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IDENTIFICATION

PRODUCT CODE: AC-8484E-MC  
PRODUCT NAME: CZDMKEO MODEM CONTROL MULTIPLEXER DIAGNOSTIC  
DATE : JULY 1984  
MAINTAINER: DIAGNOSTIC GROUP

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## 1.0 ABSTRACT

THIS PROGRAM IS A TEST OF THE MODEM CONTROL MULTIPLEXER USED WITH THE DM11 OPTI  
THE PROGRAM IS DIVIDED INTO FUNCTIONAL TEST GROUPS AS  
FOLLOWS:

- GROUP 0: ALL LINE SCANNER AND LINE MULTIPLEXER FUNCTIONS ARE  
TESTED. NO TEST CONNECTOR IS NEEDED...  
GROUP 1: A SINGLE LINE IS TESTED USING THE MODEM CABLE AND  
A H315 TEST CONNECTOR  
GROUP 2: CONNECT-DISCONNECT TEST FOR 103A MODEMS  
GROUP 3: CONNECT-DISCONNECT TEST FOR 202C MODEMS

## 2.0 REQUIREMENTS

## 2.1 EQUIPMENT

PDP-11 COMPUTER WITH AT LEAST 8K OF MEMORY  
WITH OR WITHOUT HARDWARE SWITCH REGISTER  
ASR-33 TELETYPE OR EQUIVALENT  
MODEM CONTROL MODULES

## 2.1.1 FOR 16 LINE SCANNER TEST

NO ADDITIONAL HARDWARE IS NEEDED. PROGRAM HAS BEEN MODIFIED  
TO RUN WITHOUT H861 TEST CONNECTOR.

## 2.1.2 FOR SINGLE LINE CABLE TEST

4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL  
H315 TEST CONNECTOR

## 2.1.3 FOR ON LINE TESTS

4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL  
2 BELL 103A MODEMS (FOR 103A TEST)  
2 BELL 202C MODEMS (FOR 202C TEST)

## 3.0 LOADING PROCEDURE

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

## 4.0 STARTING PROCEDURE

## 4.1 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200.  
RESTART ADDRESS FOR ALL TESTS IS 000200

CZDHC-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 3  
 CZDHC.E.P11 11-JUL-84 08:45

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4.2 OPERATOR AND/OR PROGRAM ACTION

4.2.1 INITIAL PROGRAM START

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 NOTE  
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IF PROGRAM IS BEING RUN WITH THE "XOR" MODULE TESTER  
 LOCATION 1030(8) MUST BE MODIFIED TO CONTAIN A 240(8)  
 "NOP" TO ACTIVATE THAT CODE AFFECTING THE "XOR" TESTER.

\*\*\*\*\*  
 NOTE  
 \*\*\*\*\*

SOFTWARE SWITCH REGISTER IS DEFINED AS LOC. 176  
 (REFER TO SECTION 5.1.2 FOR DYNAMIC LOADING INSTRUCTIONS)

4.2.1.1 LOAD ADDRESS 000200

SET SW00 = 1  
 PRESS START  
 \*\*\*SOFTWARE SWITCH REGISTER IS LOC. 176

4.2.1.2 PROGRAM WILL TYPE

"DM11-MODEM CONTROL DIAGNOSTIC "(ONCE ONLY)  
 \*\*\*NOTE: IF USING SOFTWARE SWITCH REGISTER THE FOLLOWING  
 WILL BE TYPED BEFORE TITLE:  
 SMR-XXXXXX NEW- (REFER TO SECTION 5.1.2 FOR OPTIONS)

4.2.1.3 PROGRAM WILL TYPE (WITH SW00 = 1)

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

4.2.1.4 TYPE A THREE DIGIT NUMBER (OCTAL) WHICH IS THE

ADDRESS THAT THE MODEM CONTROL WILL INTERRUPT TO, FOLLOWED BY  
 <RETURN>. IF AN INCORRECT ADDRESS IS TYPED, THE PROGRAM WILL  
 TYPE "?" AND THEN REPEAT 4.2.1.3.

NOTE: IF THE ADDRESS ENTERED IS ACCEPTIBLE TO THE PROGRAM,  
 BUT IS NOT THE INTERRUPT VECTOR ADDRESS OF THE MODEM CONTROL  
 UNDER TEST, A HALT WILL OCCUR AT THAT ADDRESS\*2, WHEN  
 THE MODEM CONTROL INTERRUPTS.

TO RECOVER, PERFORM 4.2.2.1.

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

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4.2.1.6 TYPE A 6 DIGIT (OCTAL NUMBER) WHICH IS THE ADDRESS OF THE MODEM CONTROL'S CONTROL REGISTER FOLLOWED BY <RETURN>. IF AN INCORRECT ADDRESS IS TYPED, THE PROGRAM WILL TYPE "?" AND THEN REPEAT 4.2.1.6.

NOTE: IF THE ADDRESS ENTERED IS ACCEPTIBLE TO THE PROGRAM BUT IS A NON-EXISTANT REGISTER, A BUS ERROR TRAP WILL OCCUR WHEN THE PROGRAM ADDRESSES THE REGISTER, AND THE PROGRAM WILL HALT AT LOCATION 6.

TO RECOVER, PERFORM 4.2.2.1.

4.2.1.7 THE PROGRAM WILL TYPE "LINE SELECTION PARAMETER-" AND WAIT FOR INPUT FROM THE TTY KEYBOARD.

4.2.1.8 TYPE AN OCTAL NUMBER TO SPECIFY THE LINES TO BE TESTED USING THE FOLLOWING ENCODING SCHEME:

BIT00 = 1	TEST LINE 00
BIT01 = 1	TEST LINE 01
BIT02 = 0	DO NOT TEST LINE 2
"	
"	
BIT15 = 1	TEST LINE 15

EG: TYPING 377(8) SELECTS LINES 00 THRU 07  
TYPING 177777(8) SELECTS ALL 16 LINES

IF THE NO. TYPED IS NOT ACCEPTABLE, THE PROGRAM TYPES A "?" AND ASKS FOR THE LINE SELECT PARAMETER AGAIN.

4.2.1.9 THE PROGRAM WILL TYPE "TEST-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

4.2.1.10 TYPE A THREE DIGIT OCTAL NUMBER CORRESPONDING TO THE NUMBER OF THE TEST TO BE RUN FOLLOWED BY <RETURN>. IF AN INCORRECT TEST NUMBER IS TYPED THE PROGRAM WILL TYPE "?" AND THEN REPEAT 4.2.1.7. THE AVAILABLE TESTS TOGETHER WITH THE NUMBER TO BE TYPED ARE GIVEN BELOW.

TEST GROUP 0:  
OFF LINE TESTS -FIRST TEST=0  
TEST GROUP 1:  
OFF LINE TESTS USING DC11 TEST CONNECTOR AND MODEM CABLE-FIRST TEST=100  
TEST GROUP 2:  
CONNECT/DISCONNECT TEST FOR BELL 103A MODEMS-FIRST TEST=200  
TEST GROUP 3:  
CONNECT/DISCONNECT TEST FOR BELL 202C MODEMS-FIRST TEST=300

4.2.1.11 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

CZDHC-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 5  
 CZDHKE.P11 11-JUL-84 08:45

194 4.2.2 PROGRAM RESTART  
 195  
 196 4.2.2.1 WITH SW00=1  
 197  
 198 LOAD ADDRESS 200  
 199 SET SW00=1 BEFORE PRESSING START.  
 200 \*\*\*SOFTWARE SWITCH REGISTER IS LOC 176\*\*\*  
 201 PRESS START  
 202  
 203 PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.10.  
 204  
 205 4.2.2.2 WITH SW00=0  
 206  
 207 LOAD ADDRESS 200  
 208 \*\*\*SOFTWARE SWITCH REGISTER IS LOC. 176  
 209 PRESS START  
 210  
 211 PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.10  
 212 5.0 OPERATING PROCEDURE  
 213  
 214 5.1 TEST GROUP 0 16 LINE SCANNER TEST  
 215  
 216 5.1.1 TEST INITIALIZATION  
 217  
 218 NONE REQUIRED, PROGRAM TYPES "16 LINE SCANNER TEST"  
 219 AND BEGINS TEST EXECUTION.  
 220  
 221 5.1.2 OPERATIONAL SWITCH SETTINGS  
 222  
 223 IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH  
 224 REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS  
 225 THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER.  
 226 IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES  
 227 AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH  
 228 REGISTER (LOC. 176) IS USED.  
 229  
 230  
 231 CONTROL:  
 232  
 233 THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH  
 234 REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY  
 235 DOING THE FOLLOWING:  
 236  
 237 1) TYPE CONTROL G <+G>; THIS WILL ALLOW THE TTY TO ENTER DATA INTO  
 238 LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.  
 239  
 240 2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS  
 241 OF THE SOFTWARE SWITCH REGISTER.)  
 242  
 243 3) AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE  
 244 OF THE FOLLOWING AT THE TTY:  
 245

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 6  
 CZDMKE.P11 11-JUL-84 08:45

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- A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>. (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS WILL BE ALLOWED)  
 IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.
- B) IF A CONTROL U <+U> IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

SW15=1. HALT ON ERROR  
 SW14=1. LOOP ON CURRENT TEST  
 SW13=1. SUPPRESS ERROR TYPEOUT  
 SW11=1. SUPPRESS ITERATIONS  
 SW10=1. ESCAPE TO NEXT TEST ON ERROR  
 SW09=1. FREEZE DATA

### 5.1.3 PROGRAM AND/OR OPERATOR ACTION

5.1.3.1 WITH ALL SWITCHES DOWN, THE PROGRAM WILL RUN ALL TESTS IN THE SELECTED GROUP, SEQUENTIALLY. EACH TEST IS REPEATED A FIXED NUMBER OF TIMES (SEE LISTING FOR DETAILS), EXCEPT FOR TO WHICH IS EXECUTED ONCE ONLY AFTER START OF TEST. WHEN ALL TESTS HAVE BEEN COMPLETED, THE PROGRAM WILL ISSUE A "RESET", RING THE TELETYPE BELL, AND RESTART AT THE FIRST TEST OF THE SELECTED GROUP.

IF AN ERROR OCCURS, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND CONTINUE TESTING.

5.1.3.2 WITH SW15=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT A HALT WILL OCCUR AFTER ERROR TYPEOUT.  
 NOTE: IF USING THE SOFTWARE SWITCH REGISTER AND AN EROR HALT OCCURS. THE SOFTWARE SWITCH REGISTER CAN BE CHANGED BY PRESSING CONTINUE THE PROGRAM WILL RESPOND WITH THE FOLLOWING:  
 SWR=XXXXXX NEW=

5.1.3.3 WITH SW13=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT NO ERROR TYPEOUT WILL OCCUR. THE PC OF THE TEST THAT FAILED WILL BE DISPLAYED IN THE COMPUTER DATA LIGHTS.

5.1.3.4 THIS PROGRAM WILL NO LONGER TRACE TRAP WITH THIS RELEASE

5.1.3.5 WITH SW10=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT AFTER AN ERROR HAS OCCURED, THE PROGRAM WILL IMMEDIATELY START THE NEXT TEST IN SEQUENCE.

292 5.2 TEST GROUP 1 SINGLE LINE CABLE TEST  
293  
294 5.2.1 TEST INITIALIZATION  
295  
296 THE PROGRAM WILL TYPE "SINGLE LINE CABLE TEST  
297 LINE NUMBER-" AND WILL WAIT FOR AN INPUT FROM  
298 THE TELETYPE KEYBOARD.  
299  
300 TYPE A 2 DIGIT OCTAL NUMBER BETWEEN 0 AND 17, CORRESPONDING  
301 TO THE NUMBER OF THE LINE TO BE TESTED, FOLLOWED BY  
302 <RETURN>. THE PROGRAM WILL THEN BEGIN TEST EXECUTION.  
303 IF THE TELETYPE INPUT IS INCORRECT, THE PROGRAM  
304 WILL TYPE "?" AND REPEAT THE MESSAGE.  
305  
306 5.2.2 OPERATIONAL SWITCH SETTINGS  
307  
308 SAME AS 5.1.2  
309  
310 5.2.3 PROGRAM AND/OR OPERATOR ACTION  
311  
312 SAME AS 5.1.3  
313  
314 5.3 TEST GROUP 2 BELL 103A MODEM CONNECT-DISCONNECT TEST  
315  
316 5.3.1 TEST INITIALIZATION  
317  
318 THE PROGRAM WILL TYPE "103A CONNECT-DISCONNECT TEST  
319 ORIGINATE LINE-" AND WAIT FOR AN INPUT FROM THE TELETYPE  
320 KEYBOARD.  
321  
322 TYPE THE NUMBER OF THE LINE THAT WILL ORIGINATE THE  
323 CALL (0-17 OCTAL) FOLLOWED BY RETURN.  
324  
325 THE PROGRAM WILL TYPE "ANSWER LINE-" AND WILL WAIT  
326 FOR AN INPUT FROM THE TELETYPE KEYBOARD.  
327  
328 TYPE THE NUMBER OF THE LINE THAT WILL ANSWER THE CALL  
329 (0-17 OCTAL) FOLLOWED BY <RETURN>.  
330  
331 THE PROGRAM WILL TYPE "DIAL ANSWERING DATA SET"  
332 AND WILL WAIT FOR THE ORIGINATE AND ANSWERING MODEMS  
333 TO GENERATE INTERRUPTS.  
334  
335 5.3.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION  
336  
337 AFTER THE MESSAGE "DIAL ANSWERING DATA SET" IS TYPED  
338 THE OPERATOR HAS APPROXIMATELY 5 MINUTES TO ESTABLISH  
339 A CONNECTION BETWEEN THE 2 DATA SETS.  
340  
341 5.3.2.1 PLACE ANSWERING DATA SET IN "AUTO ANSWER" MODE

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5.3.2.2 PLACE ORIGINATING DATA SET IN "TALK" MODE

5.3.2.3 DIAL DIAL ANSWERING DATA SET FROM ORIGINATING  
DATA SET

5.3.2.4 LISTEN FOR TONE IN HANDSET OF ORIGINATING DATA SET.

WHEN TONE IS HEARD, PRESS "DATA" BUTTON ON  
ORIGINATING DATA SET.

"DATA" LIGHT SHOULD ILLUMINATE

5.3.2.5 "DATA" LIGHT ON ANSWERING DATA SET SHOULD BE LIT.

5.3.2.6 THE PROGRAM WILL NOW WAIT FOR  
INTERRUPTS FROM THE MODEM CONTROL.

5.3.2.7 IF THE CONNECTION HAS BEEN PROPERLY ESTABLISHED,  
THE PROGRAM WILL TYPE "TYPE TTY KEY TO DISCONNECT".

WHEN TTY KEY IS STRUCK, THE PROGRAM WILL BEGIN THE  
DISCONNECT SEQUENCE.

5.3.2.8 WHEN THE DISCONNECT SEQUENCE HAS BEEN COMPLETED  
THE PROGRAM WILL TYPE "103A TEST COMPLETE",  
AND WILL REQUEST THE OPERATOR TO SELECT NEW LINES.

5.3.3 PROGRAM ACTION IN CASE OF ERROR

5.3.3.1 RING ON INCORRECT LINE

IF THE PROGRAM DETECTS A RING SIGNAL ON AN INCORRECT  
LINE, OR IF ANY OTHER TRANSITION BESIDES RING IS  
DETECTED BEFORE RING, THE PROGRAM WILL TYPE  
A FATAL ERROR MESSAGE AND REQUEST THE OPERATOR  
TO RESELECT LINES AND REDIAL.

5.3.3.2 OTHER ERRORS

IF ANY ERRORS OCCUR AFTER THE FIRST RING HAS BEEN  
DETECTED, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR  
MESSAGE AND CONTINUE TESTING TO COMPLETION.

THE ONLY EXCEPTION TO THIS IS IF AN INTERRUPT  
OCCURS ON A LINE NOT SELECTED, IN WHICH  
CASE A FATAL ERROR WILL BE REPORTED, AND THE PROGRAM  
WILL PROCEED AS DESCRIBED IN 5.3.3.1

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## 5.3.4 OPERATION SWITCH SETTINGS

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

## CONTROL:

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

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

SW15=1, HALT ON ERROR  
SW13=1, SUPPRESS ERROR TYPEOUT

## 5.3.5 DATA SET MODE SWITCHING

AFTER THE PROGRAM HAS TYPED THE MESSAGE DESCRIBED IN 5.3.2.7, BUT BEFORE TTY KEY IS STRUCK, THE OPERATOR MAY SWITCH EITHER DATA SET FROM THE MODE THAT IT IS IN TO ANOTHER MODE. ALL TRANSITIONS DETECTED AT THIS TIME WILL BE REPORTED.

NOTE: THE ORIGINATE DATA SET MUST BE RETURNED TO "TALK" MODE AND THE ANSWERING DATA SET TO "AUTO ANSWER" BEFORE DISCONNECT IS STARTED TO PREVENT ERRORS FROM BEING DETECTED THAT ARE CAUSED BY THE FACT THAT THE MODEM IS IN THE INCORRECT STATE.

CZDHE-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 10  
CZDHE.P11 11-JUL-84 08:45

442 5.4 TEST GROUP 3 BELL 202C MODEM CONNECT-DISCONNECT TEST  
443  
444 5.4.1 TEST INITIALIZATION  
445  
446 SAME AS 5.3.1 EXCEPT PROGRAM WILL TYPE "202C CONNECT  
447 DISCONNECT TEST".  
448  
449 5.4.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION  
450  
451 SAME AS 5.3.2 EXCEPT AT END OF TEST, PROGRAM WILL TYPE  
452 "202C TEST COMPLETE".  
453  
454 5.4.3 PROGRAM ACTION IN CASE OF ERRORS  
455  
456 SAME AS 5.3.3  
457  
458 5.4.4 OPERATIONAL SWITCH SETTINGS  
459  
460 SAME AS 5.3.4  
461  
462 5.4.5 DATA SET MODE SWITCHING  
463  
464 SAME AS 5.3.5  
465 5.5 TEST RESELECTION  
466  
467 TO ESCAPE FROM THE TEST IN PROGRESS, AND SELECT  
468 A NEW TEST, TYPE <CONTROL C>.  
469  
470 THE PROGRAM WILL STOP EXECUTION OF THE TEST IN PROGRESS  
471 AND THEN TYPE "TEST-" AND WAIT FOR AN INPUT FROM  
472 THE TELETYPE KEYBOARD.  
473  
474 PROCEED AS DESCRIBED IN 4.2.1.8  
475  
476 5.5 ADDRESS CHANGE  
477  
478 TO CHANGE THE VECTOR AND REGISTER ADDRESS OF THE MODEM CONTROL  
479 UNDER TEST, TYPE <CONTROL V>. THE PROGRAM WILL  
480 STOP EXECUTION OF THE TEST IN PROGRESS AND PROCEED AS  
481 DESCRIBED IN SECTION 4.2.1, EXCEPT THAT  
482 "MODEM CONTROL DIAGNOSTIC" WILL NOT BE TYPED.  
483  
484 5.6 LINE NUMBER CHANGE  
485  
486 TO CHANGE THE LINE NUMBER(S) UNDER TEST, TYPE  
487 <CONTROL L>. THE PROGRAM WILL SUSPEND THE  
488 TEST IN PROGRESS AND RETURN TO THE INITIALIZATION  
489 STAGE OF THE SELECTED TEST.  
490  
491 WHEN THE LINE NUMBER(S) HAS BEEN CHANGED, THE  
492 PROGRAM WILL RESTART THE SELECTED TEST USING THE NEW  
493 LINE NUMBER(S).  
494

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 11  
CZDMKE.P11 11-JUL-84 08:45

495 5.7 POWER FAILURE  
496  
497 IF A POWER FAIL TRAP OCCURS DURING TEST EXECUTION  
498 THE PROGRAM WILL SAVE THE GENERAL REGISTERS OF THE  
499 PROCESSOR AND HALT.  
500  
501 WHEN POWER UP OCCURS, THE PROGRAM WILL TYPE  
502 "POWER FAILURE-CURRENT TEST WILL BE RESTARTED".  
503  
504 THE PROGRAM WILL THEN RESUME TEST EXECUTION.  
505  
506 NOTE: IF A TEST IS NOT IN PROGRESS, I.E., IF THE PROGRAM  
507 IS WAITING FOR AN INPUT FROM THE TELETYPE KEYBOARD,  
508 THE ERROR MESSAGE WILL BE "POWER FAILURE".  
509 THE PROGRAM WILL THEN REQUEST THE OPERATOR TO SELECT A TEST.  
510  
511 NOTE: IF MACHINE HAS A SOLID-STATE SWITCH REGISTER, THEN THE CONTENTS WILL BE  
512 LOST ON A POWER FAIL AND THEREFORE WILL HAVE TO BE RELOADED.  
513  
514 6.0 ERRORS  
515  
516 6.1 NORMAL OPERATION  
517  
518 IF AN ERROR OCCURS WITH ALL SWITCHES DOWN, THE PROGRAM  
519 WILL TYPE AN APPROPRIATE ERROR MESSAGE AND THEN  
520 RESUME TESTING.  
521  
522 THERE ARE SEVERAL ERROR MESSAGE FORMATS, AND  
523 THE PARTICULAR MESSAGE TYPED DEPENDS UPON THE  
524 TEST IN PROGRESS.  
525  
526 6.1.1 ERROR MESSAGES  
527  
528 6.1.1.1 UNIQUE ERROR  
529  
530 ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER  
531  
532 AN EXAMPLE OF THIS TYPE OF ERROR IS:  
533  
534 1. AN INTERRUPT OCCURED AT THE WRONG PRIORITY  
535 2. A REGISTER BIT WAS NOT CLEARED BY RESET  
536

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## 6.1.1.2 TRANSITION DETECTION ERROR

THIS ERROR WILL OCCUR IN ONE OF THE ON-LINE TESTS  
IF AN EXPECTED INTERRUPT DOES NOT OCCUR, OR IF  
AN UNEXPECTED INTERRUPT DOES OCCUR, ON THE LINES  
UNDER TEST.

