHO TEST
TST STFLG ;ARE YOU LOOPING ?
BNE IS ;YES
COM STFLG ;NO
TYPE ,MTERM ;TYPE ECHO TEST
JMP @RETURN ;START TESTING
;THIS TEST WILL ACCEPT 1 CHARACTER AT A TIME
;(IN INTERRUPT MODE) AND TRANSMIT THAT SAME CHARACTER.
;ONE LINE AT A TIME, ANY LINE 0 THRU 17 (OCTAL)

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TEST1: MOV #340,PS ;DISABLE ALL INTERRUPTS
MOV #LINE,ESCAPE
MOV #EOP,NEXT
BIS #BIT11,@DHSCR ;MASTER CLEAR INTERFACE
MOV NUMLIN,@DHSCR ;SELECT LINE # & SET INTERRUPT ENABLE
MOV SPEED,@DHLPR ;SET LINE SPEED AND
;CHARACTER LENGTH (TRANS. & REC.)
MOV #0,@DHSSR ;SET SILO ALARM LEVEL=0
MOV #TBUF,@DHBA ;ADDRESS OF TRANSMITTER
;DATA BUFFER
BIS #100000,@DHSCR ;SET TRANSMIT "DONE"
MOV #INTSVC,@DHAVEC ;SET UP INTERRUPT SERVICE
MOV #PRIO,@DARLVL ;AND LEVEL
MOV LESS1,PS ;ALLOW INTERRUPTS
TYPE ,MCHAR ;TYPE "ANY CHARACTER"
BIT #SW02,SWR ;IF SW02=! GET NEW LINE NUMBER
BEQ DELAY ;RETURN HERE AFTER "INTERRUPT"
JMP LINE

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;THE FOLLOWING IS THE RECEIVER INTERRUPT SVC ROUTINE
INTSVC: TSTB @DHSCR ;TEST REC. FLAG
BMI .+4
HLT 0 ;ERROR - INTERRUPT NOT CAUSED BY FLAG
TST @DHNRC ;TEST FOR VALID CHARACTER
BMI .+4
HLT 1 ;NON- VALID CHARACTER
MOV @DHNRC,@RECDAT ;MOVE CHARACTER TO OUTPUT AREA
MOVB RECDAT,TBUF ;MOVE CHARACTER TO CHECK FOR !C
MOVB RECDAT,INBUF ;STRIP JUNK PLUS PARITY
BIC #!C<177>,INBUF ;SAVE ONLY LINE NUMBER
BIC #170377,@RECDAT
SWAB RECDAT
CMP LINENU,RECDAT ;DOES THE LINE # COMPARE?
BEQ .+4
HLT 2 ;WRONG LINE NUMBER
MOV #-1,@DHBC ;! (OCTAL) BYTES WILL BE XMITTED
BIT #100000,@DHSCR ;TEST "FLAG" FOR DONE
BNE .+4
HLT 3 ;TRANSMITTER DONE SHOULD BE SET

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551 001726 123727 005710 000003 CMPB INBUF,#3 ;IS IT A 10 ?
552 001734 001006 BNE 1$ ;NO
553 001736 052777 004000 002672 BIS #BIT11,JDHSCR ;STOP DEVICE
554 001744 012716 002374 MOV #EOP,(SP) ;CRUNCH STACK
555 001750 000002 RTI
556 001752 012777 004772 002664 1$: MOV #TBUF,JDHBA ;ADDRESS OF TRANSMITTER
557 001760 013777 004762 002662 MOV NUMBAR,JDHBAR ;START XMITTER
558 001766 000002 RTI

;THIS TEST TRANSMITS A BINARY COUNT PATTERN
;VIA INTERRUPT MODE TO THE RECEIVER
;... THE LINE UNDER TEST MUST BE TERMINATED WITH THE TEST CONNECTOR
564 001770 012737 000340 177776 TEST2: MOV #340,PS ;DISABLE INTERRUPTS
565 001776 012737 001274 004702 MOV #LINE,ESCAPE
566 002004 012737 002374 004670 MOV #EOP,NEXT
567 002012 052777 004000 002616 BIS #BIT11,JDHSCR ;MASTER CLEAR INTERFACE
568 002020 013777 004760 002610 MOV NUMLIN,JDHSCR ;SELECT LINE # & REC. INTERRUPT ENABLE
569 002026 052777 020000 002602 BIS #BIT13,JDHSCR ;SET TRANSMITTER INTERRUPT ENABLE
; & NON EXISTANT MEMORY INTR ENABLE
571 002034 013777 004754 002600 MOV SPEED,JDHLPR ;SET LINE SPEED
572 002042 012777 000000 002604 MOV #0,JDHSSR ;SET SILO ALARM LEVEL =0
573 002050 012777 006506 002566 MOV #TABLE,JDHBA ;ADDRESS OF TRANSMITTER DATA BUFFER
574 002056 012777 177400 002562 MOV #-256,JDHBC ;SET UP BYTE COUNT
575 002064 012777 002162 002566 MOV #INTREC,JDHVEC ;SET UP INTR SERVICE
576 002072 013777 004764 002562 MOV PRIO,JDHRLVL ;SET UP LEVEL
577 002100 012777 002332 002556 MOV #INTRAN,JDHTVEC ;SET UP INTR SERVICE
578 002106 013777 004764 002552 MOV PRIO,JDHTLVL ;SET UP LEVEL
579 002114 012701 006506 MOV #TABLE,R1 ;SET UP DATA PCINTER
580 002120 013737 004766 177776 MOV LESS1,PS ;ALLOW INTERRUPTS
581 002126 013777 004762 002514 MOV NUMBAR,JDHBAR ;SET UP BAR BIT

;YOU RETURN HERE AFTER EVERY RECEIVER INTERRUPT
584 002134 032737 000004 177570 SPIN: BIT #SW02,SWR ;IF SW02=1 GET NEW LINE NUMBER
585 002142 001402 BEQ 1$ ;SW02=0
586 002144 000137 001274 JMP LINE ;SW02=1
587 002150 005237 004740 1$: INC LOCKUP ;INC TIMEOUT FLAG
588 002154 001367 BNE SPIN ;IF NOT 0 RETURN SPINNING
589 002156 104006 HLT 6 ;RECEIVER FAILED TO INTERRUPT CHECK CABLE TERMINATOR
590 002160 104400 QUIT: SCOPE
591 002162 005037 004740 INTREC: CLR LOCKUP ;CLEAR TIMEOUT FLAG
592 002166 105777 002444 TSTB JDHSCR ;TEST REC DONE
593 002172 100401 BMI .+4 ;YES
594 002174 104000 HLT 0 ;FALSE INTERRUPT
595 002176 017737 002436 004770 MOV JDHNR,RECDAT ;SAVE WORD
596 002204 005737 004770 TST RECDAT ;TEST FOR VALID CHARACTER
597 002210 100401 BMI .+4
598 002212 104001 HLT 1 ;NON VALID CHARACTER
599 002214 032737 040000 004770 BIT #BIT14,RECDAT ;DATA OVERRUN ?
600 002222 001401 BEQ .+4 ;NO
601 002224 104007 HLT 7 ;YES
602 002226 032737 020000 004770 BIT #BIT13,RECDAT ;FRAMING ERROR ?
603 002234 001401 BEQ .+4 ;NO
604 002236 104010 HLT 10 ;YES
605 002240 032737 010000 004770 BIT #BIT12,RECDAT ;PARITY ERROR ?
606 002246 001401 BEQ .+4 ;NO

```



607	002250	104011				HLT	11		; YES
608	002252	122137	004770			CMPB	(R1)+,RECDAT		; GOOD CHARACTER ?
609	002256	001401				BEQ	.+4		; YES
610	002260	104005				HLT	5		; NO
611	002262	042737	170377	004770		BIC	#170377,RECDAT		; SAVE ONLY LINE NUMBER
612	002270	000337	004770			SWAB	RECDAT		
613	002274	023737	004756	004770		CMP	LINENU,RECDAT		; DOES THE LINE # COMPARE ?
614	002302	001401				BEQ	.+4		; YES
615	002304	104002				HLT	2		; WRONG LINE #
616	002306	126127	177777	000377		CMPB	-1(R1),#377		; LAST CHARACTER ?
617	002314	001003				BNE	1\$		; NO
618	002316	012716	002160			MOV	#QUITS,(SP)		; CRUNCH STACK
619	002322	000402				SR	2\$		
620	002324	012716	002134		1\$:	MOV	#SPIN,(SP)		; CRUNCH STACK
621	002330	000002			2\$:	RTI			
622									
623	002332	032777	100000	002276	INTRAN:	BIT	#BIT15,JDHSCR		; TEST TRANSMIT FLAG
624	002340	001001				BNE	.+4		
625	002342	104003				HLT	3		; FALSE INTERRUPT
626	002344	032777	002000	002264		BIT	#BIT10,JDHSCR		; NON EXISTANT MEMORY ?
627	002352	001404				BEQ	1\$		
628	002354	104004				HLT	4		; NON EXISTANT MEMORY SHOULD NOT BE UP
629	002356	042777	000400	002252		BIC	#BIT08,JDHSCR		; CLEAR NON EXISTANT MEMORY BIT
630	002364	042777	100000	002244	1\$:	BIC	#BIT15,JDHSCR		; CLEAR DONE BIT FOR NEXT ROUND
631	002372	000002				RTI	:RETURN		