FORMAT FOR ERROR TYPEOUT IS

```
XXXXXX TRANSITION ERROR
EXP  REC  LINE
AA   BB   CC
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE  
AA=EXPECTED INTERRUPT FLAGS (CORRESPONDS TO 4 MSB OF CONTROL REGISTER)  
BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)  
CC=LINE ON WHICH ERROR OCCURED

## 6.1.1.3 SINGLE LINE STATUS ERROR

THIS ERROR WILL OCCUR IN ANY TEST, OFF LINE OR ON-LINE  
WHEN THE EXPECTED AND RECEIVED LINE STATUS ARE NOT  
THE SAME.

FORMAT FOR SINGLE LINE STATUS ERROR IS

```
XXXX LINE ERROR
EXP  REC  LINE
AAA  BBB  CC
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE  
AAA=EXPECTED LINE STATUS AT TIME OF ERROR  
BBB=RECEIVED LINE STATUS AT TIME OF ERROR  
CC=LINE ON WHICH ERROR OCCURED

## 6.1.1.4 FATAL TRANSITION ERROR

THIS ERROR WILL OCCUR IN AN ON-LINE TEST IF AN INTERRUPT  
OCCURS ON A LINE NOT SELECTED FOR TESTING.

FORMAT FOR FATAL ERROR TYPEOUT IS

```
XXXXXX FATAL ERROR
CSTAT LSTAT
AAAAAA BBB
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE  
AAAAAA=RECEIVED CONTROL STATUS ON LINE THAT INTERRUPTED  
BBB=RECEIVED LINE STATUS ON LINE THAT INTERRUPTED

CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 13  
CZDHKE.P11 11-JUL-84 08:45

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#### 6.1.1.4 CONTROL STATUS ERROR

THIS ERROR WILL OCCUR IN A TEST THAT PRIMARILY INVOLVES THE LINE SCANNER

FORMAT FOR CONTROL STATUS ERROR IS

```
XXXXXX STATUS FRROR
EXP   REC
AAAAAA BBBB888
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE  
AAAAAA=EXPECTED CONTROL STATUS AT TIME OF ERROR  
BBBB888=RECEIVED(ACTUAL) CONTROL STATUS AT TIME OF ERROR

#### 6.1.1.5 LINE STATUS ERROR

THIS ERROR WILL OCCUR IN THOSE OFF LINE TESTS THAT SET ONE LINE TO A PARTICULAR STATE, AND THEN CHECK ALL OTHER LINES

FORMAT FOR LINE STATUS ERROR IS

```
XXXX LINE ERROR
EXP  REC  LINE  SEL
AAA  DDD  CC   DD
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE  
AAA=EXPECTED LINE STATUS AT TIME OF ERROR  
BBB=RECEIVED LINE STATUS AT TIME OF ERROR  
CC=LINE ON WHICH ERROR OCCURED  
DD=THE LINE ON WHICH THE PROGRAM WAS OPERATING

#### 6.1.1.6 TIME OUT ERROR

THIS ERROR WILL OCCUR IF THE LINE UNDER TEST DOES NOT INTERRUPT WITHIN A GIVEN TIME FRAME.

FORMAT FOR THIS ERROR IS

```
XXXXXX TIME OUT WAITING FOR INTERRUPT
LN  CSR  LSR
AAA BBB8888 CCCCCC
```

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WHERE    XXXXXX=PC.2 OF ERROR CALL  
          AAA=FAILING LINE NUMBER  
          BBBBBB=CONTROL STATUS REGISTER  
          CCCCCC=LINE STATUS REGISTER

6.1.2 REPEATED ERRORS

IF THE SAME ERROR OCCURS REPEATEDLY IN A GIVEN TEST  
ONLY THE DATA RELATING TO THAT ERROR WILL BE TYPED  
IF THE ERROR OCCURS IN THE SAME TEST ON THE SAME PASS

CZDNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 15  
CZDNKE.P11 11-JUL-84 08:45

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## 6.2 SCOPE LOOPS

NOTE: SCOPE LOOPING APPLIES ONLY TO TEST GROUPS 0 AND 1

### 6.2.1 AFTER ERROR MALT

TO LOOP ON A GIVEN TEST AFTER AN ERROR MALT,  
SET SW15=0 TO RUN WITHOUT STOPPING  
SET SW14=1 TO LOOP ON CURRENT TEST  
SET SW13=1 TO SUPPRESS ERROR TYPEOUT  
SET SW10=0 (IF IT IS 1)  
SET SW09=1 TO LOOP ON SAME DATA (IF REQUIRED)

\*\*\*IF USING SOFTWARE SWITCH REGISTER AND YOU WANT TO CHANGE  
THE SWITCH SETTING TYPE A <+G> BEFORE CONTINUING.  
PRESS CONTINUE

THE PROGRAM WILL LOOP ON THE SAME TEST.

### 6.2.2 FROM PROGRAM START

6.2.2.1 PROCEED AS DESCRIBED IN 4.2.1.1 TO 4.2.1.4

6.2.2.2 WHEN THE PROGRAM TYPES "TEST-", SET SW14=1 TO LOOP  
ON THE TEST THAT WILL BE SELECTED.

6.2.2.3 TYPE IN THE NUMBER OF THE TEST THAT IS TO BE LOOPE  
ON (SEE LISTING FOR TEST NUMBER REFERENCE DESIGNATIONS)

6.2.2.4 THE PROGRAM WILL LOOP ON THE SELECTED TEST UNTIL  
SW14=0.

### 6.2.3 AFTER <CONTROL>

SAME AS 6.2.2.2 TO 6.2.2.4

## 7.0 RESTRICTIONS

### 7.1 STARTING

#### 7.1.1 FOR 16 LINE SCANNER TEST

NO TEST CONNECTOR IS NEEDED TO RUN THIS TEST....

#### 7.1.2 FOR SINGLE LINE CABLE TEST

H315 TEST CONNECTOR MUST BE INSTALLED ON MODEM CABLE

#### 7.1.3 FOR ON LINE TESTS

NONE

CZDNR-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 16  
CZDNR.E.P11 11-JUL-84 08:45

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7.2 OPERATING

NONE.

7.3 WHEN ON ACT-11 OR "XOR"  
PROGRAM WILL DEFAULT TO 16 LINE SCANNER TEST

7.4 DEFAULT PARAMETERS (INCLUDING ACT-11 & "XOR")

VECTORS

-----  
DHMVEC: 300 (AUTOMATICALLY GENERATED  
DHMLVL: 302 BY PROGRAM WHEN UNDER ACT-11 OR "XOR")  
ADDRESSES

-----  
DHMCSR: 170500  
DHMLSR: 170502

NOTE: SMOO(RESELECT ADDRESSES AND VECTORS BECOMES  
INOPERATIVE UNDER ACT-11 OR "XOR").

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 17  
CZDMKE.P11 11-JUL-84 08:45

721 8.0 EXECUTION TIME  
722  
723 8.1 16 LINE SCANNER TEST  
724 THE TIME FOR 2 PASSES OF THE 16 LINE SCANNER TEST IS  
725 APPROXIMATELY 1.5 MINUTES.  
726  
727 8.2 SINGLE LINE CABLE TEST  
728 THE TIME FOR 12 PASSES OF THE SINGLE LINE CABLE TEST  
729 IS APPROXIMATELY 1 MINUTE.  
730  
731 8.3 103A MODEM CONNECT-DISCONNECT TEST  
732 APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE  
733 TIME THAT THE ANSWERING DATA SET FIRST DETECTS A RING  
734 SIGNAL TO THE TIME THAT THE PROGRAM TYPES  
735 "SET SW01-1 TO DISCONNECT".  
736 APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME  
737 THAT THE PROGRAM TYPES THE ABOVE MESSAGE UNTIL THE  
738 TIME THAT THE PROGRAM TYPES "103A TEST COMPLETE".  
739  
740 8.4 202C MODEM CONNECT-DISCONNECT TEST  
741 APPROXIMATELY 1.5 MINUTES WILL ELAPSE BETWEEN THE TIME  
742 THAT THE ANSWERING DATA SET DETECTS THE FIRST RING SIGNAL  
743 TO THE TIME THAT THE PROGRAM TYPES "SET SW01-1 TO DISCONNECT".  
744 APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE  
745 TIME THAT THE PROGRAM TYPES THE ABOVE MESSAGE UNTIL  
746 THE PROGRAM TYPES "202C TEST COMPLETE".  
747  
748 9. PROGRAM DESCRIPTION  
749 THIS PROGRAM CONSISTS OF A SERIES OF TEST GROUPS  
750 LINKED BY A SET OF COMMON SERVICE ROUTINES AND A KEYBOARD  
751 MONITOR.  
752 WHEN INITIALLY LOADED AND STARTED ...SW00 MUST BE SET =1. THE PROGRAM WILL  
753 BEGIN A DIALOG WITH THE OPERATOR TO INPUT THE PARAMETERS  
754 REQUIRED BY THE PROGRAM.  
755 WHEN ALL INFORMATION HAS BEEN INPUTTED, THE PROGRAM WILL  
756 REQUEST THE OPERATOR TO SELECT A TEST BY TYPING  
757 THE NUMBER OF THE TEST TO BE RUN. WHEN A CORRECT TEST NUMBER  
758 IS RECEIVED, THE PROGRAM WILL BEGIN EXECUTION OF THE  
759 SELECTED TEST.  
760 AT ANY TIME DURING TEST EXECUTION, THE OPERATOR MAY  
761 CHANGE A TEST PARAMETER BY ENTERING THE APPROPRIATE  
762 COMMAND VIA THE TELETYPE KEYBOARD.  
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CZDNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 18  
CZDNKE.P11 11-JUL-84 08:45

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9. CONT'D

IF AN OFF LINE TEST HAS BEEN SELECTED, THAT TEST WILL  
BE REPEATED UNTIL THE OPERATOR INTERVENES.

IF AN ON LINE TEST HAS BEEN SELECTED, THE OPERATOR IS  
REQUIRED TO TAKE ACTION EACH TIME THE TEST IS COMPLETED.

AT THE END OF EVERY OFF LINE TEST PASS, THE PROGRAM  
WILL RING THE TELETYPE BELL.

AT THE END OF AN ON LINE TEST, A TEST COMPLETE MESSAGE WILL BE  
TYPED.

10. LISTING

11. MODIFICATION HISTORY:

10-JULY-84 KEN RAUHALA  
ADDED DELAY FOR PDP-11/44 WITH CACHE ON.  
THE "MUXS2" MACRO WAS MODIFIED.

\*

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 19  
 CZDMKE.P11 11-JUL-84 08:45

```

794      .TITLE  CZDMK-E
795      .ENABLE ABS,AMA
796      ;SWITCH REGISTER OPTIONS
797
798
799      ;SW15=1. HALT ON ERROR
800      ;SW14=1. LOOP ON CURRENT TEST
801      ;SW13=1. SUPPRESS ERROR TYPEOUT
802      ;SW12=1. SUPPRESS TRACE TRAPPING(THIS IS INOPERATIVE IN THIS RELEASE)
803      ;SW11=1. SUPPRESS ITERATIONS
804      ;SW10=1. ESCAPE TO NEXT TEST ON ERROR
805      ;SW09=1. FREEZE DATA
806      ;SW01=1. START DISCONNECT SEQUENCE
807      ;SW00=1. RESELECT VECTOR AND CONTROL REGISTER ADDRESS
808      ;AFTER PROGRAM RESTART
809
810      ;STARTING ADDRESS FOR ALL TESTS IS 000200
811      ;RESTART ADDRESS=000200
812
813      ;TESTS AVAILABLE
814
815      ;TEST GROUP 0-
816      ;OFF LINE TESTS USING NO TEST CONNECTOR-FIRST TEST=0
817      ;TEST GROUP 1-
818      ;OFF LINE TESTS USING DC11 TEST CONNECTOR AND MODEM CABLE-FIRST TEST=100
819      ;TEST GROUP 2-
820      ;CONNECT/DISCONNECT TEST FOR BELL 103A MODEMS-FIRST TEST=200
821      ;TEST GROUP 3-
822      ;CONNECT/DISCONNECT TEST FOR BELL 202C MODEMS-FIRST TEST=300
823
824      ;SYMBOL DEFINITIONS
825
826      100000      SW15=100000
827      040000      SW14=40000
828      020000      SW13=20000
829      010000      SW12=10000
830      004000      SW11=4000
831      002000      SW10=2000
832      001000      SW09=1000
833      000400      SW08=400
834      000100      SW06=100
835
836      .NLIST MC,MD,CND
837      .LIST  ME
838
839

```

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 20  
 CZDMKE.P11 11-JUL-84 08:45

```

840
841           ;REGISTER DEFINITIONS
842
843           000000      R0=#0           ;GENERAL REGISTER
844           000001      R1=#1           ;GENERAL REGISTER
845           000002      R2=#2           ;GENERAL REGISTER
846           000003      R3=#3           ;GENERAL REGISTER
847           000004      R4=#4           ;GENERAL REGISTER
848           000005      R5=#5           ;GENERAL REGISTER
849           000006      SP=#6          ;PROCESSOR STACK POINTER
850           000007      PC=#7          ;PROGRAM COUNTER
851
852           ;LOCATION EQUIVALENCIES
853
854           177776      PS=177776      ;PROCESSOR STATUS WORD
855           .EQUIV PS,PSW
856           014376      RADIX=DIVIS    ;CONVERSION FACTOR FOR DECIMAL OUTPUT
857           014372      BINMRD=DIVIDL  ;WORD TO BE CONVERTED TO OCTAL ASCII
858           014374      DIGIT=DIVIDH   ;ASCII OCTAL DIGIT
859
860           ;CONTROL STATUS REGISTER BIT FUNCTIONS
861
862           000020      BUSY=20         ;LINE SCANNER RUNNING
863           000040      SCENEA=40      ;LINE SCANNER ENABLE
864           000100      INTENA=100     ;INTERRUPT ENABLE
865           000200      DONE=200       ;SCANNER DONE
866           000400      STEP=400       ;CAUSES LINE COUNTER TO BE INCREMENTED BY 1 COUNT
867           001000      MAINT=1000     ;FORCES IS TO INPUT OF SCRATCH PAD MEMORY
868           002000      CLRMUX=2000    ;CLEAR MULTIPLEXER FUNCTION FLIPFLOPS
869           004000      CLRSCN=4000    ;CLEARS SCANNER SCRATCHPAD MEMORY
870           010000      SECRXF=10000   ;SECONDARY RECEIVE TRANSITION WAS DETECTED BY SCANNER
871           020000      CSF=20000     ;CLEAR TO SEND TRANSITION WAS DETECTED BY SCANNER
872           040000      COF=40000     ;CARRIER TRANSITION WAS DETECTED BY SCANNER
873           100000      RINGF=100000   ;RING SIGNAL WAS DETECTED BY SCANNER
874
875           ;LINE REGISTER BIT FUNCTIONS
876
877           000001      LINENA=1       ;-1. RECOGNIZE TRANSITIONS ON THIS LINE
878           000002      TRMRDY=2      ;-1. SEND TERMINAL READY TO MODEM
879           000004      RS=4          ;-1. SEND REQUEST TO SEND TO MODEM
880           000010      SECTX=10      ;-1. SEND SECONDARY TRANSMIT TO MODEM
881           000020      SECRX=20      ;-1. SECONDARY RECEIVE TURNED ON BY MODEM
882           000040      CS=40         ;-1. CLEAR TO SEND TURNED ON BY MODEM
883           000100      CO=100        ;-1. CARRIER TURNED ON BY MODEM
884           000200      RING=200      ;-1. RING TURNED ON BY MODEM
885
886           ;SOFTWARE TRANSITION FLAGS
887
888           000004      XCO=4          ;CARRIER TRANSITION WAS DETECTED
889           000002      XCS=2         ;CLEAR TO SEND TRANSITION WAS DETECTED
890           000001      XSCRX=1       ;SECONDARY RECEIVE TRANSITION WAS DETECTED

```

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 21  
 CZDMKE.P11 11-JUL-84 08:45

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## ;INSTRUCTION DEFINITIONS

005746	PUSH1SP=5746	;DECREMENT PROCESSOR STACK 1 WORD
005726	POP1SP=5726	;INCREMENT PROCESSOR STACK 1 WORD
010046	PUSHRO=10046	;SAVE RO ON STACK
012600	POPPO=12600	;RESTORE RO FROM STACK
024646	PUSH2SP=24646	;DECREMENT STACK TWICE
022626	POP2SP=22626	;INCREMENT STACK TWICE

## ;EMT DEFINITION TABLE

104000	ERRORC=EMT.X	;CONTROL STATUS ERROR SERVICE
104001	ERRORL=EMT.X	;LINE STATUS ERROR SERVICE
104002	SCOPE=EMT.X	;SCOPE LOOP AND ITERATION SERVICE
104003	SCOPEF=EMT.X	;DATA FREEZE SERVICE
104004	TYPE=EMT.X	;TELETYPE OUTPUT
104005	SAVOSP=EMT.X	;SAVE RO-R5, PC+2 OF CALL
104006	OCTASC=EMT.X	;CONVERT DATA TO ASCII AND TYPE
104007	RESO5=EMT.X	;RESTORE RO-R5
104010	CONVERT=EMT.X	;ASCII CONVERSION ROUTINE
104011	EXTRACT=EMT.X	;DIGIT EXTRACTION ROUTINE
104012	ERROR=EMT.X	;TYPE PC OF FAILING TESTS ONLY
104013	INSTRG=EMT.X	;INPUT OCTAL DATA STRING
104014	ERRORT=EMT.X	;TRANSITION ERROR
104015	ERRORS=EMT.X	;ON LINE STATUS ERROR
104016	ERRORN=EMT.X	;FATAL TRANSITION
104017	GETLNS=EMT.X	;INPUT LINE NUMBERS
104024	WAITS=EMT.X	;DELAY FOR TRANSIENTS
104025	CNTLUU=EMT.X	;CHANGE SWREG ROUTINE
104026	CKINTT=EMT.X	;CHECK FOR INTERRUPTS-FLAG STYLE
104027	KBDIN=EMT.X	;FAKE INTERRUPT ENTRY POINT

CZDNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 22  
CZDNKE.P11 11-JUL-84 08:45