```

632
633
634
635
636
637
638
639 002374 104401 EOP: TYPE ;TYPE NAME OF TEST
640 002376 005372 MEPASS
641 002400 005037 004742 CLR LAST ;CLEAR LAST ERROR PC
642 002404 005037 004672 CLR ERRFLG ;CLEAR ERROR FLAG
643 002410 005237 004674 INC PASCNT ;UPDATE PASS COUNT
644 002414 013737 004674 177570 MOV PASCNT,LIGHTS ;DISPLAY PASS COUNT
645 002422 013701 000042 MOV @#42,R1 ;CHECK FOR ACT-11 OR DDP
646 002426 001406 BEQ RESTRT ;IF NOT, CONTINUE TESTING
647 002430 000005
648 002432 004711 LOGICAL: JSR PC,(R1)
649 002434 000240 NOP
650 002436 000240 NOP
651 002440 000240 NOP
652 002442 000240 NOP
653 002444 000137 001360 RESTRT: JMP BEGIN
654
655 ;CHECK FOR LOOP ON CURRENT TEST
656 ;CHECK FOR ITERATION SUPPRESSION
657
658 002450 032737 002000 177570 SCOPER: BIT #SW10,SWR
659 002456 001030 BNE 4$
660 002460 032737 040000 177570 1$: BIT #SW14,SWR
661 002466 001021 BNE 3$
662 002470 032737 004000 177570 BIT #SW11,SWR
663 002476 001006 BNE 2$
664 002500 005237 004710 INC LPCNT
665 002504 023737 004710 004706 CMP LPCNT,ICOUNT
666 002512 001007 BNE 3$
667 002514 005037 004710 2$: CLR LPCNT
668 002520 005037 004672 CLR ERRFLG
669 002524 013737 004670 004700 MOV NEXT,RETURN
670 002532 013716 004700 3$: MOV RETURN,(SP) ;LOOPING
671 002536 000002 RTI
672 002540 005737 004672 4$: TST ERRFLG
673 002544 001745 BEQ 1$
674 002546 000762 BR 2$
675
676 ;CHECK FOR FREEZE ON CURRENT DATA
677
678 002550 032737 001000 177570 SCOP1F: BIT #SW09,SWR
679 002556 001402 BEQ 1$
680 002560 013716 004704 MOV FREEZ1,(SP)
681 002564 000002 1$: RTI
682
683 ;ERROR HANDLER
684
685 002566 032737 020000 177570 ERRORS: BIT #SW13,SWR
686 002574 001051 BNE HALTS
687 002576 021637 004742 CMP (SP),LAST

```

002770	011646	000002
002772	162716	000002
002776	017616	000002
003002	00631E	
003004	042716	177001
003010	062716	005650
003014	017616	000000
003020	00013E	

```

: S:
BEQ 16
MOV (SP), LAST
CLR ERRFLG
SAVOSP
MOV (SP), R5
SUB #2, R5
MOV (R5), R4
ASL R4
ASL R4
BIC #177001, R4
ADD #ERRTAB, R4
MOV (R4), ERRMSG
MOV (R4), DATABP
TST ERRFLG
BEQ TYPMSG
TST ERRTAB
BNE TYPDAT
TYPMSG: OCTASC
ERRTAB:
MOV #1, ERRFLG
TYPE
ERRMSG: 0
TYPDAT: TST DATABP
LEQ RESREG
OCTASC
DATABP: 0
RESREG: RESOS
HALTS: TST SWR
SPL EXITER
PUSHRO
MOV 2(SP), RC
HALT
POPPO
EXITER: INC ERRCNT
BIT #SWIC, SWR
BEQ 16
MOV ESCAPE, (SP)
RTI
: S:
ERRTAB: 1
BYTE 6.2
SAVPC
: TRAP DISPATCH SERVICE
: ARGUMENT OF TRAP IS EXTRACTED
: AND USED AS OFFSET TO OBTAIN POINTER
: TO SELECTED SUBROUTINE
TRPSRV: MOV (SP), -(SP)
SUB #2, (SP)
MOV 2(SP), (SP)
TRPOK: ASL (SP)
BIC #177001, (SP)
ADD #TRPTAB, (SP)
MOV 2(SP), (SP)
JMP 2(SP)+
: GET PC OF RETURN
: EPC OF TRAP
: GET TRP
: MULTIPLY TRAP ARG BY 2
: CLEAR UNWANTED BITS
: POINTER TO SUBROUTINE ADDRESS
: SUBROUTINE ADDRESS
: GO TO SUBROUTINE
: SAVE PC OF TEST THAT FAILED AND PC-R5

```

```

16
(SP), LAST
ERRFLG
(SP), R5
R5
(R5), R4
R4
R4
#177001, R4
ERRTAB, R4
(R4), ERRMSG
(R4), DATABP
ERRFLG
TYPMSG
ERRTAB
TYPDAT
OCTASC
ERRTAB:
#1, ERRFLG
TYPE
ERRMSG: 0
DATABP
RESREG
OCTASC
RESOS
SWR
EXITER
2(SP), RC
HALT
POPPO
EXITER:
ERRCNT
#SWIC, SWR
ESCAPE, (SP)
: S:
ERRTAB: 1
BYTE 6.2
SAVPC
: TRAP DISPATCH SERVICE
: ARGUMENT OF TRAP IS EXTRACTED
: AND USED AS OFFSET TO OBTAIN POINTER
: TO SELECTED SUBROUTINE
: GET PC OF RETURN
: EPC OF TRAP
: GET TRP
: MULTIPLY TRAP ARG BY 2
: CLEAR UNWANTED BITS
: POINTER TO SUBROUTINE ADDRESS
: SUBROUTINE ADDRESS
: GO TO SUBROUTINE
: SAVE PC OF TEST THAT FAILED AND PC-R5

```

CU2

```

780 003022 016637 000034 004730 SVOSP: MOV 4(SP), SAVPC
781 :SAVE R0-R5
782
783 003030 010537 004724 SVOS: MOV R5, SAVR5
784 003034 010437 004722 MOV R4, SAVR4
785 003040 010337 004720 MOV R3, SAVR3
786 003044 010237 004718 MOV R2, SAVR2
787 003050 010137 004714 MOV R1, SAVR1
788 003054 010037 004712 MOV R0, SAVR0
789 003058 000032 RTI
790 :RESTORE R0-R5
791
792 003062 013700 004712 RSOS: MOV SAVR0, R0
793 003066 013701 004714 MOV SAVR1, R1
794 003072 013702 004716 MOV SAVR2, R2
795 003076 013703 004720 MOV SAVR3, R3
796 003102 013704 004722 MOV SAVR4, R4
797 003106 013705 004724 MOV SAVR5, R5
798 003112 000002 RTI
799
800 :TELETYPE OUTPUT ROUTINE
801
802 003114 017605 000000 TYPER: MOV 2(SP), R5
803 003120 062716 000002 ADD #2, (SP)
804 003124 105777 001502 15: TSTB 2TPCSR
805 003130 100375 BPL 15
806 003132 105715 TSTB (R5)
807 003134 001001 BNE 25
808 003136 000002 RTI
809 003140 112577 00147C 25: MOVB (R5)+, 2TPDBR
810 003144 000757 BR 15
811
812 :ASCII STRING INPUT ROUTINE
813
814 003146 017637 000000 003162 INSTRG: MOV 2(SP), MSG
815 003154 062716 000002 ADD #2, (SP)
816 003160 104401 INSTR1: TYPE
817 003162 000000 MSG: 0
818 003164 012704 005710 MOV #INBUF, R4
819 003170 012703 000007 MOV #7, R3
820 003174 105777 001426 15: TSTB 2TKCSR
821 003200 100375 BPL 15
822 003202 117714 001422 MOVB 2TKDBR, (R4)
823 003206 142714 000200 BICB #200, (R4)
824 003212 122427 000015 CMPB (R4)+, #15
825 003216 001413 BEQ INSTR2
826 003220 117777 001404 001406 25: MOVB 2TKDBR, 2TPCSR
827 003226 105777 00140C TSTB 2TPCSR
828 003232 100375 BPL 25
829 003234 005303 DEC R3
830 003236 001356 BNE 15
831 003240 104401 INSTR2: TYPE
832 003242 005274 MOV #0, INSTR1
833 003244 000745 BR INSTR1

```



```

003246 000000
003250 011605
003252 012537 003424
003256 012537 003426
003262 012537 003430
003266 112537 003432
003272 112537 003433
003276 010516
003300 005005
003302 012704 005710
003306 122714 000015
003312 001420
003314 121427 000060
003320 002415
003322 121427 000067
003326 003012
003330 142714 000060
003334 152405
003336 122714 000015
003342 001406
003344 006305
003346 006305
003350 006305
003352 000750
003354 104404
003356 000750

003360 020537 003426
003364 101373
003366 020537 003424
003372 103770
003374 133735 003432
003400 001365

003402 013704 003430
003406 010524
003410 062705 000002
003414 105337 003433
003420 001372
003422 000002
003424 000000
003426 000000
003430 000000
003432 000
003433 000

003434 011605
003436 012537 003620

```

```

INSTRE: R'I
;CONVERT ASCII STRING TO OCTAL

PARAMS: MOV (SP),R5
MOV (R5)+,LOLIM
MOV (R5)+,HILIM
MOV (R5)+,DEVADR
MOV (R5)+,LOBITS
MOV (R5)+,ADRCNT
PARAM1: MOV R5,(SP)
MOV *INBUF,R4
CMPB #15,(R4)
BEQ PARERR
;S: CMPB (R4),#60
BLT PARERR
CMPB (R4),#67
BGT PARERR
BYCB #60,(R4)
BISB (R4)+,R5
CMPB #15,(R4)
BEQ LIMITS
ASL R5
ASL R5
ASL R5
BR #5
PARERR: INSTER
BR PARAM1

;TEST TO SEE IF NUMBER IS WITHIN LIMITS
LIMITS: CMP R5,HILIM
BHI PARERR
CMP R5,LOLIM
BLO PARERR
BYTB LOBITS,R5
BNE PARERR

;STORE NUMBER AT SPECIFIED ADDRESS
;S: MOV DEVADR,R4
MOV R5,(R4)+
ADD #2,R5
DECB ADRCNT
BNE #5
RTI

LOLIM: 0
HILIM: 0
DEVADR: 0
LOBITS: .BYTE 0
ADRCNT: .BYTE 0

;CONVERT DECIMAL ASCII STRING TO OCTAL
.PARAMD: MOV (SP),R5
MOV (R5)+,#65

```









```

004406 023727 004756 000015 BAR13: CMP LINENU,#15 :IS IT LINE 15?
004414 021004 BNE BAR14 :NO
004416 012737 020000 004762 MOV #20000,0#NUMBAR :STORE BAR BIT 13
004424 000422 BR SET1
004426 023727 004756 000016 BAR14: CMP LINENU,#16 :IS IT LINE 16?
004434 001004 BNE BAR15 :NO
004436 012737 040000 004762 MOV #40000,0#NUMBAR :STORE BAR BIT 14
004444 000412 BR SET1
004446 023727 004756 000017 BAR15: CMP LINENU,#17 :IS IT LINE 17?
004454 001004 BNE BARNUN :NO
004456 012737 100000 004762 MOV #100000,0#NUMBAR :STORE BAR BIT 15
004454 000402 BR SET1
004466 005037 004762 BARNUN: CLR 0#NUMBAR :CLEAR BAR BITS
004472 012701 004536 SET1: MOV #TABLE2,R1
004476 022137 004752 18: CMP (R1)+,LINESP
004502 001407 BEQ 28
004504 005721 TST (R1)+ :IS IT THE END OF TABLE?
004506 001373 BNE 18 :NO
004510 104401 005404 TYPE ,MINVAL :INVALID BAUD RATE,BEGIN AGAIN.
004514 012705 001324 MOV #BAUD,R5 :JUMP TO BAUD THRU R5
004520 000402 BR 38
004522 011137 004754 38: MOV (R1),SPEED :SET UP BAUD RATE
004526 000205 38: RTS R5
  
```