```
919      104020      SETUP=EMT+X      ;SET UP FOR ON LINE TEST
920      104021      CKRING=EMT+X     ;CHECK FOR RING ON CORRERT LINE
921      104022      WAITRN=EMT+X     ;WAIT FOR TRANSITIONS
922      104023      CKTRAN=EMT+X     ;CHECK TRANSITIONS
927      104030      ERRINT=EMT+X     ;TIME OUT ERROR FOR INTERRUPTS
928
929                      ;TRAPCATCAER FOR ILLEGAL INTERRUPTS
930      000000      .=0
931      000200      .REPT 200
932                      .+2
933                      HALT
934      .ENDR
```

CZDNR-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 23  
 CZDNR.E.P11 11-JUL-84 08:45

```

935
936          ;STANDARD INTERRUPT VECTORS
937
938          .-24
939 000024 015144      PFAIL          ;POWER FAIL HANDLER
940 000026 000340      340          ;SERVICE AT LEVEL 7
941 000030 013004      EMTSRV        ;EMT DISPATCH SERVICE
942 000032 000340      340          ;SERVICE AT LEVEL 7
943
944          .-46
945 000046 012766      LOGICAL        ;ACT11?
946
947          .-60
948 000060 001760      KBDINT        ;KEYBOARD MONITOR
949 000062 000340      340          ;SERVICE AT LEVEL 7
950
951          .-174
951 000174 000000      DISPRG:      0
952 000176 000000      SWREG: 0
953
954          .-200
955 000200 000137 001100  JMP      START      ;GO TO START OF PROGRAM
956
957
958
959

```

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960
961      001100      001100      .-1100
962 001100      012737      015144      000024  STACK:
963 001100      012737      015144      000024  START: MOV      #PFAIL,24      ;SET UP POWER FAIL
964                                     ;INTERRUPT SERVICE VECTOR
965 001106      005037      001756      CLR      TIPFLG      ;CLEAR TEST IN PROGRESS FLAG
966 001112      005077      014440      CLR      @TKCSR
967 001116      012706      001100      MOV      @STACK,SP      ;SET UP STACK POINTER
968
969 001122      013746      000006      SUSWR: MOV      @06,-(SP)      ;SAVE VECTORS
970 001126      013746      000004      MOV      @04,-(SP)
971 001132      012737      001152      000004      MOV      @64,@04      ;SET UP FOR TIMEOUT
972 001140      022777      177777      014420      CMP      @-1,@SWR      ;REFERENCE HARDWARE SWITCH REGISTER
973 001146      001402      BEQ      65@
974 001150      000407      BR      66@
975 001152      022626      64@: CMP      (SP),,(SP)      ;ADJUST STACK
976 001154      012737      000176      015566      65@: MOV      @SWREG,SWR      ;POINT TO SOFTWARE SWITCH REG
977 001162      012737      000174      015570      MOV      @DISPREG,DISPLAY      ;POINT TO SOFT DISPLAY REG
978 001170      012637      000004      66@: MOV      (SP),@04      ;RESTORE VECTORS
979 001174      012637      000006      MOV      (SP),@06
980 001200      012777      000100      014350      MOV      @INTENA,@TKCSR      ;ENABLE TELETYPE INTERRUPTS
981 001206      005037      001252      CLR      XFLAG      ;XOR = NO
982
983 ;*****
984 ;REPLACE THE FOLLOWING BRANCH WITH A "NOP" (240) TO ACTIVATE "XOR" CODE
985 ;*****
986 001212      000423      BR      STARTO      ;SKIP XOR STUFF
987 001214      013746      000004      MOV      4,-(SP)      ;SAVE 4
988 001220      012737      001254      000004      MOV      @XORSVC,4      ;SET UP SVC ROUTINE
989 001226      005737      177060      TST      177060      ;GOT AN XOR TESTER OUT THERE ?
990 001232      012637      000004      MOV      (SP),4      ;YES
991 001236      005137      001252      COM      XFLAG      ;XOR = YES
992 001242      004737      015266      JSR      PC,XOR      ;AUTO VECTOR
993 001246      000137      001262      JMP      STARTO      ;RESTORE TRAPCATCHER
994 001252      000000      XFLAG: 0      ;XOR FLAG
995 001254      022626      XORSVC: POP2SP
996 001256      012637      000004      MOV      (SP),4      ;RESTORE 4
997 001262      005737      015656      STARTO: TST      TIFLG      ;TYPED TITLE?
998 001266      001005      BNE      .+14      ;YES
999 001270      104004      TYPE      ;TYPE "MODEM CONTROL DIAGNOSTIC"
1000 001272      016535      HTITLE
1001 001274      012737      000001      015656      MOV      @1,TIFLG      ;SET TITLE TYPED FLAG
1002 001302      005737      001252      TST      XFLAG      ;X OR ?
1003 001306      100422      BMI      VECSTR      ;RESTORE TRAPCATCHER
1004 001310      005737      000042      TST      42      ;ACT 11?
1005 001314      001403      BEQ      START1      ;NO
1006 001316      004737      015266      JSR      PC,XOR      ;YES AUTO VECTOR
1007 001322      000414      BR      VECSTR      ;GET VECTOR AND REGISTER ADDRESS
1008 001324      005737      000042      START1: TST      @42      ;UNDER MONITOR?
1009 001330      001005      BNE      1@
1010 001332      022737      000176      015566      CMP      @SWREG,SWR      ;USING SWREG?
1011 001340      001001      BNE      1@
1012 001342      104025      CNTLUU
1013 001344      032777      000001      014214      1@: BIT      @1,@SWR      ;IF SW BIT 0=1, ON PROGRAM RESTART
1014 001352      001510      BEQ      STARTN      ;INPUT VECTOR AND REGISTER ADDRESSES
1015 001354      012706      001100      VECSTR: MOV      @STACK,SP      ;SET UP PROCESSOR STACK POINTER
1016 001360      012737      000300      012712      MOV      @300,DATA1      ;ADDRESS OF FIRST FLOATING VECTOR

```

CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 25  
 CZDHK.E.P11 11-JUL-84 08:45

1016	001366	012737	000302	012714		MOV	#302,DATA2		;ADDRESS OF STATUS WORD
1017	001374	013777	012714	011310	VECSTA:	MOV	DATA2,@DATA1		;MOVE ADDRESS OF STATUS WORD TO VECTOR
1018	001402	005077	011306			CLR	@DATA2		;CLEAR STATUS WORD
1019									;(FOR HALT ON ILLEGAL INTERRUPT)
1020	001406	062737	000004	012712		ADD	#4,DATA1		;NEXT VECTOR
1021	001414	062737	000004	012714		ADD	#4,DATA2		;NEXT STATUS WORD
1022	001422	023727	012712	001000		CMP	DATA1,#1000		;IS TABLE CLEARED
1023	001430	001361				BNE	VECSTA		;IF NOT, CONTINUE
1024	001432	005737	001252			TST	XFLAG	;XOR ?	
1025	001436	100523				BMI	TSTGO	;YES	
1026	001440	005737	000042			TST	42	;ACT 11 ?	
1027	001444	001120				BNE	TSTGO	;YES	
1028	001446	104013				INSTRG			;GET VECTOR ADDRESS
1029	001450	016621				MVECTOR			;MESSAGE "VECTOR ADDRESS-"
1030	001452	000300				300			;LOWER LIMIT FOR ADDRESS
1031	001454	000774				774			;UPPER LIMIT FOR ADDRESS
1032	001456	015546				DHIVEC			;STORAGE FOR ADDRESS
1033	001460	032737	000003	015546	1#:	BIT	#3,DHIVEC		;TEST 2 LSB OF ADDRESS
1034	001466	001404				BEQ	VECST1		;IF 0, CONTINUE
1035	001470	012716	001460			MOV	#1#,(SP)		
1036	001474	000137	014774			JMP	INSTR		;INCORRECT ADDRESS, TRY AGAIN
1037	001500	013737	015546	015550	VECST1:	MOV	DHIVEC,DHMLVL		;GENERATE ADDRESS OF
1038	001506	062737	000002	015550		ADD	#2,DHMLVL		;INTERRUPT STATUS WORD
1039	001514	104013				INSTRG			;GET ADDRESS OF CONTROL REGISTER
1040	001516	016643				MREGAD			;MESSAGE "REGISTER ADDRESS-"
1041	001520	170500				170500			;LOWER LIMIT FOR ADDRESS
1042	001522	177777				177777			;UPPER LIMIT FOR ADDRESS
1043	001524	015552				DHMCSR			;STORAGE FOR ADDRESS
1044	001526	032737	000007	015552	1#:	BIT	#7,DHMCSR		;IF 3 LSB ARE NOT 0
1045	001534	001404				BEQ	REGST1		
1046	001536	012716	001526			MOV	#1#,(SP)		
1047	001542	000137	014774			JMP	INSTR		;INCORRECT ADDRESS, TRY AGAIN
1048	001546	013737	015552	015554	REGST1:	MOV	DHMCSR,DHMLSR		;SET UP ADDRESS OF LINE STATUS REGISTER
1049	001554	062737	000002	015554		ADD	#2,DHMLSR		
1050	001562	104013				INSTRG			;GET LINE SELECT PARAMETER
1051	001564	016677				MLINSL			
1052	001566	000000				0			
1053	001570	177777				177777			
1054	001572	015660				LINSEL			

CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 26  
 CZDHKE.P11 11-JUL-84 08:45

1055										
1056	001574	012706	001100		STARTN:	MOV	#STACK,SP			;SET UP PROCESSOR STACK
1057	001600	104013				INSTRG				;GET TEST NUMBER
1058	001602	016731				MTEST				;MESSAGE "TEST-"
1059	001604	000000				0				;LOWER LIMIT FOR TEST NUMBER
1060	001606	000777				777				;UPPER LIMIT FOR TEST NUMBER
1061	001610	015600				TSTNO				;STORAGE FOR TEST NUMBER
1062	001612	013705	015600		X1A:	MOV	TSTNO,R5			;GET TEST NUMBER
1063	001616	042705	177077			BIC	#177077,R5			;EXTRACT TEST GROUP NUMBER
1064	001622	006205				ASR	R5			
1065	001624	006205				ASR	R5			
1066	001626	006205				ASR	R5			
1067	001630	006205				ASR	R5			
1068	001632	006205				ASR	R5			
1069	001634	016537	017472	015634		MOV	GRO(R5),TSTMAX			;GET HIGHEST TEST IN GROUP
1070	001642	016537	017452	015632		MOV	TSTLST(R5),TSTPNT			;GET POINTER TO TEST TABLE
1071	001650	005737	015632			TST	TSTPNT			;IF 0, INVALID TEST GROUP
1072	001654	001004				BNE	STRTOA			
1073	001656	012716	001612		X1B:	MOV	#X1A,(SP)			
1074	001662	000137	014774			JMP	INSTER			;TRY AGAIN
1075	001666	042737	177700	015600	STRTOA:	BIC	#177700,TSTNO			;GET NUMBER OF FIRST TEST
1076										;TO BE EXECUTED IN SELECTED GROUP
1077	001674	023737	015600	015634		CMP	TSTNO,TSTMAX			;IS NUMBER TOO LARGE
1078	001702	003401				BLE	TSTGO			
1079	001704	000764				BR	X1B			
1080	001706	012746	000340		TSTGO:	MOV	#340,-(SP)			;SET UP PRIORITY LEVEL
1081	001712	005746				PUSH1SP				
1082	001714	000005				RESET				
1083	001716	012737	002202	002204		MOV	#DMYRTI,KRET			;SET UP DUMMY KEYBOARD RETURN
1084	001724	005037	015636			CLR	LINFLG			;CLEAR LINE SELECTED FLAG
1085	001730	005037	015574			CLR	TRACON			;CLEAR TRACE TRAP FLAG
1086	001734	005037	015576			CLR	PASCNT			;CLEAR PASS COUNT
1087	001740	104004				TYPE				
1088	001742	016745				MCRLF				
1089	001744	012737	000001	001756	14:	MOV	#1,TIPFLG			;SET TEST IN PROGRESS FLAG
1090	001752	000137	013226			JMP	TSTENT			;START TESTING
1091	001756	000000			TIPFLG:	0				

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 27  
 CZDMKE.P11 11-JUL-84 08:45

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1092
1093           ;TELETYPE KEYBOARD INTERRUPT SERVICE ROUTINE
1094
1095 001760 005037 001756           KBDINT: CLR     TIPFLG           ;CLEAR TEST IN PROGRESS FLAG
1096 001764 005037 014222           CLR     TMP1
1097 001770 005037 002206           CLR     SINTFL           ;CLEAR SOFTWARE INTERRUPT FLAG
1098 001774 117737 013560 014222   MOV     @TKDBR, TMP1
1099 002002 142737 000200 014222   BIC     @200, TMP1
1100 002010 122737 000003 014222   CMP     #3, TMP1           ;IF <CONTROL C> WAS TYPED
1101 002016 001011                   BNE     KBDIN1           ;TYPE "+C" AND
1102 002020 104004                   TYPE
1103 002022 017175                   MCONTC
1104 002024 022626                   POP2SP
1105 002026 005077 013520           CLR     @DMCSR
1106 002032 005077 013520           CLR     @TKCSR
1107 002036 000137 001574           JMP     STARTN
1108 002042 122737 000026 014222   KBDIN1: CMP     @26, TMP1           ;IF <CONTROL V> WAS TYPED
1109 002050 001011                   BNE     KBDIN2           ;TYPE "+V" AND GET NEW
1110 002052 104004                   TYPE                       ;VECTOR AND REGISTER ADDRESS
1111 002054 017200                   MCONTV
1112 002056 022626                   POP2SP
1113 002060 005077 013466           CLR     @DMCSR
1114 002064 005077 013466           CLR     @TKCSR
1115 002070 000137 001354           JMP     VECSTR
1116 002074 122737 000014 014222   KBDIN2: CMP     @14, TMP1           ;IF <CONTROL L> WAS TYPED
1117 002102 001015                   BNE     KBDIN3           ;TYPE "+L" AND GET NEW
1118 002104 104004                   TYPE                       ;LINE NUMBERS, UNLESS
1119 002106 017203                   MCONTL
1120 002110 022737 002202 002204   CMP     @DMYRTI, KRET
1121 002116 001431                   BEQ     DMYRTI           ;TEST GROUP 0 WAS IN PROGRESS
1122 002120 022626                   POP2SP
1123 002122 005077 013424           CLR     @DMCSR
1124 002126 005077 013424           CLR     @TKCSR
1125 002132 000177 000046           JMP     @KRET
1126 002136 005737 000042           KBDIN3: TST     @42
1127 002142 001011                   BNE     1@
1128 002144 022737 000176 015566   CMP     @SWREG, SWR
1129 002152 001005                   BNE     1@
1130 002154 122737 000007 014222   CMP     @7, TMP1           ;IS IT <+G>
1131 002162 001001                   BNE     1@
1132 002164 104025                   CNTRLU
1133 002166 012737 000001 002206   1@:   MOV     @1, SINTFL           ;SET SOFTWARE INTERRUPT FLAG
1134 002174 012737 000001 001756   MOV     @1, TIPFLG           ;SET TEST IN PROGRESS FLAG
1135 002202 000002
1136           DMYRTI: RTI
1137           .EVEN
1137 002204 000000           KRET: 0
1138 002206 000000           SINTFL: 0

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 29  
 CZDMKE.P11 11-JUL-84 08:45

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1193
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1196 002404 012777 000040 013140 T4:
1197 002404 032777 000040 013132 CSTR4: MOV #SCNENA, BDHMCSR ;REFERENCE DESIGNATION
1198 002412 032777 000040 013132 BIT #SCNENA, BDHMCSR ;SET SCAN ENABLE
1199 002420 001001 BNE .+4 ;WAS SCAN ENABLE SET
1200
1201 002422 104012 ERROR ;NO, ERROR
1202 002424 042777 000040 013120 BIC #SCNENA, BDHMCSR ;CLEAR SCAN ENABLE
1203 002432 032777 000040 013112 BIT #SCNENA, BDHMCSR ;WAS SCAN ENABLE CLEARED
1204 002440 001401 BEQ .+4
1205
1206 002442 104012 ERROR ;NO, ERROR
1207 002444 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
1208
1209 ;VERIFY THAT "BUSY" IS SET WHEN "SCAN ENABLE" IS SET
1210 ;VERIFY THAT "BUSY" IS CLEARED WHEN "SCAN ENABLE" IS CLEARED
1211
1212 002446 012777 000040 013076 T5:
1213 002446 032777 000020 013070 CSTR5: MOV #SCNENA, BDHMCSR ;REFERENCE DESIGNATION
1214 002454 032777 000020 013070 BIT #BUSY, BDHMCSR ;SET SCAN ENABLE
1215 002462 001001 BNE .+4 ;IS BUSY BIT SET
1216 002464 104012 ERROR ;BUSY NOT SET, ERROR
1217 002466 042777 000040 013056 BIC #SCNENA, BDHMCSR ;CLEAR SCAN ENABLE
1218 002474 032777 000020 013050 BIT #BUSY, BDHMCSR ;IS BUSY BIT CLEARED
1219 002502 001401 BEQ .+4
1220 002504 104012 ERROR ;BUSY NOT CLEARED, ERROR
1221 002506 104002 SCOPE ;CHECK FOR LOOP, ITERATIONS
1222
1223 ;VERIFY THAT SETTING "DONE" DOES NOT CCAUSE AN
1224 ;INTERRUPT IF "INTERRUPT ENABLE" IS CLEARED.
1225
1226 002510 052737 000340 177776 T6:
1227 002510 005077 013030 INT1: BIS #340, PS ;REFERENCE DESIGNATION
1228 002516 012777 002556 013016 CLR BDHMCSR ;LOCK OUT INTERRUPTS
1229 002522 013777 177776 013012 MOV #INT1A, BDHMVEC ;CLEAR CONTROL REGISTER
1230 002530 052777 000200 013006 MOV PS, BDHMLVL ;SET UP INTERRUPT SERVICE ADDRESS
1231 002536 042737 000340 177776 BIS #DONE, BDHMCSR ;SET UP INTERRUPT PRIORITY
1232 002544 000240 BIC #340, PS ;SET DONE
1233 002552 000402 NOP ;ALLOW INTERRUPTS
1234 002554 000402 BR INT1B ;DELAY FOR INTERRUPT
1235 002556 022626 INT1A: POP2SP ;NO INTERRUPT, CONTINUE
1236 002560 104012 ERROR ;RESTORE STACK, INTERRUPT
1237 002562 104002 INT1B: SCOPE ;OCCURED, ERROR
;CHECK FOR LOOP, ITERATIONS

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 30  
 CZDMKE.P11 11-JUL-84 08:45

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1242 002564
1243 002564 052737 000340 177776
1244 002572 005077 012754
1245 002576 012777 002632 012742
1246 002604 013777 177776 012736
1247 002612 052777 000100 012732
1248 002620 042737 000340 177776
1249 002626 000240
1250 002630 000402
1251 002632 022626
1252 002634 104012
1253 002636 104002
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1258 002640
1259 002640 052737 000340 177776
1260 002646 005077 012700
1261 002652 012777 002724 012666
1262 002660 012777 000100 012664
1263 002666 013777 177776 012654
1264 002674 042737 000340 177776
1265 002702 052777 000200 012642
1266 002710 000240
1267 002712 000240
1268 002714 005077 012632
1269 002720 104012
1270 002722 000401
1271 002724 022626
1272 002726 104002
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1278 002730
1279 002730 005077 012616
1280 002734 042737 000340 177776
1281 002742 052737 000340 177776
1282 002750 012777 003012 012570
1283 002756 013777 177776 012564
1284 002764 012777 000100 012560
1285 002772 052777 000200 012552
1286 003000 000240
1287 003002 000240
1288 003004 005077 012542
1289 003010 000402
1290 003012 022626
1291 003014 104012
1292 003016 104002

;VERIFY THAT NO INTERRUPT OCCURS WITH "INTERRUPT ENABLE"
;SET AND "DONE" CLEARED.

T7:
INT2: BIS #340,PS ;REFERENCE DESIGNATION
      CLR BDHMCSR ;LOCK OUT INTERRUPTS
      MOV #INT2A,BDHMVEC ;CLEAR CONTROL REGISTER
      MOV PS,BDHMLVL ;SET UP INTERRUPT SERVICE ADDRESS
      BIS #INTENA,BDHMCSR ;SET UP INTERRUPT SERVICE LEVEL
      BIC #340,PS ;SET INTERRUPT ENABLE
      NOP ;ALLOW INTERRUPTS
      BR INT2B ;DELAY FOR INTERRUPTS
      ;NO INTERRUPT, CONTINUE
INT2A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT2B: SCOPE ;CHECK FOR ITERATIONS, LOOP

;VERIFY THAT SETTING "DONE" CAUSES AN INTERRUPT
;WITH "INTERRUPT ENABLE" SET

T10:
INT3: BIS #340,PS ;REFERENCE DESIGNATION
      CLR BDHMCSR ;LOCK OUT INTERRUPTS
      MOV #INT3A,BDHMVEC ;CLEAR CONTROL REGISTER
      MOV #INTENA,BDHMCSR ;SET UP INTERRUPT SERVICE ADDRESS
      MOV PS,BDHMLVL ;SET "INTERRUPT ENABLE"
      BIC #340,PS ;SET "INTERRUPT LEVEL"
      BIS #DONE,BDHMCSR ;ALLOW INTERRUPTS
      NOP ;SET "DONE"
      NOP ;DELAY FOR INTERRUPT
      CLR BDHMCSR
      ERROR ;INTERRUPT OCCURED, ERROR
      BR INT3B ;CONTINUE
INT3A: POP2SP ;INTERRUPT OCCURED, RESTOR STACK
INT3B: SCOPE ;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 7.

T11:
INT4: CLR BDHMCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #340,PS ;SET PROCESSOR PRIORITY
      MOV #INT4A,BDHMVEC ;TO LEVEL 7.
      MOV PS,BDHMLVL ;SET UP INTERRUPT SERVICE ADDRESS
      MOV #INTENA,BDHMCSR ;SET UP INTERRUPT SERVICE LEVEL
      BIS #DONE,BDHMCSR ;SET INTERRUPT ENABLE
      NOP ;GENERATE INTERRUPT
      NOP ;DELAY FOR INTERRUPT
      CLR BDHMCSR
      BR INT4B ;NO INTERRUPT, CONTINUE
INT4A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT4B: SCOPE ;CHECK FOR ITERATION, LOOP

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CZDHE-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 31  
 CZDHE.P11 11-JUL-84 08:45

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1297 003020
1298 003020 005077 012526
1299 003024 042737 000340 177776
1300 003032 052737 000300 177776
1301 003040 012777 003102 012500
1302 003046 013777 177776 012474
1303 003054 012777 000100 012470
1304 003062 052777 000200 012462
1305 003070 000240
1306 003072 000240
1307 003074 005077 012452
1308 003100 000402
1309 003102 022626
1310 003104 104012
1311 003106 104002
1312
1313
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1315
1316 003110
1317 003110 005077 012436
1318 003114 042737 000340 177776
1319 003122 052737 000240 177776
1320 003130 012777 003172 012410
1321 003136 013777 177776 012404
1322 003144 012777 000100 012400
1323 003152 052777 000200 012372
1324 003160 000240
1325 003162 000240
1326 003164 005077 012362
1327 003170 000402
1328 003172 022626
1329 003174 104012
1330 003176 104002
1331
1332
1333
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1335 003200
1336 003200 005077 012346
1337 003204 042737 000340 177776
1338 003212 052737 000200 177776
1339 003220 012777 003262 012320
1340 003226 013777 177776 012314

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;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 6.

T12:
INT5: CLR      @DMCSR
      BIC      @340,PS
      BIS      @300,PS
      MOV      @INT5A,@DMVEEC
      MOV      PS,@DMPLVL
      MOV      @INTENA,@DMCSR
      BIS      @DONE,@DMCSR
      NOP
      NOP
      CLR      @DMCSR
      BR       INT5B
INT5A: POP2SP
      ERROR
INT5B: SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;SET PROCESSOR PRIORITY
;TO LEVEL 6.
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;GENERATE INTERRUPT
;DELAY FOR INTERRUPT

;NO INTERRUPT, CONTINUE
;RESTORE STACK
;INTERRUPT OCCURED, ERROR
;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 5.

T13:
INT6: CLR      @DMCSR
      BIC      @340,PS
      BIS      @240,PS
      MOV      @INT6A,@DMVEEC
      MOV      PS,@DMPLVL
      MOV      @INTENA,@DMCSR
      BIS      @DONE,@DMCSR
      NOP
      NOP
      CLR      @DMCSR
      BR       INT6B
INT6A: POP2SP
      ERROR
INT6B: SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;SET PROCESSOR PRIORITY
;TO LEVEL 5.
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;GENERATE INTERRUPT
;DELAY FOR INTERRUPT

;NO INTERRUPT, CONTINUE
;RESTORE STACK
;INTERRUPT OCCURED, ERROR
;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 4.

T14:
INT7: CLR      @DMCSR
      BIC      @340,PS
      BIS      @200,PS
      MOV      @INT7A,@DMVEEC
      MOV      PS,@DMPLVL

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;SET PROCESSOR PRIORITY
;TO LEVEL 4.
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 32  
CZDMKE.P11 11-JUL-84 08:45

1341	003234	012777	000100	012310	MOV	#INTENA, BDHMCSR	;SET INTERRUPT ENABLE
1342	003242	052777	000200	012302	BIS	#DONE, BDHMCSR	;GENERATE INTERRUPT
1343	003250	000240			NOP		;DELAY FOR INTERRUPT
1344	003252	000240			NOP		
1345	003254	005077	012272		CLR	BDHMCSR	
1346	003260	000402			BR	INT7B	;NO INTERRUPT, CONTINUE
1347	003262	022626			INT7A: POP2SP		;RESTORE STACK
1348	003264	104012			ERROR		;INTERRUPT OCCURED, ERROR
1349	003266	104002			INT7B: SCOPE		;CHECK FOR ITERATION, LOOP

CZDHR-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 33  
 CZDHR.E.P11 11-JUL-84 08:45

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1350
1351
1352           ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
1353           ;ENABLE" SET AND "DONE" SET AT PRIORITY 0.
1354
1355 003270          T15:           ;REFERENCE DESIGNATION
1356 003270 005077 012256          INT10: CLR      @DHMCSR      ;CLEAR CONTROL REGISTER
1357 003274 042737 000340 177776  BIC      @340,PS      ;ALLOW INTERRUPTS
1358 003302 012777 003352 012236  MOV      @INT10A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
1359 003310 005077 012234          CLR      @DHMLVL      ;SET UP INTERRUPT SERVICE PRIORITY
1360 003314 052737 000000 177776  BIS      @0,PS        ;SET PROCESSOR PRIORITY TO LEVEL 0.
1361 003322 012777 000100 012222  MOV      @INTENA,@DHMCSR ;SET INTERRUPT ENABLE
1362 003330 052777 000200 012214  BIS      @DONE,@DHMCSR  ;GENERATE INTERRUPT
1363 003336 000240          NOP          ;WAIT FOR INTERRUPT
1364 003340 000240          NOP
1365 003342 005077 012204          CLR      @DHMCSR
1366 003346 104012          ERROR          ;NO INTERRUPT, ERROR
1367 003350 000401          BR      INT10B      ;CONTINUE
1368 003352 022626          INT10A: POP2SP    ;INTERRUPT OCCURED, RESTORE STACK
1369 003354 104002          INT10B: SCOPE    ;CHECK FOR INTERATIONS, LOOP.
1370
1371           ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
1372           ;ENABLE" SET AND "DONE" SET AT PRIORITY 1.
1373
1374 003356          T16:           ;REFERENCE DESIGNATION
1375 003356 005077 012170          INT11: CLR      @DHMCSR      ;CLEAR CONTROL REGISTER
1376 003362 042737 000340 177776  BIC      @340,PS      ;ALLOW INTERRUPTS
1377 003370 012777 003440 012150  MOV      @INT11A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
1378 003376 005077 012146          CLR      @DHMLVL      ;SET UP INTERRUPT SERVICE PRIORITY
1379 003402 052737 000040 177776  BIS      @40,PS        ;SET PROCESSOR PRIORITY TO LEVEL 1.
1380 003410 012777 000100 012134  MOV      @INTENA,@DHMCSR ;SET INTERRUPT ENABLE
1381 003416 052777 000200 012126  BIS      @DONE,@DHMCSR  ;GENERATE INTERRUPT
1382 003424 000240          NOP          ;WAIT FOR INTERRUPT
1383 003426 000240          NOP
1384 003430 005077 012116          CLR      @DHMCSR
1385 003434 104012          ERROR          ;NO INTERRUPT, ERROR
1386 003436 000401          BR      INT11B      ;CONTINUE
1387 003440 022626          INT11A: POP2SP    ;INTERRUPT OCCURED, RESTORE STACK
1388 003442 104002          INT11B: SCOPE    ;CHECK FOR INTERATIONS, LOOP.
1389
1390           ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
1391           ;ENABLE" SET AND "DONE" SET AT PRIORITY 2.
1392
1393 003444          T17:           ;REFERENCE DESIGNATION
1394 003444 005077 012102          INT12: CLR      @DHMCSR      ;CLEAR CONTROL REGISTER
1395 003450 042737 000340 177776  BIC      @340,PS      ;ALLOW INTERRUPTS
1396 003456 012777 003526 012062  MOV      @INT12A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
1397 003464 005077 012060          CLR      @DHMLVL      ;SET UP INTERRUPT SERVICE PRIORITY

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CZDHW-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 34  
 CZDHW.E.P11 11-JUL-84 08:45

1398	003470	052737	000100	177776	BIS	#100,PS	;SET PROCESSOR PRIORITY TO LEVEL 2.
1399	003476	012777	000100	012046	MOV	#INTENA,@DHMCSR	;SET INTERRUPT ENABLE
1400	003504	052777	000200	012040	BIS	#DONE,@DHMCSR	;GENERATE INTERRUPT
1401	003512	000240			NOP		;WAIT FOR INTERRUPT
1402	003514	000240			NOP		
1403	003516	005077	012030		CLR	@DHMCSR	
1404	003522	104012			ERROR		;NO INTERRUPT, ERROR
1405	003524	000401			BR	INT128	;CONTINUE
1406	003526	022626			INT12A: POP2SP		;INTERRUPT OCCURED, RESTORE STACK
1407	003530	104002			INT12B: SCOPE		;CHECK FOR INTERATIONS, LOOP.

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 35  
 CZDMKE.P11 11-JUL-84 08:45

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1408
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1412 003532          T20:
1413 003532 005077 012014 INT13: CLR      @DMCSR
1414 003536 042737 000340 177776      BIC      @340,PS
1415 003544 012777 003614 011774      MOV      @INT13A,@DMVEC
1416 003552 005077 011772          CLR      @DMPLVL
1417 003556 052737 000140 177776      BIS      @140,PS
1418 003564 012777 000100 011760      MOV      @INTENA,@DMCSR
1419 003572 052777 000200 011752      BIS      @DONE,@DMCSR
1420 003600 000240          NOP
1421 003602 000240          NOP
1422 003604 005077 011742          CLR      @DMCSR
1423 003610 104012          ERROR
1424 003612 000401          BR      INT13B
1425 003614 022626          INT13A: POP2SP
1426 003616 104002          INT13B: SCOPE

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;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT  
;ENABLE" SET AND "DONE" SET AT PRIORITY 3.  
;REFERENCE DESIGNATION  
;CLEAR CONTROL REGISTER  
;ALLOW INTERRUPTS  
;SET UP INTERRUPT SERVICE ADDRESS  
;SET UP INTERRUPT SERVICE PRIORITY  
;SET PROCESSOR PRIORITY TO LEVEL 3.  
;SET INTERRUPT ENABLE  
;GENERATE INTERRUPT  
;WAIT FOR INTERRUPT  
;NO INTERRUPT, ERROR  
;CONTINUE  
;INTERRUPT OCCURED, RESTORE STACK  
;CHECK FOR INTERATIONS, LOOP.

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 36  
 CZDMKE.P11 11-JUL-84 08:45

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1431 003620
1432 003620 005077 011726
1433 003624 042737 000340 177776
1434 003632 012737 000001 015662
1435 003640 005005
1436 003642 012700 000020
1437 003646 033737 015662 015660
1438 003654 001407
1439 003656 010577 011670
1440 003662 017704 011664
1441 003666 020504
1442 003670 001401
1443 003672 104000
1444 003674 104003
1445 003676 003646
1446 003700 005205
1447 003702 006337 015662
1448 003706 005300
1449 003710 001356
1450 003712 104002
1451
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1455 003714
1456 003714 042737 000340 177776
1457 003722 005077 011624
1458 003726 005005
1459 003730 012737 000001 015662
1460 003736 012701 177777
1461 003742 012700 000020
1462 003746 012777 000017 011576
1463 003754 033737 015662 015660
1464 003762 001407
1465 003764 004737 013344
1466 003770 017704 011556
1467 003774 020504
1468 003776 001401
1469 004000 104000
1470 004002 104003
1471 004004 003714
1472 004006 005205
1473 004010 006337 015662
1474 004014 005201
1475 004016 010177 011530
1476 004022 005300
1477 004024 001353
1478 004026 104002

;VERIFY THAT ALL LINE NUMBERS CAN BE WRITTEN INTO AND
;READ BACK FROM LINE COUNTER

T21:
LINT1: CLR BDHMCSR ;REFERENCE DESIGNATION
        BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
        MOV #1,SELMSK ;ENABLE INTERRUPTS
        CLR R5 ;INIT LINE SELECT MASK
        MOV #16.,R0 ;CLEAR EXPECTED LINE NUMBER
        BIT SELMSK,LINSEL ;SET UP TO TEST 16 LINE NUMBERS
        BEQ LINT1B ;THIS LINE SELECTED ??
        MOV R5,BDHMCSR ;BR IF NOT
        MOV BDHMCSR,R4 ;SET LINE NUMBER
        CMP R5,R4 ;READ BACK LINE NUMBER
        BEQ LINT1B ;ARE EXPECTED AND RECEIVED
        ERRORC ;LINE NUMBERS THE SAME
        SCOPEF ;LINE NUMBERS DIFFERENT, ERROR
        LINT1A ;CHECK FOR DATA FREEZE
        INC R5 ;RETURN FOR DATA FREEZE
        ASL SELMSK ;UPDATE LINE COUNT
        DEC R0 ;SELECT NEXT LINE TO TEST
        BNE LINT1A ;UPDATE LINE NUMBER
        SCOPE ;CONTINUE
        ;CHECK FOR ITERATION, LOOP

;USING "STEP" MODE, VERIFY THAT THE
;LINE COUNTER CAN BE STEPPED THRU ALL STATES.

T22:
LINT2: BIC #340,PS ;REFERENCE DESIGNATION
        CLR BDHMCSR ;ENABLE INTERRUPTS
        CLR R5 ;CLEAR CONTROL STATUS REGISTER
        MOV #1,SELMSK ;CLEAR EXPECTED LINE COUNT
        MOV #-1,R1 ;SET UP SELECT MASK
        MOV #16.,R0 ;INIT LINE COUNTER
        MOV #17,BDHMCSR ;SET UP TO TEST 16 VALUES
        BIT SELMSK,LINSEL ;FIRST VALUE =0
        BEQ LINT2B ;THIS LINE SELECTED ??
        CALL STEPER ;BR IF NOT
        MOV BDHMCSR,R4 ;STEP LINE COUNTER
        CMP R5,R4 ;READ LINE COUNTER
        BEQ LINT2B ;COMPARE EXPECTED AND
        ERRORC ;RECEIVED LINE NUMBERS
        SCOPEF ;LINE COUNTER ERROR
        LINT2 ;CHECK FOR DATA FREEZE
        INC R5 ;UPDATE EXPECTED LINE NUMBER
        ASL SELMSK ;SHIFT SELECT MASK
        INC R1 ;GEN NEW LINE NO.
        MOV R1,BDHMCSR ;SET NEW LINE NO. IN CSR
        DEC R0
        BNE LINT2A
        SCOPE ;CHECK FOR ITERATIONS, LOOP

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CZDHW-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 37  
 CZDHW.E.P11 11-JUL-84 08:45

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1479
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1486 004030 T23:
1487 004030 012777 002000 011514 MENT1: MOV #CLRMUX,SDHMCSR ;REFERENCE DESIGNATION
1488 004036 042737 000340 177776 BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
1489 004044 012700 000020 MOV #16.,R0 ;ENABLE INTERRUPTS
1490 004050 052777 001017 011474 BIS #MAINT+17,SDHMCSR ;SET UP TO TEST 16 LOCATIONS
1491 004056 004737 013344 MENT1A: CALL STEPER ;SET MAINTENANCE MODE
1492 004062 005300 DEC R0 ;SET LINE COUNTER THRU ALL
1493 004064 001374 BNE MENT1A ;STATES, WRITING 1'S INTO
1494 004066 012700 000020 MOV #16.,R0 ;ALL MEMORY WORDS
1495 004072 012705 070000 MOV #70000,R5 ;SET UP TO TEST 16 WORDS
1496 004076 012777 000017 011446 MOV #17,SDHMCSR ;SET UP EXPECTED STATUS REGISTER
1497 004104 004737 013344 MENT1B: CALL STEPER ;START WITH LINE 0
1498 004110 017704 011436 MOV SDHMCSR,R4 ;ACCESS SCANNER MEMORY
1499 004114 020504 CMP R5,R4 ;READ DATA
1500 004116 001403 BEQ MENT1C ;COMPARE EXPECTED AND RECEIVED
1501 004120 104000 ERRORC ;DATA
1502 004122 104003 SCOPEF ;CONTROL STATUS OR MEMORY ERROR
1503 004124 004030 MENT1 ;CHECK FOR DATA FREEZE
1504 004126 005205 MENT1C: INC R5 ;UPDATE EXPECTED STATUS
1505 004130 005300 DEC R0 ;UPDATE LINE COUNT
1506 004132 001364 BNE MENT1B ;CONTINUE
1507 004134 012777 004000 011410 MENT1D: MOV #CLRSCN,SDHMCSR ;SET "CLEAR SCAN"
1508 004142 032777 000020 011402 BIT #BUSY,SDHMCSR ;WAIT FOR "CLEAR CYCLES"
1509 004150 001374 BNE .-6
1510 004152 012700 000020 MOV #16.,R0 ;SET UP TO TEST 16 MEMORY
1511 004156 005005 CLR R5 ;LOCATIONS
1512 004160 012777 000017 011364 MOV #17,SDHMCSR ;FIRST TO BE TESTED=0
1513 004166 004737 013344 MENT1E: CALL STEPER ;ACCESS SEANNER MEMORY
1514 004172 017704 011354 MOV SDHMCSR,R4 ;READ DATA
1515 004176 020504 CMP R5,R4 ;COMPARE EXPECTED AND RECEIVED
1516 004200 001403 BEQ MENT1F ;DATA
1517 004202 104000 ERRORC ;CONTROL STATUS OF MEMORY ERROR
1518 004204 104003 SCOPEFF ;CHECK FOR DATA FREEZE
1519 004206 004134 MENT1D
1520 004210 005205 MENT1F: INC R5 ;UPDATE EXPECTED DATA
1521 004212 005300 DEC R0 ;UPDATE LINE COUNT
1522 004214 001364 BNE MENT1E ;CONTINUE
1523 004216 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP

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CZDNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 38  
 CZDNKE.P11 11-JUL-84 08:45

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1528 004220
1529 004220 005077 011326
1530 004224 042737 000340 177776
1531 004232 012700 000020
1532 004236 012702 000017
1533 004242 012777 004000 011302
1534 004250 032777 000020 011274
1535 004256 001374
1536 004260 012777 001000 011264
1537 004266 050277 011260
1538 004272 004737 013344
1539 004276 042777 001000 011246
1540 004304 012703 000020
1541 004310 012777 000017 011234
1542 004316 005202
1543 004320 005001
1544 004322 004737 013344
1545 004326 117704 011220
1546 004332 010105
1547 004334 120402
1548 004336 001002
1549 004340 052705 070000
1550 004344 020405
1551 004346 001403
1552 004350 104000
1553 004352 104003
1554 004354 004242
1555 004356 005201
1556 004360 005303
1557 004362 001357
1558 004364 005300
1559 004366 001325
1560 004370 104002

;WRITE 1'S INTO SELECTED SCANNER MEMORY LOCATION.
;VERIFY THAT ONLY SELECTED LOCATION WAS WRITTEN INTO.