```

004530 000000 WRDONT: 0
004532 000000 CHRCNT: 0
004534 000000 SPACNT=CHRCNT+1
004536 000000 BINWRD: 0
  
```

```

004536 000062
004540 002107
004542 000113
004544 004207
004546 000156
004550 006307
004552 000207
004554 010407
004556 000226
004560 012503
004562 000310
004564 014503
004566 000454
004570 016703
004572 001130
004574 021003
004576 002260
004600 023103
004602 003410
004604 025203
004606 004540
004610 027303
004612 011300
004614 031403
004616 022600
  
```

TABLE2: :THE FOLLOWING IS A TABLE OF LEGAL BAUD RATES (8 BITS STOP)

.WORD 50.	:50 BAUD
.WORD 2107	:TWO STOP BITS
.WORD 75.	:75 BAUD
.WORD 4207	:TWO STOP BITS
.WORD 110.	:110 BAUD
.WORD 6307	:TWO STOP BITS
.WORD 135.	:134.5 BAUD
.WORD 10407	:TWO STOP BITS
.WORD 150.	:150 BAUD
.WORD 12503	:ONE STOP BIT
.WORD 200.	:200 BAUD
.WORD 14603	:ONE STOP BIT
.WORD 300.	:300 BAUD
.WORD 16703	:ONE STOP BIT
.WORD 600.	:600 BAUD
.WORD 21003	:ONE STOP BIT
.WORD 1200.	:1200 BAUD
.WORD 23103	:ONE STOP BIT
.WORD 1800.	:1800 BAUD
.WORD 25203	:ONE STOP BIT
.WORD 2400.	:2400 BAUD
.WORD 27303	:ONE STOP BIT
.WORD 4800.	:4800 BAUD
.WORD 31403	:ONE STOP BIT
.WORD 9600.	:9600 BAUD

004620 33503  
004622 177777 303000

.WORD 33503 :ONE STOP BIT  
.WORD -1.0 :TABLE TERMINATOR

:INDIRECT POINTERS

004626 177560  
004630 177562  
004632 177564  
004634 177566  
004636 000000  
004640 000000  
004642 000000  
004644 000000  
004646 000000  
004650 000000  
004652 000000  
004654 000000  
004656 000000  
004660 000000  
004662 000000  
004664 000000  
004666 000000

TKCSR: 177560  
TKDBR: 177562  
TPCSR: 177564  
TPDBR: 177566  
DHSCR: 0  
DHNRC: 0  
DHLPR: 0  
DHBA: 0  
DHBC: 0  
DHBAR: 0  
DHBCR: 0  
DHSSR: 0  
DHSLR: 0  
DHRVEC: 0  
DHRLVL: 0  
DHTVEC: 0  
DHTLVL: 0

:PROGRAM VARIABLES

004670 000000  
004672 000000  
004674 000000  
004676 000000  
004700 001100  
004702 000000  
004704 000000  
004706 000012  
004710 000000  
004712 000000  
004714 000000  
004716 000000  
004720 000000  
004722 000000  
004724 000000  
004726 000000  
004730 000000  
004732 177777  
004734 000000  
004736 000000  
004740 000000  
004742 000000  
004744 000000  
004746 000000  
004750 000000  
004752 000156  
004754 006307

NEXT: 0 :NEXT TEST #  
ERRFLG: 0 :ERROR FLAG  
PASCNT: 0 :PASS COUNT  
ERRCNT: 0 :ERROR COUNT  
RETURN: START :RETURN ADDRESS  
ESCAPE: 0 :ADDRESS FOR ERROR ESCAPE  
FREEZ1: 0 :DATA LOOPING RETURN ADDRESS  
ICOUNT: 10. :ITERATION COUNT FOR TEST IN PROGRESS  
IPCNT: 0 :NUMBER OF ITERATIONS THIS TEST  
SAVR0: 0 :R0 SAVE AREA  
SAVR1: 0 :R1 SAVE AREA  
SAVR2: 0 :R2 SAVE AREA  
SAVR3: 0 :R3 SAVE AREA  
SAVR4: 0 :R4 SAVE AREA  
SAVR5: 0 :R5 SAVE AREA  
SAVSP: 0 :STACK POINTER SAVE AREA  
SAVPC: 0 :CALLING ROUTINE SAVE AREA  
INIFLG: .WORD -1 :PROGRAM INITIALIZATION FLAG  
WCHFLG: 0 :ECHO OR CABLE FLAG  
STFLG: 0 :PROGRAM START FLAG  
LOCKUP: 0 :TIMEOUT FLAG  
LAST: 0 :LAST ERROR PC  
TDATA: 0  
RDATA: 0  
BYTCNT: 0  
LINESP: 110.  
SPEED: 6307

:DEFAULT BAUD RATE  
:DEFAULT 110 BAUD, 8 BITS CHAR.  
:FDX 2 STOP BITS  
:DEFAULT VALUE, LINE 0  
:DEFAULT VALUE, REC. INTERRUPT ENABLED

004756 000000  
004758 000100

LINENU: 0  
NUMLIN: 100

1136 004762 000001  
 1137 004764 000240  
 1138 004766 000200  
 1139 004770 000000  
 1140 004772 000000  
 1141  
 1142  
 1143  
 1144  
 1145 004774 010046  
 1146 004776 010146  
 1147 005000 010246  
 1148 005002 010346  
 1149 005004 010446  
 1150 005006 010546  
 1151 005010 013746 000024  
 1152 005014 010637 004726  
 1153 005020 012737 005032 000024  
 1154 005026 000000  
 1155 005030 000777  
 1156  
 1157  
 1158 005032 013706 004726  
 1159 005036 012605  
 1160 005040 012604  
 1161 005042 012603  
 1162 005044 012602  
 1163 005046 012601  
 1164 005050 012600  
 1165 005052 012737 004774 000024  
 1166 005060 012737 000340 177776  
 1167 005066 012706 001100  
 1168 005072 005037 005722  