T24:
MENT2: CLR @DHMCSR
        BIC @340,PS
        MOV @16.,R0
        MOV @17,R2
MENT2A: MOV @CLRSCN,@DHMCSR
        BIT @BUSY,@DHMCSR
        BNE .-6
        MOV @MAINT,@DHMCSR
        BIS R2,@DHMCSR
        CALL STEPER
        BIC @MAINT,@DHMCSR
        MOV @16.,R3
        MOV @17,@DHMCSR
        INC R2
        CLR R1
MENT2B: CALL STEPER
        MOVB @DHMCSR,R4
        MOV R1,R5
        CPB R4,R2
        BNE MENT2C
        BIS @70000,R5
MENT2C: CMP R4,R5
        BEQ MENT2D
        ERRORC
        SCOPEF
MENT2A: MENT2A: INC R1
        DEC R3
        BNE MENT2B
        DEC R0
        BNE MENT2A
        SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 ADDRESSES
;FIRST ADDRESS TO BE TESTED=0
;CLEAR ACANNER MEMORY
;WAIT FOR CLEAR CYCLE

;SET "MAINTENANCE MODE"
;SET LINE COUNTER TO TEST ADDRESS-1
;WRITE 1'S INTO TEST ADDRESS
;CLEAR "MAINTENANCE MODE"
;SET UP TO TEST ALL 16
;SCANNER MEMORY LOCATIONS

;ACCESS SCANNER MEMORY
;READ CONTENTS OF MEMORY
;SET UP EXPECTED CONTENTS
;OF SCANNER MEMORY

;COMPARE EXPECTED AND RECEIVED
;VALUES
;SCANNER MEMORY ERROR
;CHECK FOR DATA FREEZE

;TEST NEXT SCANNED LOCATION

;UPDATE LINE COUNT

;CHECK FOR ITERATION, LOOP

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CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 39  
 CZDHK.E.P11 11-JUL-84 08:45

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1566 004372 005077 011154 T25:
1567 004372 042737 000340 177776 MENT3: CLR BDHMCSR ;REFERENCE DESIGNATION
1568 004376 012700 000020 BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
1569 004404 012702 000017 MOV #16.,R0 ;ENABLE INTERRUPTS
1570 004410 012703 000020 MOV #17,R2 ;SET UP TO TEST 16 ADDRESSES
1571 004414 012703 000020 MENT3A: MOV #16.,R3 ;FIRST ADDRESS TO BE TESTED=0
1572 004420 012777 001017 011124 MOV #MAINT+17,BDHMCSR ;WRITE 1'S INTO ALL SCANNER
1573 004426 004737 013344 MENT3B: CALL STEPER ;MEMORY LOCATIONS
1574 004432 005303 DEC R3 ;ACCESS SCANNER MEM
1575 004434 001374 BNE MENT3B
1576 004436 010277 011110 MOV R2,BDHMCSR ;SET LINE COUNTER TO TEST ADDRESS-1
1577 004442 004737 013344 CALL STEPER ;WRITE 0'S INTO TEST ADDRESS
1578 004446 012703 000020 MOV #16.,R3 ;SET UP TO TEST ALL 16
1579 004452 012777 000017 011072 MOV #17,BDHMCSR ;SCANNER MEMORY LOCATIONS
1580 004460 005202 INC R2
1581 004462 005001 CLR R1
1582 004464 004737 013344 MENT3C: CALL STEPER ;ACCESS SCANNER MEMORY
1583 004470 117704 011056 MOVB BDHMCSR,R4 ;READ CONTENTS OF MEMORY
1584 004474 010105 MOV R1,R5 ;SET UP EXPECTED CONTENTS
1585 004476 120402 CMPB R4,R2 ;OF SCANNER MEIORY
1586 004500 001002 BNE MENT3D
1587 004502 052705 070000 BIS #70000,R5
1588 004506 020405 MENT3D: CMP R4,R5 ;COMPARE EXPECTED AND
1589 004510 001403 BEQ MENT3E ;RECEIVED VALUES
1590 004512 104000 ERRORC ;SCANNER MEMORY ERROR
1591 004514 104003 SCOPEF ;CHECK FOR DATA FREEZE
1592 004516 004414 MENT3A
1593 004520 005201 MENT3E: INC R1
1594 004522 005303 DEC R3 ;TEST NEXT SCANNER LOCATION
1595 004524 001357 BNE MENT3C
1596 004526 005300 DEC R0 ;UPDATE ADDRESS COUNT
1597 004530 001331 BNE MENT3A
1598 004532 104002 SCOPE ;CHECK FOR ITERATION, LOOP

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 41  
 CZDMKE.P11 11-JUL-84 08:45

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1655                                     ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
1656                                     ;BE SET AND CLEARED FOR SELECTED LINE
1657
1658 004774                                T27:                                ;REFERENCE DESIGNATION
1659 004774 005077 010552                 MUX2:  CLR      BDHMCSR             ;CLEAR CONTROL STATUS REGISTER
1660 005000 042737 000340 177776         BIC      #340,PS                 ;ENABLE INTERRUPTS
1661 005006 012700 000020                 MOV      #16,,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
1662 005012 012737 000001 015662         MOV      #1,SELMSK              ;INIT LINE SELECT MASK
1663 005020 005001                         CLR      R1                      ;START AT LINE 0
1664 005022 012777 002000 010522         MUX2A: MOV      @CLRMUX,BDHMCSR
1665 005030 012702 000020                 MOV      #16,,R2
1666 005034 033737 015662 015660         BIT      SELMSK,LINSEL          ;IS THIS LINE SELECTED FOR TEST ?
1667 005042 001462                         BEQ      MUX2F                   ;BR IF NOT
1668 005044 010177 010502                 MOV      R1,BDHMCSR             ;SELECT LINE TO BE TESTED
1669 005050 012777 000002 010476         MOV      @TRMRY,BDHPLSR        ;SET TERMINAL READY FUNCTION FLIP-FLOP
1670 005056 012737 000001 015664         MOV      #1,SLMSK              ;INIT ANOTHER SELECT MASK
1671 005064 005077 010462                 CLR      BDHMCSR
1672 005070 005005                         MUX2B: CLR      R5
1673 005072 033737 015664 015660         BIT      SLMSK,LINSEL          ;SELECTED ??
1674 005100 001417                         BEQ      MUX2D                   ;BR IF NOT
1675 005102 017704 010446                 MOV      BDHPLSR,R4            ;READ LINE STATUS REGISTER
1676 005106 117703 010440                 MOV      BDHMCSR,R3            ;READ CONTROL STATUS REGISTER
1677 005112 042703 177760                 BIC      #177760,R3            ;CLEAR UNWANTED BITS
1678 005116 020103                         CMP      R1,R3                  ;IF LINE NUMBER=SELECTED LINE NUMBER,
1679 005120 001002                         BNE      MUX2C                   ;EXCEPT TERMINAL READY FUNCTION FLIP FLOP
1680 005122 012705 000002                 MOV      @TRMRY,R5            ;TO BE SET
1681
1682 005126                         MUX2C:
1683 005126 020504                         CMP      R5,R4                  ;CMP EXPECTED AND RECVD
1684 005130 001403                         BEQ      MUX2D                   ;RESULTS
1685 005132 104001                         ERRORL
1686 005134 104003                         SCOPEF
1687 005136 005140                         MUX2D
1688 005140 004737 013344                 MUX2D: CALL      STEPER           ;EXAMINE NEXT LINE
1689 005144 006337 015664                 ASL      SLMSK                 ;SHIFT MASK
1690 005150 005302                         DEC      R2
1691 005152 001346                         BNE      MUX2B
1692 005154 005005                         CLR      R5
1693 005156 010177 010370                 MUX2E: MOV      R1,BDHMCSR
1694 005162 010103                         MOV      R1,R3
1695 005164 005077 010364                 CLR      BDHPLSR              ;SET LINE COUNTER TO SELECTED LINE
1696 005170 105227 000000                 INCB     #0                     ;CLEAR TERMINAL READY FLIP FLOP
1697 005174 001375                         BNE     .-4                      ;DELAY FOR CABLE
1698 005176 017704 010352                 MOV      BDHPLSR,R4            ;DITTO
1699 005202 005704                         TST     R4                      ;READ LINE STATUS REGISTER
1700 005204 001401                         BEQ     MUX2F                   ;WAS TERMINAL READY FUNCTION FLIP FLOP
1701 005206 104001                         ERRORL                          ;CLEARED
1702 005210 104003                         MUX2F: SCOPEF                   ;NO, LINE STATUS ERROR
1703 005212 005022                         MUX2A
1704 005214 006337 015662                 ASL     SELMSK                  ;CHECK FOR LOOP ON SAME DATA
1705 005220 005201                         INC     R1                      ;SHIFT SELECT MASK
1706 005222 005300                         DEC     R0                      ;SELECT NEXT LINE
1707 005224 001276                         BNE     MUX2A                   ;DECREMENT LINE COUNT
1708 005226 104002                         SCOPE

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 44  
 CZDMKE.P11 11-JUL-84 08:45

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1821 005720          T32:
1822 005720 005077 007626          MUX8: CLR      8DHCSR
1823 005724 042737 000340 177776 BIC      @340,PS
1824 005732 012700 000020          MOV      @16.,R0
1825 005736 012777 000017 007610 MUX8A: MOV      @17,8DHMLSR
1826 005744 004737 013344          CALL    STEPER
1827 005750 005300          DEC      R0
1828 005752 001371          BNE     MUX8A
1829 005754 012737 000001 015662 MOV      @1,SELMSK
1830 005762 005003          CLR      R3
1831 005764 012700 000020          MOV      @16.,R0
1832 005770 012777 002000 007554 MUX8B: MOV      @CLRMUX,8DHCSR
1833 005776 033737 015662 015660 MUX8C: BIT      SELMSK,LINSEL
1834 006004 001427          BEQ     MUX8E
1835 006006 010377 007540          MOV      R3,8DHCSR
1836 006012 017704 007536          MOV      8DHMLSR,R4
1837 006016 005005          CLR      R5
1838 006020 005704          TST     R4
1839 006022 001403          BEQ     MUX8D
1840 006024 104001          ERRORL
1841 006026 104003          SCOPEF
1842 006030 005770          MUX8B
1843 006032 005205          MUX8D: INC      R5
1844 006034 052777 000001 007512 BIS      @LINENA,8DHMLSR
1845 006042 017704 007506          MOV      8DHMLSR,R4
1846 006046 042704 000360          BIC      @360,R4
1847 006052 020504          CMP     R5,R4
1848 006054 001403          BEQ     MUX8E
1849 006056 104001          ERRORL
1850 006060 104003          SCOPEF
1851 006062 005770          MUX8B
1852 006064 005203          MUX8E: INC      R3
1853 006066 005077 007462          CLR      8DHMLSR
1854 006072 006337 015662          ASL     SELMSK
1855 006076 005300          DEC     R0
1856 006100 001336          BNE     MUX8C
1857 006102 104002          SCOPE

;VERIFY THAT "CLEAR MULTIPLXER" CLEARS ALL MULTIPLEXER
;FUNCTION FLIP-FLOPS

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 LINES
;WRITE 15 INTO ALL MULTIPLEXER
;FUNCTION FLIPFLOPS

;INIT SELECT MASK
;SET UP FOR 16 LINES

;CLEAR MULTIPLEXER
;SELECTED ??
;BR IF NOT
;SELECT LINE
;READ LINE STATUS REGISTER
;EXPECT OS
;WAS LINE STATUS REGISTER CLEARED

;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

;EXPECT LINE ENABLE
;SET LINE ENABLE ON SELECTED LINE
;READ LINE STATUS REGISTER
;CLEAR RING,CO,CS SECRCV-MAY FLOAT HIGH
;IS ANYTHING BUT LINE ENABLE SET

;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

;UPDATE LINE NUMBER
;CLEAR CURRENT LINE
;SHIFT SELECT MASK
;CONTINUE IF ALL LINES NOT
;TESTED
;CHECK FOR ITERATIONS. LOOP

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CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 45  
 CZDHK.E.P11 11-JUL-84 08:45

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1868 006104
1869 006104 012777 002000 007440
1870 006112 005077 007434
1871 006116 042737 000340 177776
1872 006124 012700 000020
1873 006130 012777 001017 007414
1874 006136 012737 000001 015662
1875 006144 004737 013344
1876 006150 012777 000001 007376
1877 006156 005300
1878 006160 001371
1879 006162 012701 177777
1880 006166 012705 070300
1881 006172 012777 006344 007346
1882 006200 013777 177776 007342
1883 006206 012700 000020
1884 006212 012777 000117 007332
1885 006220 033737 015662 015660
1886 006226 001456
1887 006230 052737 000340 177776
1888 006236 004737 013344
1889 006242 005003
1890 006244 042737 000340 177776
1891 006252 005303
1892 006254 001404
1893 006256 105777 007270
1894 006262 100373
1895 006264 100416
1896 006266 052737 000340 177776
1897 006274 017704 007252
1898 006300 010402
1899 006302 017703 007246
1900 006306 042704 177760
1901 006312 104030
1902 006314 104003
1903 006316 006104
1904 006320 000421
1905 006322 052737 000340 177776
1906 006330 017704 007216
1907 006334 104000
1908 006336 104003
1909 006340 006104
1910 006342 000410
1911 006344 022626
1912 006346 017704 007200
1913 006352 020504

;WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS
;SET "LINE ENABLE FOR ALL LINES
;VERIFY THAT AN INTERRUPT OCCURS FOR EACH LINE
;THIS TEST WILL FAIL ON ANY LINE THAT DOES
;NOT HAVE A LEVEL CONVERTER--CO,CS,RING,SECRV WILL FLOAT
;HIGH,HENCE MAINT. MODE CANNOT TOGGLE THESE SIGNALS TO
;CAUSE A TRANSITION.A PROGRAM TIME OUT WILL OCCUR.....

T33:
SCNT1: MOV @CLRMUX,BDMCSR ;REFERENCE DESIGNATION
CLR BDMCSR ;CLEAR ALL MULTIPLEXER FLIPFLOPS
BIC #340,PS ;CLEAR CONTROL REGISTER
MOV #16.,RO ;ENABLE INTERRUPTS
MOV #MAINT+17,BDMCSR ;SET UP TO WRITE 1'S INTO
MOV #1,SELMSK ;ALL SCANNER MEMORY LOCATION
SCNT1A: CALL STEPER ;INIT SELECT MASK
MOV @LINENA,BDMLSR ;WRITE A LOCATION
DEC RO ;LET "LINE ENABLE"
BNE SCNT1A
MOV #-1,R1 ;INIT LINE NO. GEN.
MOV #70300,R5 ;EXPECT "DONE","COF","CSF","SECRXF"
MOV #SCNT1C,BDMVEC ;SET UP LOCAL INTERRUPT SERVICE
MOV PS,BDMPLVL ;SERVICE AT LEVEL 7
MOV #16.,RO
MOV #INTENA+17,BDMCSR ;SET INTERRUPT ENABLE
SCNT1B: BIT SELMSK,LINSEL ;SELECTED ??
BEQ SCNT1D ;BR IF NOT
BIS #340,PS ;LOCK OUT INTERRUPTS
CALL STEPER ;HIT THE SCANNER ONCE
CLR R3 ;CLEAR DELAY
BIC #340,PS ;ENABLE INTERRUPTS
1#: DEC R3 ;WAIT LONG ENOUGH?
BEQ 2# ;WE HAVE AN ERROR
TSTB BDMCSR ;DID DONE SET
BPL 1# ;NOT YET
BMI 3# ;SET BUT NO INTERRUPT
2#: BIS #340,PS
MOV BDMCSR,R4 ;GET FAILING LINE
MOV R4,R2 ;GET CSR
MOV BDMLSR,R3 ;GET LSR
BIC #177760,R4
ERRINT ;REPORT ERROR HAS OCCURED
SCOPEF
SCNT1
BR SCNT1D ;CONTINUE THE TEST
3#: BIS #340,PS ;INTERRUPT DID NOT OCCUR
MOV BDMCSR,R4 ;ERROR
ERRORC ;CONTROL STATUS ERROR
SCOPEF ;CHECK FOR LOOP ON SAME DATA
SCNT1
BR SCNT1D
SCNT1C: POP2SP ;INTERRUPT OCCURED, REPOSITION STACK
MOV BDMCSR,R4 ;READ CONTROL STATUS
CMP R5,R4 ;ARE EXPECTED AND RECEIVED

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1926
1927
1928
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1931
1932
1933
1934
1935 006414
1936 006414 012737 006434 002204
1937 006422 042737 000340 177776
1938 006430 104004
1939 006432 016750
1940 006434 104013
1941 006436 017003
1942 006440 000000
1943 006442 000017
1944 006444 015640
1945 006446 104004
1946 006450 016745

;SINGLE LINE CABLE TEST
;FOR USE WITH MODEM CABLE AND DC11 TEST CONNECTOR

;NOTE: MODEM CONTROL MULTIPLEXER INPUTS SHOULD BE CONNECTED
;TO DISTRIBUTION PANEL WIA DM11-DC

T100:
STRLIN: MOV #STRLNA,KRET
        BIC #340,PS
        TYPE
        MLINE
STRLNA: INSTRG
        MLINEI
        0
        17
        LINE
        TYPE
        MCRLF

;REFERENCE DESIGNATION
;SET UP FOR NEW LINE SELECTION
;ENABLE INTERRUPTS
;TYPE "SINGLE LINE CABLE TEST"

;GET LINE NUMBER

```

CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 48  
 CZDHK.E.P11 11-JUL-84 08:45

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1947
1948
1949
1950
1951 006452          T101:
1952 006452 005077 007074 MUX11: CLR      BDHMCSR           ;REFERENCE DESIGNATION
1953 006456 042737 000340 177776 BIC      #340,PS           ;CLEAR CONTROL STATUS REGISTER
1954 006464 013701 015640          MOV      LINE,R1         ;ENABLE INTERRUPTS
1955 006470 012777 002000 007054 MUX11A: MOV      @CLRMUX,BDHMCSR
1956 006476 012702 000020          MOV      #16.,R2
1957 006502 010177 007044          MOV      R1,BDHMCSR     ;SELECT LINE TO BE TESTED
1958 006506 012777 000001 007040 MUX11A: MOV      @LINENA,BDHMLSR ;SET LINE ENABLE FUNCTION FLIP-FLOP
1959 006514 005077 007032          CLR      BDHMCSR
1960 006520 005005 MUX11B: CLR      R5
1961 006522 017704 007026          MOV      BDHMLSR,R4     ;READ LINE STATUS REGISTER
1962 006526 117703 007020          MOV      BDHMCSR,R3     ;READ CONTROL STATUS REGISTER
1963 006532 042703 177760          BIC      #177760,R3     ;CLEAR UNWANTED BITS
1964 006536 020103          CMP      R1,R3          ;IF LINE NUMBER=SELECTED LINE NUMBER,
1965 006540 001002          BNE      MUX11C         ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
1966 006542 012705 000001          MOV      @LINENA,R5
1967
1968 006546 MUX11C:
1969 006546 042704 000360          BIC      #360,R4
1970
1971 006552 020504          CMP      R5,R4
1972 006554 001403          BEQ      MUX11D
1973 006556 104001          ERRORL
1974 006560 104003          SCOPEF
1975 006562 006564          MUX11D
1976 006564 004737 013344 MUX11D: CALL     STEPER           ;EXAMINE NEXT LINE
1977 006570 705302          DEC      R2
1978 006572 001352          BNE      MUX11B
1979 006574 005005          CLR      R5
1980 006576 010177 006750 MUX11E: MOV      R1,BDHMCSR
1981 006602 010103          MOV      R1,R3
1982 006604 005077 006744          CLR      BDHMLSR
1983 006610 105227 000000          INCB    #0
1984 006614 001375          BNE      .-4
1985 006616 017704 006732          MOV      BDHMLSR,R4
1986 006622 005704          TST     R4
1987 006624 001401          BEQ     MUX11F
1988 006626 104001          ERRORL
1989 006630 104002 MUX11F: SCOPE

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CZDHW-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 51  
 CZDHW.E.P11 11-JUL-84 08:45

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2070                                     ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
2071                                     ;BE SET AND CLEARED FOR SELECTED LINE
2072
2073 007162                                T104:                                ;REFERENCE DESIGNATION
2074 007162 005077 006364                MUX14: CLR  BDHMCSR                ;CLEAR CONTROL STATUS REGISTER
2075 007166 042737 000340 177776        BIC  #340,PS                       ;ENABLE INTERRUPTS
2076 007174 013701 015640                MOV  LINE,R1
2077 007200 012777 002000 006344        MUX14A: MOV #CLRMUX,BDHMCSR
2078 007206 012702 000020                MOV  #16.,R2
2079 007212 010177 006334                MOV  R1,BDHMCSR                    ;SELECT LINE TO BE TESTED
2080 007216 012777 000010 006330        MOV  #SECTX,BDHPLSR                ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
2081 007224 005077 006322                CLR  BDHMCSR
2082 007230 005005                MUX14B: CLR  R5
2083 007232 017704 006316                MOV  BDHPLSR,R4                    ;READ LINE STATUS REGISTER
2084 007236 117703 006310                MOVB BDHMCSR,R3                    ;READ CONTROL STATUS REGISTER
2085 007242 042703 177760                BIC  #177760,R3                    ;CLEAR UNWANTED BITS
2086 007246 020103                CMP  R1,R3                          ;IF LINE NUMBER-SELECTED LINE NUMBER,
2087 007250 001002                BNE  MUX14C                          ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
2088 007252 012705 000010                MOV  #SECTX,R5
2089                                     ;TO BE SET
2090
2091 007256                MUX14C:                CMP  R5,R4                          ;CMP EXPECTED AND RECVD
2092 007260 001403                BEQ  MUX14D                          ;RESULTS
2093 007262 104001                ERRORL                                ;LINE STATUS ERROR
2094 007264 104003                SCOPEF
2095 007266 007270                MUX14D
2096 007270 004737 013344                MUX14D: CALL  STEPER                    ;EXAMINE NEXT LINE
2097 007274 005302                DEC  R2
2098 007276 001354                BNE  MUX14B
2099 007300 005005                CLR  R5
2100 007302 010177 006244                MUX14E: MOV  R1,BDHMCSR
2101 007306 010103                MOV  R1,R3                          ;SET LINE COUNTER TO SELECTED LINE
2102 007310 005077 006240                CLR  BDHPLSR                        ;CLEAR SECONDARY TRANSMIT FLIP FLOP
2103 007314 105227 000000                INCB #0                              ;DELAY FOR CABLE
2104 007320 001375                BNE  .-4                              ;DITTO
2105 007322 017704 006226                MOV  BDHPLSR,R4                    ;READ LINE STATUS REGISTER
2106 007326 005704                TST  R4                              ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
2107 007330 001401                BEQ  MUX14F                          ;CLEARED
2108 007332 104001                ERRORL                                ;NO, LINE STATUS ERROR
2109 007334 104002                MUX14F: SCOPE                        ;CHECK FOR ITERATIONS, LOOP

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 52  
 CZDMKE.P11 11-JUL-84 08:45

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2110
2111
2112
2113
2114 007336
2115 007336 005077 006210
2116 007342 042737 000340 177776
2117 007350 013701 015640
2118 007354 012702 000020
2119 007360 010177 006166
2120 007364 012777 000003 006162
2121
2122
2123
2124 007372 000240
2125 007374 000240
2126
2127 007376 005077 006150
2128 007402 005005
2129 007404 017704 006144
2130 007410 117703 006136
2131 007414 042703 177760
2132 007420 020103
2133 007422 001002
2134 007424 012705 000143
2135
2136 007430 020405
2137 007432 001403
2138 007434 104001
2139 007436 104003
2140 007440 007442
2141 007442 004737 013344
2142 007446 005302
2143 007450 001354
2144 007452 012705 000001
2145 007456 010103
2146 007460 010177 006066
2147 007464 042777 000002 006062
2148 007472 105227 000000
2149 007476 001375
2150 007500 017704 006050
2151 007504 020504
2152 007506 001401
2153 007510 104001
2154 007512 104002

;VERIFY THAT CLEAR TO SEND AND CARRIER ARE SET IF "LINE ENABLE"
;AND TERMINAL ARE SET FOR SELECTED LINE.

T105:
MUX15: CLR @DMCSR ;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
BIC @340,PS
MOV LINE,R1
MUX15A: MOV @16.,R2 ;16 LINES
MOV R1,@DMCSR ;SELECT A LINE
MOV @LINENA+TRMRDY,@DMPLSR ;SET LINE ENABLE +TRMRDY

;THESE TWO NOP'S ADDED FOR SOME DELAY FOR PDP-11/44
;WITH CACHE MEMORY TURNED ON.
NOP ;KR 10-JULY-84 REV E
NOP ;KR 10-JULY-84 REV E

MUX15B: CLR @DMCSR ;CLEAR CONTROL REGISTER
CLR R5 ;CLEAR EXPECTED RESULT
MOV @DMPLSR,R4 ;READ LINE STATUS
MOVB @DMCSR,R3 ;READ LINE NUMBER
BIC @177760,R3 ;CLEAR UNWANTED BITS
CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
BNE MUX15C ;EXPECT LINE ENABLE AND
MOV @LINENA+TRMRDY+CO+CS,R5 ;CLEAR TO SEND AND CARRIER ARE SET

MUX15C: CMP R4,R5 ;COMPARE EXPECTED AND
BEQ MUX15D ;RECEIVED RESULTS
ERRORL ;LINE STATUS ERROR
SCOPEF
MUX15D

MUX15D: CALL STEPER ;UPDATE LINE COUNTER
DEC R2 ;CONTINUE IF ALL CHECKS
BNE MUX15B ;ARE NOT DONE FOR THIS LINE
MOV @LINENA,R5 ;EXPECT LINE ENABLE
MUX15E: MOV R1,R3 ;ON SELECTED LINE
MOV R1,@DMCSR ;SELECT LINE
BIC @TRMRDY,@DMPLSR ;CLEAR TERMINAL
INCB @0 ;DELAY FOR CABLE
BNE .-4 ;DITTO
MOV @DMPLSR,R4 ;READ LINE STATUS REGISTER
CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
BEQ MUX15F ;SET ON THIS LINE
ERRORL ;LINE STATUS ERROR
MUX15F: SCOPE ;CHECK FOR ITERATIONS. LOOP

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 53  
 CZDMKE.P11 11-JUL-84 08:45

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2155
2156
2157
2158
2159 007514
2160 007514 005077 006032
2161 007520 042737 000340 177776
2162 007526 013701 015640
2163 007532 012702 000020
2164 007536 010177 006010
2165 007542 012777 000005 006004
2166
2167
2168
2169 007550 000240
2170 007552 000240
2171
2172 007554 005077 005772
2173 007560 005005
2174 007562 017704 005766
2175 007566 117703 005760
2176 007572 042703 177760
2177 007576 020103
2178 007600 001002
2179 007602 012705 000205
2180
2181 007606 020405
2182 007610 001403
2183 007612 104001
2184 007614 104003
2185 007616 007620
2186 007620 004737 013344
2187 007624 005302
2188 007626 001354
2189 007630 012705 000001
2190 007634 010103
2191 007636 010177 005710
2192 007642 042777 000004 005704
2193 007650 105227 000000
2194 007654 001375
2195 007656 017704 005672
2196 007662 020504
2197 007664 001401
2198 007666 104001
2199 007670 104002

;VERIFY THAT RING IS SET IF "LINE ENABLE"
;AND REQUEST TO SEND ARE SET FOR SELECTED LINE.

T106:
MUX16: CLR BDHMCSR ;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
BIC #340,PS
MOV LINE,R1
MUX16A: MOV #16,,R2 ;16 LINES
MOV R1,BDHMCSR ;SELECT A LINE
MOV #LINENA*RS,BDHMLSR ;SET LINE ENABLE *RS

;THESE TWO NOP'S ADDED FOR SOME DELAY FOR PDP-11/44
;WITH CACHE MEMORY TURNED ON.
NOP ;KR 10-JULY-84 REV E
NOP ;KR 10-JULY-84 REV E

MUX16B: CLR BDHMCSR ;CLEAR CONTROL REGISTER
CLR R5 ;CLEAR EXPECTED RESULT
MOV BDHMLSR,R4 ;READ LINE STATUS
MOV B DHMCSR,R3 ;READ LINE NUMBER
BIC #177760,R3 ;CLEAR UNWANTED BITS
CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
BNE MUX16C ;EXPECT LINE ENABLE AND
MOV #LINENA*RS,RING,R5

MUX16C: CMP R4,R5 ;RING IS SET
BEQ MUX16D ;COMPARE EXPECTED AND
;RECEIVED RESULTS
ERRORL ;LINE STATUS ERROR
SCOPEF
MUX16D: CALL STEPER ;UPDATE LINE COUNTER
DEC R2 ;CONTINUE IF ALL CHECKS
BNE MUX16B ;ARE NOT DONE FOR THIS LINE
MOV #LINENA,R5 ;EXPECT LINE ENABLE
MUX16E: MOV R1,R3 ;ON SELECTED LINE
MOV R1,BDHMCSR ;SELECT LINE
BIC #RS,BDHMLSR ;CLEAR REQUEST TO SEND
INCB #0 ;DELAY FOR CABLE
BNE .-4 ;DITTO
MOV BDHMLSR,R4 ;READ LINE STATUS REGISTER
CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
BEQ MUX16F ;SET ON THIS LINE
ERRORL ;LINE STATUS ERROR
MUX16F: SCOPE ;CHECK FOR ITERATIONS, LOOP

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CZDHW-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 54  
 CZDHW.E.P11 11-JUL-84 08:45

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2200
2201
2202
2203
2204 007672
2205 007672 005077 005654
2206 007676 042737 000340 177776
2207 007704 013701 015640
2208 007710 012702 000020
2209 007714 010177 005632
2210 007720 012777 000011 005626
2211
2212
2213
2214 007726 000240
2215 007730 000240
2216
2217 007732 005077 005614
2218 007736 005005
2219 007740 017704 005610
2220 007744 117703 005602
2221 007750 042703 177760
2222 007754 020103
2223 007756 001002
2224 007760 012705 000031
2225
2226 007764 020405
2227 007766 001403
2228 007770 104001
2229 007772 104003
2230 007774 007776
2231 007776 004737 013344
2232 010002 005302
2233 010004 001354
2234 010006 012705 000001
2235 010012 010103
2236 010014 010177 005532
2237 010020 042777 000010 005526
2238 010026 105227 000000
2239 010032 001375
2240 010034 017704 005514
2241 010040 020504
2242 010042 001401
2243 010044 104001
2244 010046 104002

;VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
;AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.

T107:
MUX17: CLR BDMCSR ;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
BIC #340,PS ;ENABLE INTERRUPTS
MOV LINE,R1
MUX17A: MOV #16,R2 ;16 LINES
MOV R1,BDMCSR ;SELECT A LINE
MOV @LINEMA*SECTX,BDMPLSR ;SET LINE ENABLE *SECTX

;THESE TWO NOP'S ADDED FOR SOME DELAY FOR POP-11/44
;WITH CACHE MEMORY TURNED ON.
NOP ;KR 10-JULY-84 REV E
NOP ;KR 10-JULY-84 REV E

MUX17B: CLR BDMCSR ;CLEAR CONTROL REGISTER
CLR R5 ;CLEAR EXPECTED RESULT
MOV BDMPLSR,R4 ;READ LINE STATUS
MOVB BDMCSR,R3 ;READ LINE NUMBER
BIC #177760,R3 ;CLEAR UNWANTED BITS
CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
BNE MUX17C ;EXPECT LINE ENABLE AND
MOV @LINEMA*SECTX*SECRX,R5

MUX17C: CMP R4,R5 ;SECONDARY RECEIVE IS SET
BEQ MUX17D ;COMPARE EXPECTED AND
ERRORL MUX17D ;RECEIVED RESULTS
SCOPEF ;LINE STATUS ERROR
MUX17D

MUX17D: CALL STEPER ;UPDATE LINE COUNTER
DEC R2 ;CONTINUE IF ALL CHECKS
BNE MUX17B ;ARE NOT DONE FOR THIS LINE
MOV @LINEMA,R5 ;EXPECT LINE ENABLE
MUX17E: MOV R1,R3 ;ON SELECTED LINE
MOV R1,BDMCSR ;SELECT LINE
BIC #SECTX,BDMPLSR ;CLEAR SECONDARY TRANSMIT
INCB #0 ;DELAY FOR CABLE
BNE .-4 ;DITTO
MOV BDMPLSR,R4 ;READ LINE STATUS REGISTER
CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
BEQ MUX17F ;SET ON THIS LINE
ERRORL ;LINE STATUS ERROR
MUX17F: SCOPE ;CHECK FOR ITERATIONS, LOOP

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 55  
 CZDMKE.P11 11-JUL-84 08:45

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2245
2246
2247
2248
2249
2250
2251
2252
2253
2254
2255
2256
2257
2258 010050
2259 010050 000005
2260 010052 012737 000340 177776
2261 010060 104004
2262 010062 016167
2263 010064 022737 000176 015566
2264 010072 001001
2265 010074 104025
2266 010076 012737 010114 011704
2267 010104 012737 010112 002204
2268 010112 104017
2269
2270 010114 104020
2271
2272 010116 010126
2273 010120 010122
2274 010122 104012
2275 010124 000772
2276
2277
2278
2279
2280
2281
2282 010126 104021
2283
2284
2285
2286 010130 010146
2287
2288 010132 010136
2289
2290 010134 010142
2291
2292 010136 104014
2293 010140 000207
2294 010142 104014
2295 010144 000762

;MODEM CONTROL ON LINE TEST USING 103A TYPE MODEMS
;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
;USING THE MODEM CONTROL TO CONTROL 103A TYPE MODEMS

;NOTE: IF THE DM11-AA IS NOT CONNECTED TO THE
;DISTRIBUTION PANEL, AN M974 DM11 MAINTENANCE JUMPER
;SHOULD BE INSTALLED IN SLOT B1 OR B3 OF THE DISTRIBUTION
;PANEL TO PREVENT A POSSIBLE LONG SPACE
;DISCONNECT FROM HANGING UP THE MODEM

T200:
ST103A: RESET
MOV #340,PS
TYPE
MT103T
CMP #SMREG,SMR
BNE 11
CNTLUU
11: MOV #T103A,FATRET
MOV #ST103B,KRET
ST103B: GETLNS
T103A: SETUP
T103B
T103A1
T103A1: ERROR
BR ST103B

;REFERENCE DESIGNATION
;INITIALIZE INTERFACE
;DISABLE ALL INTERRUPTS
;TYPE "103A MODEM CONNECT-
;DISCONNECT TEST"

;SET UP FOR FATAL ERROR
;SET UP FOR LINE CHANGE
;INPUT ORIGINATE AND
;AND ANSWER LINE NUMBERS
;SET UP TO RECEIVE INTERRUPTS
;WAIT FOR RING
;GO HERE IF RING OK
;GO HERE IF NO RING
;NO RING WITHIN 5 MINUTES
;SELECT NEW LINES AND REDIAL

;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
;WILL BE REQUESTED TO RESELECT LINES AND REDIAL

T103B: CKRING
T103C
T103B1
T103B2
T103B1: ERROR
RTS PC
T103B2: ERROR
BR ST103B

;CHECK FOR RING INTERRUPT
;ONLY ON ANSWER LINE
;AND NO TRANSITIONS ON
;ORIGINATE LINE
;GO HERE IF TRANSITIONS
;ARE CORRECT
;GO HERE IF INCORRECT
;TRANSITION ON ANSWER LINE
;GO HERE IF INCORRECT TRANSITION
;ON ORIGINATE LINE
;TRANSITION ERROR ON ANSWER LINE
;CONTINUE CHECKING
;TRANSITION ERROR ON ORIGINATE LINE
;RESELECT LINES AND REDIAL

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CZDNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 56  
 CZDNKE.P11 11-JUL-84 08:45

2296									
2297									;SET TERMINAL READY ON SELECTED ANSWER LINE
2298									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2299									
2300	010146	013777	015644	005376	T103C:	MOV	LINANS, @DMCSR		;SET LINE COUNTER TO
2301									;ANSWER LINE NUMBER
2302	010154	052777	000002	005372		BIS	@TRMRDY, @DMPLSR		;SET TERMINAL READY ON
2303									;SELECTED ANSWER LINE
2304	010162	104026				CKINTT			
2305	010164	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2306									
2307									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2308									;SELECTED ORIGINATE AND ANSWER LINES
2309									
2310	010166	104023				CKTRAN			;CHECK TRANSITIONS AND
2311									;STATUS ON SELECTED
2312									;ANSWER AND ORIGINATE LINES
2313	010170	000143				CO*CS*LINENA*TRMRDY			;EXPECT CARRIER, CLEAR TO SEND,
2314									;LINE ENABLE AND TERMINAL
2315									;READY STATUS BITS SET ON
2316									;ANSWER LINE
2317	010172	000143				CO*CS*LINENA*TRMRDY			;EXPECT CARRIER, CLEAR TO SEND,
2318									;LINE ENABLE , AND TERMINAL
2319									;READY STATUS BITS ON
2320									;ORIGINATE LINE
2321	010174	100006				RINGF*XCO*XCS			;EXPECT CARRIER, CLEAR TO SEND
2322									;AND POSSIBLE RING TRANSITIONS
2323									;ON ANSWER LINE
2324	010176	000006				XCO*XCS			;EXPECT CARRIER AND CLEAR
2325									;TO SEND TRANSITIONS ON
2326									;ORIGINATE LINE
2327	010200	010212				T103D1			;GO HERE ON ANSWER LINE STATUS ERROR
2328									