 1169 005076 005237 005722  
 1170 005102 001375  
 1171 005104 104402  
 1172 005106 005130  
 1173 005110 104401  
 1174 005112 005304  
 1175 005114 005037 004672  
 1176 005120 005037 004742  
 1177 005124 000177 177550  
 1178 005130 000001  
 1179 005132 006 002  
 1180 005134 000207  
 1181 005136 005015 042812 030510  
 005170 055104 044104 020112  
 005214 005015 042526 052103  
 005237 015 041412 047117  
 005274 020040 020077 000  
 005301 015 000012  
 005304 020040 047520 042527  
 005372 005015 055104 044104  
 005404 005015 047111 040526  
 005433 015 046012 047111  
 005465 015 041012 052501

NUMBER: 1 ; DEFAULT VALUE, BAR BIT 0  
 PRIO: 240 ; DEFAULT DEVICE PRIORITY 5  
 LESS: 200 ; DEFAULT PRIORITY4, TO ALLOW INTERRUPTS  
 RECDAT: 0  
 TBUF: 0 ; ENTER HERE ON POWER FAILURE  
  
 PFAIL: MOV R0, -(SP) ; SAVE R0-R5 ON PROCESSOR STACK  
 MOV R1, -(SP)  
 MOV R2, -(SP)  
 MOV R3, -(SP)  
 MOV R4, -(SP)  
 MOV R5, -(SP)  
 MOV 24, -(SP)  
 MOV SF, SAVSP ; SAVE STACK POINTER  
 MOV #RESTART, 24 ; SET UP FOR POWER UP TRAP  
 HALT ; HALT ON POWER DOWN NORMAL  
 BR .  
  
 ; PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED  
  
 RESTAR: MOV SAVSP, SP ; RESTORE STACK POINTER  
 MOV (SP)+, R5 ; RESTORE R0-R5  
 MOV (SP)+, R4  
 MOV (SP)+, R3  
 MOV (SP)+, R2  
 MOV (SP)+, R1  
 MOV (SP)+, R0  
 MOV #PFAIL, 24 ; SET UP FOR POWER FAILURE  
 MOV #340, P5  
 MOV #STACK, SP  
 CLR TEMP  
 INC TEMP  
 BNE .-4  
 OCTASC  
 PFTAB  
 TYPE  
 MPFAIL  
 CLR ERRFLG  
 CLR LAST  
 JMP #RETURN  
  
 PFTAB: 1  
 .BYTE 6, 2  
 RETURN  
  
 MTITLE: .ASCII <15><12><12>?D411 ECHO CABLE TEST 15 12  
 .ASCII /DZDHJ REVISION B /  
 MVECTO: .ASCII <15><12>/VECTOR ADDRESS-  
 MREGAD: .ASCII <15><12>/CONTROL REGISTER ADDRESS-  
 MQM: .ASCII / ? /  
 MCRLF: .ASCII <15><12>  
 MPFAIL: .ASCII / POWER FAILURE, PROGRAM RESTART AT TEST IN PROGRESS  
 MEPASS: .ASCII <15><12>/DZDHJ  
 MINVAL: .ASCII <15><12>/INVALID BAUD RATE -  
 MLINE: .ASCII <15><12>/LINE NUMBER IN TOTAL -  
 MSPEED: .ASCII <15><12>/BAUD RATE -

005504	005015	054524	042520	MCHAR:	.ASCIZ	<15><12>	/TYPE A CHAR. ON CH11 TERMINAL /
005545	015	053412	044510	MWHICH:	.ASCIZ	<15><12>	/WHICH TEST ? ECHO OR CABLE (E OR C) /
005614	005015	042524	046522	MTERM:	.ASCIZ	<15><12>	/TERMINAL ECHO TEST /
005642	005015	040503	046102	MCABLE:	.ASCIZ	<15><12>	/CABLE TEST /
				.EVEN			

;TABLE OF POINTERS FOR TRAP DECODING

1192				TRPTAB:	SCOPER
1193					TYPFR
1194	005660	002450			OCTASN
1195	005662	003114			INSTRG
1196	005664	003676			INSTRE
1197	005666	003146			PARAMS
1198	005670	003240			SVQSP
1189	005672	003250			RSQ5
1190	005674	003022			SCOP1R
1191	005676	003062			.PARAMD
1192	005700	002550			.PAWCH
1193	005702	003434			SVQ5
1194	005704	003630			
1195	005706	003030			

;BUFFERS FOR INPUT-OUTPUT

1196				INBUF:	0
1197				.=. +10	
1198				TEMP:	0
1199	005710	000000		.=. +10	
1200		005722		MDATA:	0
1201	005722	000000		.=. +10	
1202		005734			
1203	005734	000000			
1204		005746			

;TABLE OF POINTERS TO ERROR MESSAGES AND DATA

1205				ERRTAB:	
1206					EM1
1207					0
1208	005746				EM2
1209	005746	006016			0
1210	005750	000000			EM3
1211	005752	006065			0
1212	005754	000000			EM4
1213	005756	006122			0
1214	005760	000000			EM5
1215	005762	006155			0
1216	005764	000000			EM6
1217	005766	006225			0
1218	005770	000000			EM7
1219	005772	006262			0
1220	005774	000000			EM8
1221	005776	006313			0
1222	006000	000000			EM9
1223	006002	006411			0
1224	006004	000000			EM10
1225	006006	006437			0
1226	006010	000000			
1227	006012	006466			
1228	006014	000000			
1229	006016	005015	051105	047522	EM1: .ASCIZ <15><12>/ERROR- INTERRUPT NOT CAUSED BY FLAG
	006065	015	042412	051122	EM2: .ASCIZ <15><12>/ERROR-NON VALID CHARACTER
	006122	005015	051105	047522	EM3: .ASCIZ <15><12>/ERROR-WRONG LINE NUMBER

006155	015	042412	051122
006225	015	042412	051122