2329	010202	010216				T103D2			;GO HERE ON ORIGINATE LINE STATUS ERROR
2330	010204	010222				T103D3			;GO HERE ON ANSWER LINE TRANSITION ERROR
2331	010206	010226				T103D4			;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2332	010210	010232				T103E			;GO TO NEXT TEST IF NO ERRORS
2333	010212	104015			T103D1:	ERRORS			;ANSWER LINE STATUS ERROR
2334	010214	000207				RTS	PC		;CONTINUE CHECKING
2335	010216	104015			T103D2:	ERRORS			;ORIGINATE LINE STATUS ERROR
2336	010220	000207				RTS	PC		;CONTINUE CHECKING
2337	010222	104014			T103D3:	ERRORT			;ANSWER LINE TRANSITION ERROR
2338	010224	000207				RTS	PC		;CONTINUE CHECKING
2339	010226	104014			T103D4:	ERRORT			;ORIGINATE LINE TRANSITION ERROR
2340	010230	000207				RTS	PC		;CONTINUE CHECKING

CZDHC-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 57  
 CZDHC.E.P11 11-JUL-84 08:45

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2351 010232 104004
2352 010234 016432
2353 010236 012737 000340 177776
2354 010244 012777 011726 005274
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2356 010252 012737 010272 015672
2357
2358 010260 012777 000140 005264
2359 010266 005037 177776
2360 010272 005077 005262
2361 010276 105777 005254
2362 010302 100375
2363 010304 005777 005250
2364 010310 012737 000340 177776
2365 010316 005077 005230
2366 010322 013777 015642 005222
2367 010330 042777 000002 005216
2368 010336 104026
2369 010340 104022

;SET UP TO TEST DISCONNECT SEQUENCE
;THE PROGRAM WILL REQUEST THE OPERATOR TO TYPE A CHARACTER
;TO INITIATE THE DISCONNECT SEQUENCE
;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
;DATA TO TALK MODE AS MANY TIMES AS DESIRED
;BEFORE THE SWITCH SEETIN IS MADE
;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
;REPORTED BY TYPEOUT

T103E: TYPE
MDISC
MOV @340,PS
MOV @TRNTYP,@DHMVEC ;SET UP
MOV @T103ES,RNGRET
MOV @SCNENA*INTENA,@DHMCSR
CLR PS
T103ES: CLR @TKDBR
1#: TSTB @TKCSR
BPL 1#
TST @TKDBR
MOV @340,PS
CLR @DHMCSR
MOV LINORG,@DHMCSR
BIC @TRMRDY,@DHMLSR
CKINTT
WAITRN

;TYPE "STRIKE ANY TTY KEY
;TEST DISCONNECT"
;LOCK OUT INTERRUPTS
;SET UP TO DETECT TRANSITIONS
;BEFORE DISCONNECT SEQUENCE STARTS
;SET UP DUMMY RETURN FOR
;RING INTERRUPT
;SET SCAN ENABLE AND INTERRUPT ENABLE
;ALLOW INTERRUPTS

;WAIT FOR TTY TO HIT

;START DISCONNECT SEQUENCE
;CLEAR CONTROL REGISTER
;SET LINE COUNTER TO SELECTED ORIGINATE LINE
;SET TERMINAL READY ON SELECTED LINE

;WAIT FOR TRANSITIONS TO OCCUR

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 59  
 CZDMKE.P11 11-JUL-84 08:45

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2410
2411 ;MODEM CONTROL ON LINE TEST USING 202C TYPE MODEMS
2412 ;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
2413 ;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
2414 ;USING THE MODEM CONTROL TO CONTROL 202C TYPE MODEMS
2415
2416 ;ALSO TESTED ARE LINE TURN-AROUND AND
2417 ;SECONDARY TRANSMIT-SECONDARY RECEIVE
2418
2419 010424 T300: ;REFERENCE DESIGNATION
2420 010424 000005 ST202A: RESET ;INITIALIZE INTERFACE
2421 010426 012737 000340 177776 MOV #340,PS ;DISABLE ALL INTERRUPTS
2422 010434 104004 TYPE ;TYPE "202C MODEM CONNECT-
2423 010436 016240 MT202T ;DISCONNECT TEST"
2424 010440 022737 000176 015566 CMP #SWREG,SWR
2425 010446 001001 RNE 14
2426 010450 104025 CNTLUU
2427 010452 012737 010470 011704 14: MOV #T202A,FATREY ;SET UP FOR FATAL ERROR
2428 010460 012737 010466 002204 MOV #ST202B,KRET ;SET UP FOR LINE CHANGE
2429 010466 104017 ST202B: GETLNS ;INPUT ORIGINATE AND
2430 ;ANSWER LINE NUMBERS
2431 010470 104020 T202A: SETUP ;SET UP TO RECEIVE INTERRUPTS
2432 ;WAIT FOR RING
2433 010472 010502 T202B ;GO HERE IF RING OK
2434 010474 010476 T202A1 ;GO HERE IF NO RING
2435 010476 104012 T202A1: ERROR ;NO RING WITHIN 5 MINUTES
2436 010500 000772 BR ST202B ;SELECT NEW LINES AND REDIAL
2437
2438 ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2439 ;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
2440 ;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
2441 ;WILL BE REQUESTED TO RESELECT LINES AND REDIAL
2442
2443 010502 104021 T202B: CKRING ;CHECK FOR RING INTERRUPT
2444 ;ONLY ON ANSWER LINE
2445 ;AND NO TRANSITIONS ON
2446 ;ORIGINATE LINE
2447 010504 010522 T202C ;GO HERE IF TRANSITIONS
2448 ;ARE CORRECT
2449 010506 010512 T202B1 ;GO HERE IF INCORRECT
2450 ;TRANSITION ON ANSWER LINE
2451 010510 010516 T202B2 ;GO HERE IF INCORRECT
2452 ;TRANSITION ON ORIGINATE LINE
2453 010512 104014 T202B1: ERROR ;ANSWER LINE TRANSITION ERROR
2454 010514 000207 RTS PC ;CONTINUE CHECKING
2455 010516 104014 T202B2: ERROR ;ORIGINATE LINE TRANSITION ERROR
2456 010520 000762 BR ST202B ;RESELECT LINES AND REDIAL

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 60  
 CZDMKE.P11 11-JUL-84 08:45

2457									
2458									
2459									
2460									
2461									
2462	010522	013777	015644	005022	T202C:	MOV	LINANS, BDHMCSR		;SET LINE COUNTER TO ANSWER LINE
2463	010530	052777	000002	005016		BIS	@TRMRDY, BDHMPLSR		;SET TERMINAL READY ON ANSWER LINE
2464	010536	013777	015642	005006	T202D:	MOV	LINORG, BDHMCSR		;SET LINE COUNTER TO ORIGINATE LINE
2465	010544	052777	000004	005002		BIS	@RS, BDHMPLSR		;SET REQUEST TO SEND ON ORIGINATE LINE
2466	010552	104026				CKINTT			
2467	010554	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2468									
2469									
2470									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2471									;SELECTED ORIGINATE AND ANSWER LINES
2472	010556	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2473									;ON SELECTED ANSWER AND
2474									;ORIGINATE LINES
2475	010560	000103				CO+LINENA+TRMRDY			;EXPECT CARRIER, LINE ENABLE
2476									;AND TERMINAL READY STATUS
2477									;BITS SET ON ANSWER LINE
2478	010562	000147				RS+CO+CS+LINENA+TRMRDY			;EXPECT REQUEST TO SEND, CLEAR
2479									;TO SEND, CARRIER, LINE ENABLE
2480									;AND TERMINAL READY STATUS BITS
2481									;SET ON ORIGINATE LINE
2482	010564	100004				RINGF+XCO			;EXPECT CARRIER AND POSSIBLE
2483									;RING TRANSITIONS ON
2484									;ANSWER LINE
2485	010566	000006				XCO+XCS			;EXPECT CARRIER AND CLEAR
2486									;TO SEND TRANSITIONS ON
2487									;ORIGINATE LINE
2488	010570	010602				T202D1			;GO HERE ON ANSWER LINE STATUS ERROR
2489	010572	010606				T202D2			;GO HERE ON ORIGINATE LINE STATUS ERROR
2490	010574	010612				T202D3			;GO HERE ON ANSWER LINE STATUS ERROR
2491	010576	010616				T202D4			;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2492	010600	010622				T202E			;GO TO NEXT TEST IF NO ERRORS
2493	010602	104015				T202D1: ERRORS			;ANSWER LINE STATUS ERROR
2494	010604	000207				RTS	PC		;CONTINUE CHECKING
2495	010606	104015				T202D2: ERRORS			;ORIGINATE LINE STATUS ERROR
2496	010610	000207				RTS	PC		;CONTINUE CHECKING
2497	010612	104014				T202D3: ERROR			;ANSWER LINE TRANSITION ERROR
2498	010614	000207				RTS	PC		;CONTINUE CHECKING
2499	010616	104014				T202D4: ERROR			;ORIGINATE LINE TRANSITION ERROR
2500	010620	000207				RTS	PC		;CONTINUE CHECKING

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2501
2502           ;SET SECONDARY TRANSMIT ON ANSWER LINE
2503           ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2504
2505 010622 013777 015644 004722 T202E: MOV     LINANS,BDMCSR           ;SET LINE COUNTER TO ANSWER LINE
2506 010630 052777 000010 004716  BIS     @SECTX,BDMPLSR        ;SET SECONDARY RECEIVE ON ANSWER LINE
2507 010636 104026                                CKINTT
2508 010640 104022                                WAITRN           ;WAIT FOR TRANSITIONS TO OCCUR
2509
2510           ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2511           ;SELECTED ORIGINATE AND ANSWER LINES
2512
2513 010642 104023                                CKTRAN           ;CHECK TRANSITIONS AND STATUS
2514                                     ;ON SELECTED ANSWER AND
2515                                     ;ORIGINATE LINES
2516 010644 000133                                SECTX+CO+LINENA+TRMRDY+SECRX ;EXPECT SECONDARY TRANSMIT
2517                                     ;SECONDARY RECEIVE, CARRIER
2518                                     ;LINE ENABLE AND TERMINAL READY
2519                                     ;STATUS BITS SET ON ANSWER LINE
2520 010646 000167                                SECRX+RS+CO+CS+LINENA+TRMRDY ;EXPECT SECONDARY RECEIVE,
2521                                     ;REQUEST TO SEND, CLEAR TO SEND
2522                                     ;CARRIER, LINE ENABLE AND
2523                                     ;TERMINAL READY STATUS BITS
2524                                     ;SET ON ORIGINATE LINE
2525 010650 000001                                XSCRX           ;EXPECT SECONDARY RECEIVE
2526                                     ;TRANSITION ON ANSWER LINE
2527 010652 000001                                XSCRX           ;EXPECT SECONDARY RECEIVE
2528                                     ;TRANSITION ON ORIGINATE LINE
2529 010654 010666                                T202E1          ;GO HERE ON ANSWER LINE STATUS ERROR
2530 010656 010672                                T202E2          ;GO HERE ON ORIGINATE LINE STATUS ERROR
2531 010660 010676                                T202E3          ;GO HERE ON ANSWER LINE TRANSITION ERROR
2532 010662 010702                                T202E4          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2533 010664 010706                                T202F           ;GO TO NEXT TEST IF NO ERRORS
2534 010666 104015                                T202E1: ERRORS ;ANSWER LINE STATUS ERROR
2535 010670 000207                                RTS             ;CONTINUE CHECKING
2536 010672 104015                                T202E2: ERRORS ;ORIGINATE LINE STATUS ERROR
2537 010674 000207                                RTS             ;CONTINUE CHECKING
2538 010676 104014                                T202E3: ERRORT ;ANSWER LINE TRANSITION ERROR
2539 010700 000207                                RTS             ;CONTINUE CHECKING
2540 010702 104014                                T202E4: ERRORT ;ORIGINATE LINE TRANSITION ERROR
2541 010704 000207                                RTS             ;CONTINUE CHECKING
    
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CZDNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 62  
 CZDNKE.P11 11-JUL-84 08:45

2542								
2543								;DROP REQUEST TO SEND ON ORIGINATE LINE
2544								;DROP SECONDARY TRANSMIT ON ANSWER LINE
2545								;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2546								
2547	010706	013777	015642	004636	T202F:	MOV	LINORG, BDHMCSR	;SET LINE COUNTER TO ORIGINATE LINE
2548	010714	042777	000004	004632		BIC	#RS, BDHMLSR	;DROP REQUEST TO SEND
2549	010722	013777	015644	004622		MOV	LINANS, BDHMCSR	;SET LINE COUNTER TO ANSWER LINE
2550	010730	042777	000010	004616		BIC	#SECTX, BDHMLSR	;DROP SECONDARY RECEIVE
2551	010736	104026				CKINTT		
2552	010740	104022				WAITRN		;WAIT FOR TRANSITIONS TO OCCUR
2553								
2554								;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2555								;SELECTED ORIGINATE AND ANSWER LINES
2556								
2557	010742	104023				CKTRAN		;CHECK TRANSITIONS AND STATUS
2558								;ON SELECTED ANSWER AND
2559								;ORIGINATE LINES
2560	010744	000003				LINENA+TRMRDY		;EXPECT LINE ENABLE AND
2561								;TERMINAL READY STATUS BITS
2562								;SET ON ANSWER LINE
2563	010746	000003				LINENA+TRMRDY		;EXPECT LINE ENABLE AND
2564								;TERMINAL READY STATUS BITS
2565								;SET ON ORIGINATE LINE
2566	010750	000005				XCO+XSCRX		;EXPECT CARRIER AND SECONDARY
2567								;RECEIVE TRANSITIONS ON
2568								;ANSWER LINE
2569	010752	000007				XCO+XCS+XSCRX		;EXPECT CARRIER, CLEAR TO SEND
2570								;AND SECONDARY RECEIVE
2571								;TRANSITIONS ON ORIGINATE LINE
2572	010754	010766				T202F2		;GO HERE ON ANSWER LINE STATUS ERROR
2573	010756	010772				T202F3		;GO HERE ON ORIGINATE LINE STATUS ERROR
2574	010760	010776				T202F4		;GO HERE ON ANSWER LINE TRANSITION ERROR
2575	010762	011002				T202F5		;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2576	010764	011006				T202G		;GO TO NEXT TEST IF NO ERRORS
2577	010766	104015				T202F2: ERRORS		;ANSWER LINE STATUS ERROR
2578	010770	000207				RTS	PC	;CONTINUE CHECKING
2579	010772	104015				T202F3: ERRORS		;ORIGINATE LINE STATUS ERROR
2580	010774	000207				RTS	PC	;CONTINUE CHECKING
2581	010776	104014				T202F4: ERROR		;ANSWER LINE TRANSITION ERROR
2582	011000	000207				RTS	PC	;CONTINUE CHECKING
2583	011002	104014				T202F5: ERROR		;ORIGINATE LINE TRANSITION ERROR
2584	011004	000207				RTS	PC	;CONTINUE CHECKING

CZDHE-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 63  
 CZDHE.P11 11-JUL-84 08:45

2585								
2586								
2587								;SET REQUEST TO SEND ON ANSWER LINE
2588								;WAIT FOR TRANSITIONS ON SELECTED LINES
2589								
2590	011006	013777	015644	004536	T202G:	MOV	LINANS,BDHPCSR	;SET LINE COUNTER TO ANSWER LINE
2591	011014	052777	000004	004532		BIS	ORS,BDHPLSR	;SET REQUEST TO SEND
2592	011022	104026				CKINTT		
2593	011024	104022				WAITRN		;WAIT FOR TRANSITIONS TO OCCUR
2594								
2595								;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2596								;SELECTED ORIGINATE AND ANSWER LINES
2597								
2598	011026	104023				CKTRAN		;CHECK TRANSITIONS AND STATUS
2599								;ON SELECTED ANSWER AND
2600								;ORIGINATE LINES
2601	011030	000147				RS*CO*CS*LINENA*TRMRDY		;EXPECT LINE ENABLE, TERMINAL
2602								;READY, REQUEST TO SEND, CLEAR
2603								;TO SEND, AND CARRIER
2604								;STATUS BITS SET ON ANSWER LINE
2605	011032	000103				CO*LINENA*TRMRDY		;EXPECT LINE ENABLE, TERMINAL
2606								;READY AND CARRIER STATUS
2607								;BITS SET ON ORIGINATE LINE
2608	011034	000006				XCO*XCS		;EXPECT CARRIER AND CLEAR
2609								;TO SEND TRANSITIONS ON
2610								;ANSWER LINE
2611	011036	000004				XCO		;EXPECT CARRIER TRANSITION
2612								;ON ORIGINATE LINE
2613	011040	011052				T202G1		;GO HERE ON ANSWER LINE STATUS ERROR
2614	011042	011056				T202G2		;GO HERE ON ORIGINATE LINE STATUS ERROR
2615	011044	011062				T202G3		;GO HERE ON ANSWER LINE TRANSITION ERROR
2616	011046	011066				T202G4		;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2617	011050	011072				T202H		;GO TO NEXT TEST IF NO ERRORS
2618	011052	104015			T202G1:	ERRORS		;ANSWER LINE STATUS ERROR
2619	011054	000207				RTS	PC	;CONTINUE TESTING
2620	011056	104015			T202G2:	ERRORS		;ORIGINATE LINE STATUS ERROR
2621	011060	000207				RTS	PC	;CONTINUE TESTING
2622	011062	104014			T202G3:	ERRORT		;ANSWER LINE TRANSITION ERROR
2623	011064	000207				RTS	PC	;CONTINUE TESTING
2624	011066	104014			T202G4:	ERRORT		;ORIGINATE LINE TRANSITION ERROR
2625	011070	000207				RTS	PC	;CONTINUE TESTING

CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 64  
 CZDHK.E.P11 11-JUL-84 08:45

2626									
2627									;SET SECONDARY TRANSMIT ON ORIGINATE LINE
2628									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2629									
2630	011072	013777	015642	004452	T202H:	MOV	LINORG,BDMCSR		;SET LINE COUNTER TO ORIGINATE LINE
2631	011100	052777	000010	004446		BIS	#SECTX,BDMPLSR		;SET SECONDARY TRANSMIT
2632	011106	104026				CKINTT			
2633	011110	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2634									
2635									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2636									;SELECTED ORIGINATE AND ANSWER LINES
2637									
2638	011112	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2639									;ON SELECTED ANSWER AND
2640									;ORIGINATE LINES
2641	011114	000167				RS*CS*CO*LINENA*TRMRDY*SECRX			;EXPECT LINE ENABLE, TERMINAL
2642									;READY, REQUEST TO SEND, CLEAR
2643									;TO SEND, CARRIER AND SECONDARY
2644									;RECEIVE STATUS BITS SET
2645									;ON ANSWER LINE
2646	011116	000133				SECTX*CO*LINENA*TRMRDY*SECRX			;EXPECT LINE ENABLE, TERMINAL
2647									;READY, CARRIER, SECONDARY
2648									;TRANSMIT AND SECONDARY
2649									;RECEIVE STATUS BITS SET
2650									;ON ORIGINATE LINE
2651	011120	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2652									;TRANSITION ON ANSWER LINE
2653	011122	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2654									;TRANSITION ON ORIGINATE LINE
2655	011124	011136				T202H2			;GO HERE ON ANSWER LINE STATUS ERROR
2656	011126	011142				T202H3			;GO HERE ON ORIGINATE LINE STATUS ERROR
2657	011130	011146				T202H4			;GO HERE ON ANSWER LINE TRANSITION ERROR
2658	011132	011152				T202H5			;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2659	011134	011156				T202I			;GO TO NEXT TEST IF NO ERRORS
2660	011136	104015			T202H2:	ERRORS			;ANSWER LIN STATUS ERROR
2661	011140	000207				RTS	PC		;CONTINUE CHECKING
2662	011142	104015			T202H3:	ERRORS			;ORIGINATE LINE STATUS ERROR
2663	011144	000207				RTS	PC		;CONTINUE CHECKING
2664	011146	104014			T202H4:	ERRORT			;ANSWER LINE TRANSITION ERROR