005262	005015	051105	045222
006313	015	042412	051122
006411	015	042412	051122
006437	015	042412	051122
006466	005015	040520	044522

EM4:	.ASCIZ	<15><12>	/ERROR-TRANSMITTER DONE SHOULD BE SET /
EM5:	.ASCIZ	<15><12>	/ERROR-NON-EXISTANT MEMORY /
EM6:	.ASCIZ	<15><12>	/ERROR-WRONG CHARACTER /
EM7:	.ASCIZ	<15><12>	/ERROR- NOT RECEIVING CHARACTERS -CHECK CABLE OR TERMINATOR /
EM8:	.ASCIZ	<15><12>	/ERROR-DATA OVERRUN /
EM9:	.ASCIZ	<15><12>	/ERROR-FRAMING ERROR /
EM10:	.ASCIZ	<15><12>	/PARITY ERROR /

.EVEN  
TABLE:

1230	006506	000	.BYTE	0
1231	006507	001	.BYTE	1
1232	006510	002	.BYTE	2
1233	006511	003	.BYTE	3
1234	006512	004	.BYTE	4
1235	006513	005	.BYTE	5
1236	006514	006	.BYTE	6
1237	006515	007	.BYTE	7
1238	006516	010	.BYTE	10
1239	006517	011	.BYTE	11
1240	006520	012	.BYTE	12
1241	006521	013	.BYTE	13
1242	006522	014	.BYTE	14
1243	006523	015	.BYTE	15
1244	006524	016	.BYTE	16
1245	005525	017	.BYTE	17
1246	006526	020	.BYTE	20
1247	006527	021	.BYTE	21
1248	006530	022	.BYTE	22
1249	005531	023	.BYTE	23
1250	005532	024	.BYTE	24
1251	006533	025	.BYTE	25
1252	006534	026	.BYTE	26
1253	006535	027	.BYTE	27
1254	006536	030	.BYTE	30
1255	006537	031	.BYTE	31
1256	006540	032	.BYTE	32
1257	006541	033	.BYTE	33
1258	006542	034	.BYTE	34
1259	006543	035	.BYTE	35
1260	006544	036	.BYTE	36
1261	006545	037	.BYTE	37
1262	006546	040	.BYTE	40
1263	006547	041	.BYTE	41
1264	007550	042	.BYTE	42
1265	006551	043	.BYTE	43
1266	006552	044	.BYTE	44
1267	006553	045	.BYTE	45
1268	006554	046	.BYTE	46
1269	006555	047	.BYTE	47
1270	006556	050	.BYTE	50
1271	006557	051	.BYTE	51
1272	006560	052	.BYTE	52
1273	006561	053	.BYTE	53
1274	006562	054	.BYTE	54
1275	006563	055	.BYTE	55
1276	006564	056	.BYTE	56

1277	006565	057	.BYTE	57
1278	006566	060	.BYTE	60
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1281	006571	063	.BYTE	63
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1283	006573	065	.BYTE	65
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1285	006575	067	.BYTE	67
1286	006576	070	.BYTE	70
1287	006577	071	.BYTE	71
1288	006600	072	.BYTE	72
1289	006601	073	.BYTE	73
1290	006602	074	.BYTE	74
1291	006603	075	.BYTE	75
1292	006604	076	.BYTE	76
1293	006605	077	.BYTE	77
1294	006606	100	.BYTE	100
1295	006607	101	.BYTE	101
1296	006610	102	.BYTE	102
1297	006611	103	.BYTE	103
1298	006612	104	.BYTE	104
1299	006613	105	.BYTE	105
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1301	006615	107	.BYTE	107
1302	006616	110	.BYTE	110
1303	006617	111	.BYTE	111
1304	006620	112	.BYTE	112
1305	006621	113	.BYTE	113
1306	006622	114	.BYTE	114
1307	006623	115	.BYTE	115
1308	006624	116	.BYTE	116
1309	006625	117	.BYTE	117
1310	006626	120	.BYTE	120
1311	006627	121	.BYTE	121
1312	006630	122	.BYTE	122
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1327	006647	141	.BYTE	141
1328	006650	142	.BYTE	142
1329	006651	143	.BYTE	143
1330	006652	144	.BYTE	144
1331	006653	145	.BYTE	145
1332	006654	146	.BYTE	146



1333	006655	147
1334	006656	150
1335	006657	151
1336	006660	152
1337	006661	153
1338	006662	154
1339	006663	155
1340	006664	156
1341	006665	157
1342	006666	160
1343	006667	161
1344	006670	162
1345	006671	163
1346	006672	164
1347	006673	165
1348	006674	166
1349	006675	167
1350	006676	170
1351	006677	171
1352	006700	172
1353	006701	173
1354	006702	174
1355	006703	175
1356	006704	176
1357	006705	177
1358	006706	200
1359	006707	201
1360	006710	202
1361	006711	203
1362	006712	204
1363	006713	205
1364	006714	206
1365	006715	207
1366	006716	210
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1368	006720	212
1369	006721	213
1370	006722	214
1371	006723	215
1372	006724	216
1373	006725	217
1374	006726	220
1375	006727	221
1376	006730	222
1377	006731	223
1378	006732	224
1379	006733	225
1380	006734	226
1381	006735	227
1382	006736	230
1383	006737	231
1384	006740	232
1385	006741	233
1386	006742	234
1387	006743	235
1388	006744	236

.BYTE	147
.BYTE	150
.BYTE	151
.BYTE	152
.BYTE	153
.BYTE	154
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.BYTE	156
.BYTE	157
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.BYTE	227
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.BYTE	232
.BYTE	233
.BYTE	234
.BYTE	235
.BYTE	236













TEST -- USER SYMBOLS

1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500
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 1231 0002100  
 1232 0005660  
 1233 0004104  
 1234 0003114  
 1235 0002666  
 1236 0001166  
 1237 0004116  
 1238 0004500  
 1239 0004000

1230\* 734  
 1231\* 1184  
 1232\* 434  
 1233\* 1185  
 1234\* 705  
 1235\* 436  
 1236\* 438  
 1237\* 493  
 1238\* 962\*  
 1239\* 1049\*

493 505 525 639 708 782 797 929 960 1042 1170  
 1123\*  
 1231\* 1232\* 1233\* 1234\* 1235\* 1236\* 1237\* 1238\* 1239\* 1240\* 1241\*  
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 1979\* 1980\* 1981\* 1982\* 1983\* 1984\* 1985\* 1986\* 1987\* 1988\* 1989\*  
 1990\* 1991\* 1992\* 1993\* 1994\* 1995\* 1996\* 1997\* 1998\* 1999\* 2000\*

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 1232 0005660  
 1233 0004104  
 1234 0003114  
 1235 0002666  
 1236 0001166  
 1237 0004116  
 1238 0004500  
 1239 0004000

359# 534 537 546 550 599 594 598 601 604 607 610 615 625 628

CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

41-1-020-0-REV-B-2  
020HJB.P11

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923	923	924	925	975	877	878						
545	585	600	603	606	609	614	627	646	673	673	682	
791	814	822	864	874	955	1039						
629	630	697	738	942								
567	569	971										
548	584	599	602	605	623	626	658	660	662	678	685	722
593	597	549	552	588	617	624	659	661	653	666	686	704
497	502	891	899	915	919	949	953	958	963	973	977	981
937	945	1001	1005	1009	1013	1017	1021	1025	1029	1033	1041	1173
794	794	776	799	826	828	880	882	917	924	975	979	983
619	674	1003	1007	1011	1015	1019	1023	1027	1031	1035	1044	1154
999	999	431	442	468	492	591	641	642	667	668	690	811
439	430	1175	1176									
1036	1168											
613	665	687	832	834	886	888	972	976	980	984	988	988
1004	1008	1012	1016	1020	1024	1028	1032	1036				
616	790	813	915	917	921	963	965	967	973	914	918	
962	957											
381	382	719	1153									
487	543	664	664	721	1169							
506	586	653	653	741	1177							
425	426	438	438	440	441	467	486	490	491	495		
515	516	518	519	522	523	574	538	547	554	558		
569	571	572	573	574	575	576	577	578	579	580		
744	645	669	670	680	689	692	694	699	705	708		
740	745	749	750	751	752	753	754	758	759	760		
780	784	785	804	805	806	807	810	812	841	841		
860	862	876	895	896	913	933	934	937	938	938		
974	982	986	990	994	998	1002	1006	1010	1014	1014		
1034	1043	1045	1144	1145	1146	1147	1148	1149	1150	1150		
1160	1161	1162	1162	1164	1165	1167						
540	775	788	792	808	809	859	920	935	936	939	941	981
650	651	652										
558	621	631	671	681	725	755	764	774	800	846	882	885
735												
403	403	404	405	406	407	408	409	410	411	412		

	496	502	535	596	672	701	703	710	715	1040
496	592	770	772	795	793	954				
1233	1233	1233	1234	1235	1236	1237	1238	1239	1240	1241
1247	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256
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1366	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375
1381	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390
1396	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405
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REAR-0  
2411 ECHO CABLE TEST

1107

DLIST

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1080

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1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084

ERRORS DETECTED: 0  
DEFAULT GLOBALS GENERATED: 0

\* DZDZJTB.SEG/SOL/CRF/PAGNUM=DZDZJTB  
RUN-TIME: 7 11 3 SECONDS  
RUN-TIME RATIO: 67/22=2.9  
CORE USED: BK (15 PAGES)