2665	011150	000207				RTS	PC		;CONTINUE CHECKING
2666	011152	104014			T202H5:	ERRORT			;ORIGINATE LINE TRANSITION ERROR
2667	011154	000207				RTS	PC		;CONTINUE CHECKING

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 65  
 CZDMKE.P11 11-JUL-84 08:45

2668									
2669									;DROP REQUEST TO SEND ON ANSWER LINE
2670									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2671									
2672	011156	013777	015644	004366	T202I:	MOV	LINANS, @DHMCSR		;SET LINE COUNTER TO ANSWER LINE
2673	011164	042777	000004	004362		BIC	@RS, @DHPLSR		;CLEAR REQUEST TO SEND
2674	011172	013777	015642	004352		MOV	LINORG, @DHMCSR		;SET LINE COUNTER TO ORIGINATE LINE
2675	011200	042777	000010	004346		BIC	@SECTX, @DHPLSR		;CLEAR SECONDARY TRANSMIT
2676	011206	104026				CKINTT			
2677	011210	104022				WAITRN			;WAIT FRO TRANSITIONS TO OCCUR
2678									
2679									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2680									;SELECTED ORIGINATE AND ANSWER LINES
2681									
2682	011212	104023				CKTRAN			;CHECK TRANSITION S AND STATUS
2683									;ON SELECTED ANSWE AND
2684									;ORIGINATE LINES
2685	011214	000003				LINENA+TRMRDY			;EXPECT LINE ENABLE AND
2686									;TERMINAL READY STATUS BITS SET
2687									;ON ANSWER LINE
2688	011216	000003				LINENA+TRMRDY			;EXPECT LINE ENABLE AND
2689									;TERMINAL READY STATUS BITS
2690									;SET ON ORIGINATE LINE
2691	011220	000007				XCO+XCS+XSCRX			;EXPECT CARRIER, CLEAR TO SEND
2692									;AND SECONDARY RECEIVE TRANSITIONS
2693									;ON ANSWER LINE
2694	011222	000005				XCO+XSCRX			;EXPECT CARRIER AND SECONDARY
2695									;RECEIVE TRANSITIONS ON
2696									;ORIGINATE LINE
2697	011224	011236				T202I2			;GO HERE ON ANSWER LINE STATUS ERROR
2698	011226	011242				T202I3			;GO HERE ON ORIGINATE LINE STATUS ERROR
2699	011230	011246				T202I4			;GO HERE ON ANSWER LINE TRANSITIN ERROR
2700	011232	011252				T202I5			;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2701	011234	011256				T202J			;GO TO NEXT TEST IF NO ERRORS
2702	011236	104015			T202I2:	ERRORS			;ANSWER LINE STATUS ERROR
2703	011240	000207				RTS	PC		;CONTINUE CHECKING
2704	011242	104015			T202I3:	ERRORS			;ORIGINATE LINE STATUS ERROR
2705	011244	000207				RTS	PC		;CONTINUE CHECKING
2706	011246	104014			T202I4:	ERRORT			;ANSWE LINE TRANSITION ERROR
2707	011250	000207				RTS	PC		;CONTINUE CHECKING
2708	011252	104014			T202I5:	ERRORT			;ORIGINATE LINE TRANSITION ERROR
2709	011254	000207				RTS	PC		;CONTINUE CHECKING

CZDHW-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 66  
 CZDHW.E.P11 11-JUL-84 08:45

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2720 011256 104004
2721 011260 016432
2722 011262 012737 000340 177776
2723 011270 012777 011726 004250
2724 011276 012737 011316 015672
2725
2726 011304 012777 000140 004240
2727
2728 011312 005037 177776
2729 011316 005077 004236
2730 011322 105777 004230
2731 011326 100375
2732 011330 005777 004224
2733
2734
2735
2736 011334 012737 000340 177776
2737 011342 005077 004204
2738 011346 013777 015642 004176
2739 011354 042777 000002 004172
2740 011362 104024
2741 011364 104026
2742 011366 104022

;SET UP TO TEST DISCONNECT SEQUENCE
;THE PROGRAM WILL REQUEST THE OPERATOR TO TYPE A CHARACTER
;TO INITIATE THE DISCONNECT SEQUENCE
;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
;DATA TO TALK MODE AS MANY TIMES AS DESIRED
;BEFORE THE SWITCH SEETIN IS MADE
;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
;REPORTED BY TYPEOUT

T202J: TYPE
MDISC
MOV #340,PS
MOV @TRNTYP,@DMHVEC
MOV @T202JS,RNGRET
MOV @SCNENA*INTENA,@DMHCSR

;TYPE "STRIKE ANY TTY KEY
;TEST DISCONNECT"
;LOCK OUT INTERRUPTS
;SET UP TO DETECT TRANSITIONS
;SET UP DUMMY RETURN FOR RING
;FROM RING INTERRUPT
;ENABLE LINE SCANNER
;START SCANNER
;ENABLE INTERRUPTS

T202JS: CLR PS
10: CLR @TKDBR
TSTB @TKCSR
BPL 10
TST @TKDBR

;DISCONNECT SEQUENCE REQUESTED

MOV #340,PS
CLR @DMHCSR
MOV LINORG,@DMHCSR
BIC @TRMRDY,@DMPLSR
WAITS
CKINTT
WAITRN

;LOCK OUT INTERRUPTS
;STOP SCANNER
;SET LINE COUNTER TO SELECTED ORIGINATE LINE
;SET TERMINAL READY ON SELECTED LINE
;DELAY

;WAIT FOR TRANSITIONS TO OCCUR
    
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CZDNR-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 68  
 CZDNR.E.P11 11-JUL-84 08:45

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2789
2790
2791 011446 017704 004100      TRANS:  MOV      BDHMCSR,R4      ;GET LINE NUMBER AND
2792                                     ;INTERRUPT FLAGS
2793 011452 010405               MOV      R4,R5
2794 011454 042705 177760       BIC      @177760,R5      ;EXTRACT LINE NUMBER
2795 011460 023705 015642       CMP      LINORG,R5      ;DID ORIGINATE LINE INTERRUPT
2796 011464 001411               BEQ      ORGTR           ;IF YES, SERVICE
2797 011466 023705 015644       CMP      LINANS,R5      ;DID ANSWER LINE INTERRUPT
2798 011472 001443               BEQ      ANSTR          ;IF YES, SERVICE
2799 011474 010577 004052       MOV      R5,BDHMCSR
2800 011500 017703 004050       MOV      BDHPLSR,R3
2801 011504 104016               ERRORN
2802 011506 000471               BR       FATEX          ;INTERRUPT ON INCORRECT LINE
2803
2804
2805
2806 011510 032704 100000       ORGTR:  BIT      @RINGF,R4      ;IF RING CAUSED INTERRUPT,
2807 011514 001403               BEQ      ORGTR1         ;SET RING TRANSITION BIT
2808 011516 052737 000010 015650  ORGTR1: BIT      @COF,R4      ;IF CARRIER CAUSED INTERRUPT
2809 011524 032704 040000       BEQ      ORGTR2         ;SET CARRIER TRANSITION BIT
2810 011530 001403               BIS      @4,ORGFLG
2811 011532 052737 000004 015650  ORGTR2: BIT      @CSF,R4      ;IF CLEAR TO SEND
2812 011540 032704 020000       BEQ      ORGTR3         ;CAUSED INTERRUPT
2813
2814 011544 001403               BEQ      ORGTR3         ;SET CLEAR TO SEND
2815
2816 011546 052737 000002 015650  ORGTR3: BIT      @SECRXF,R4     ;TRANSITION BIT
2817 011554 032704 010000       BEQ      ORGTR4         ;IF SECONDARY RECEIVE
2818
2819 011560 001403               BIS      @2,ORGFLG     ;CAUSED INTERRUPT
2820 011562 052737 000001 015650  ORGTR4: BIT      @RINGF+COF+CSF+SECRXF,R4 ;SET SECONDARY RECEIVE
2821 011570 032704 170000       BEQ      ORGTR4         ;TRANSITION BIT
2822
2823 011574 001044               BNE      TRANEX        ;IF NO INTERRUPT FLAGS SET
2824 011576 104016               ORGTRR: ERRORN        ;EXIT TRANSITION DETECTION
2825 011600 000434               BR       FATEX

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CZDNR-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 69  
 CZDNRKE.P11 11-JUL-84 08:45

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2826
2827                                ;RECORD TRANSITIONS FOR ANSWER LINE
2828
2829 011602 032704 100000          ANSTR: BIT    #RINGF,R4          ;IF RING CAUSED INTERRUPT,
2830 011606 001403                    BEQ    ANSTR1          ;SET RING TRANSITION BIT
2831 011610 052737 000010 015646    BIS    #10,ANSFLG
2832 011616 032704 040000          ANSTR1: BIT    #COF,R4          ;IF CARRIER CAUSED INTERRUPT
2833 011622 001403                    BEQ    ANSTR2          ;SET CARRIER TRANSITION BIT
2834 011624 052737 000004 015646    BIS    #4,ANSFLG
2835 011632 032704 020000          ANSTR2: BIT    #CSF,R4          ;IF CLEAR TO SEND
2836                                ;CAUSED INTERRUPT
2837 011636 001403                    BEQ    ANSTR3          ;SET CLEAR TO SEND
2838                                ;TRANSITION BIT
2839 011640 052737 000002 015646    BIS    #2,ANSFLG
2840 011646 032704 010000          ANSTR3: BIT    #SECRXF,R4       ;IF SECONDARY RECEIVE
2841                                ;CAUSED INTERRUPT
2842 011652 001403                    BEQ    ANSTR4          ;SET SECONDARY RECEIVE
2843 011654 052737 000001 015646    BIS    #1,ANSFLG          ;TRANSITION BIT
2844 011662 032704 170000          ANSTR4: BIT    #RINGF+COF+CSF+SECRXF,R4
2845                                ;IF NO INTERRUPT FLAGS SET
2846 011666 001007                    BNE    TRANEX          ;EXIT TRANSITION DETECTION
2847 011670 104016                    ANSTRR: ERRORN
2848 011672 005037 015600          FATEX: CLR    TSTNO
2849 011676 022626                    POP2SP
2850 011700 000177 000000          JMP    BFATRET
2851 011704 000000          FATRET: 0
2852
2853                                ;EXIT TRANSITION DETECTION
2854
2855 011706 005704                    TRANEX: TST    R4          ;IF RING FLAG WAS SET
2856 011710 100002                    BPL    .+6             ;SET UP SPECIAL RETURN
2857 011712 013716 015672          MOV    RINGRET,(SP)
2858 011716 012777 000140 003626    TRANX1: MOV    #SCNENA+INTENA,BDMCSR ;RESTART SCANNER
2859 011724 000002                    RTI
2860
2861                                ;TYPE TRANSITION DATA AND RETURN
2862
2863 011726 017737 003620 012712    TRNTYP: MOV    BDMCSR,DATA1
2864 011734 017737 003614 012714    MOV    BDMPLSR,DATA2
2865 011742 104004                    TYPE
2866 011744 017054                    MTRNDET
2867 011746 104006                    OCTASC
2868 011750 011754                    TRNTAB
2869 011752 000761                    BR     TRANX1
2870 011754 000002          TRNTAB: 2
2871 011756 000006                    6
2872 011760 012712                    DATA1
2873 011762 000003                    3
2874 011764 012714                    DATA2

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 70  
 CZDMKE.P11 11-JUL-84 08:45

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2875
2876                ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
2877
2878 011766 000005      GETLIN: RESET
2879 011770 104013      INSTRG                ;TYPE "ORIGINATE LINE-"
2880 011772 016311      MSELOR                ;AND GET LINE NUMBER
2881 011774 000000      0
2882 011776 000017      17
2883 012000 015642      LINORG
2884 012002 104013      INSTRG                ;TYPE "ANSWER LINE-"
2885 012004 016335      MSELANS                ;AND GET LINE NUMBER
2886 012006 000000      0
2887 012010 000017      17
2888 012012 015644      LINANS
2889 012014 104004      TYPE
2890 012016 016745      MCRLF
2891 012020 000002      RTI                ;RETURN TO CALLING ROUTINE
2892
2893                ;INITIALIZE INTERFACE
2894
2895 012022 000005      SETUPS: RESET
2896 012024 012737 000340 177776      MOV #340,PS                ;LOCK OUT ALL INTERRUPTS
2897 012032 011605      MOV (SP),R5
2898 012034 012537 012722      MOV (R5),,NXTTS
2899 012040 012537 012702      MOV (R5),,ERR1
2900 012044 010516      MOV R5,(SP)
2901 012046 012777 006000 003476      MOV #CLRSCN+CLRMUX, BDHMCSR ;CLEAR LINE SCANNER AND MULTIPLEXER
2902 012054 032777 000020 003470      SETUP1: BIT #BUSY, BDHMCSR ;WAIT FOR SCANNER TO CLEAR
2903 012062 001374      BNE SETUP1
2904 012064 005037 015572      CLR ERRFLG
2905
2906                ;ENABLE SELECTED LINES
2907                ;SET TERMINAL READY ON SELECTED ORIGINATE LINE
2908
2909 012070 013777 015642 003454      SETUP2: MOV LINORG, BDHMCSR ;SET UP TO ENABLE ORIGINATE LINE
2910                ;ORIGINATE LINE NUMBER
2911 012076 012777 000003 003450      MOV #LINENA+TRMRDY, BDHMLSR ;SET LINE ENABLE AND
2912                ;TERMINAL READY ON ORIGINATE LINE
2913 012104 013777 015644 003440      MOV LINANS, BDHMCSR ;SET LINE COUNTER TO ANSWER LINE
2914 012112 012777 000001 003434      MOV #LINENA, BDHMLSR ;SET LINE ENABLE ON ANSWER LINE
2915
2916                ;REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
2917                ;SET UP TO RECEIVE INTERRUPTS
2918                ;START LINE SCANNER
2919
2920 012120 012777 011446 003420      MOV #TRANS, BDHMVEC ;SET UP INTERRUPT VECTOR
2921                ;FOR TRANSITION DETECTION
2922 012126 012777 000340 003414      MOV #340, BDHMLVL ;SET UP INTERRUPT SERVICE LEVEL
2923 012134 012777 000140 003410      MOV #SCNENA+INTENA, BDHMCSR ;START SCANNER, ENABLE INTERRUPTS
2924 012142 005037 015646      CLR ANSFLG ;CLEAR TRANSITION DETECTED FLAGS
2925 012146 005037 015650      CLR ORGFLG
2926 012152 012737 012202 015672      MOV #SETUP4, RINGRET ;SET UP RETURN FROM
2927                ;DETECTION OF RING INTERRUPT
2928 012160 104004      TYPE ;REQUEST OPERATOR TO DIAL
2929 012162 016131      DIALM
2930 012164 005037 177776      CLR PS ;CLEAR PROCESSOR STATUS WORD

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CZDNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 71  
 CZDNKE.P11 11-JUL-84 08:45

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2931 012170 005037 015652          CLR      TIME1          ;CLEAR TIMER
2932 012174 012737 001000 015654  MOV      #1000,TIME2    ;SET UP FOR 5 MINUTE DELAY
2933 012202 005737 015646          SETUP4: TST      ANSFLG    ;IF TRANSITION HAS OCCURED,
2934 012206 001014                   BNE      SETUPB        ;EXIT WAIT LOOP
2935 012210 005737 015650          TST      ORGFLG
2936 012214 001011                   BNE      SETUPB
2937 012216 005237 015652          INC      TIME1          ;ALLOW OPERATOR 5 MINUTES TO DIAL
2938 012222 001367                   BNE      SETUP4
2939 012224 005337 015654          DEC      TIME2
2940 012230 001364                   BNE      SETUP4
2941 012232 022626                   POP2SP
2942 012234 000177 000442          JMP      @BERR1
2943 012240 022626                   SETUPB: POP2SP
2944 012242 000177 000454          JMP      @BNXTTS
2945 012246 012766 000340 000002  MOV      #340,*(SP)
2946 012254 000002                   RTI
2947
2948                                     ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2949
2950 012256 011605                   CKRNG:  MOV      (SP),R5
2951 012260 012537 012722          MOV      (R5)+,NXTTS
2952 012264 012537 012702          MOV      (R5)+,ERR1
2953 012270 012537 012704          MOV      (R5)+,ERR2
2954 012274 010516                   MOV      R5,(SP)
2955 012276 012705 000010          MOV      #10,R5        ;EXPECT RING ONLY ON ANSWER LINE
2956 012302 013704 015646          MOV      ANSFLG,R4     ;GET ACTUAL TRANSITION DATA
2957 012306 013703 015644          MOV      LINANS,R3     ;SET UP LINE NUMBER
2958 012312 020504                   CMP      R5,R4         ;DID RING CAUSE INTERRUPT
2959 012314 001402                   BEQ      CKRNG1        ;ON ANSWER LINE
2960 012316 004777 000360          JSR      PC,@BERR1
2961 012322 005005                   CKRNG1: CLR      R5
2962 012324 013704 015650          MOV      ORGFLG,R4
2963 012330 013703 015642          MOV      LINORG,R3
2964 012334 005704                   TST      R4            ;IF TRANSITION OCCURED
2965 012336 001403                   BEQ      CKRNG2        ;ON ORIGINATE LINE, ERROR
2966 012340 022626                   POP2SP
2967 012342 000177 000336          JMP      @BERR2
2968 012346 022626                   CKRNG2: POP2SP
2969 012350 000177 000346          JMP      @BNXTTS

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CZDHW-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 72  
 CZDHWKE.P11 11-JUL-84 08:45

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2970
2971 012354 005037 015646      WAITR: CLR      ANSFLG
2972 012360 005037 015650      CLR      ORGFLG
2973 012364 012777 011446 003154  MOV      @TRANS, @DHMVEC
2974 012372 012737 012412 015672  MOV      @WAITRR, RRGRET      ;SET UP FOR RETURN
2975                                     ;FROM RING DETECTION
2976 012400 012777 000140 003144  MOV      @SCNENA+INTENA, @DHMCSR ;START SCANNER
2977 012406 005037 177776      CLR      PS
2978 012412 005037 015652      WAITRR: CLR      TIME1
2979 012416 012737 000025 015654  MOV      @25, TIME2
2980 012424 005237 015652      WAITR1: INC     TIME1      ;WAIT FOR TRANSITIONS OF
2981 012430 001375                                     BNE     WAITR1      ;CARRIER AND CLEAR TO SEND
2982 012432 005337 015654      DEC     TIME2
2983 012436 001372                                     BNE     WAITR1
2984 012440 000002      RTI
2985
2986                                     ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2987                                     ;SELECTED ORIGINATE AND ANSWER LINES
2988
2989 012442 012737 000340 177776  CKTRN: MOV      @340, PS      ;LOCK OUT FURTHER INTERRUPTS
2990 012450 005077 003076      CLR      @DHMCSR      ;STOP LINE SCANNER
2991 012454 011605      MOV      (SP), R5
2992 012456 012537 012712      MOV      (R5)+, DATA1
2993 012462 012537 012714      MOV      (R5)+, DATA2
2994 012466 012537 012716      MOV      (R5)+, DATA3
2995 012472 012537 012720      MOV      (R5)+, DATA4
2996 012476 012537 012702      MOV      (R5)+, ERR1
2997 012502 012537 012704      MOV      (R5)+, ERR2
2998 012506 012537 012706      MOV      (R5)+, ERR3
2999 012512 012537 012710      MOV      (R5)+, ERR4
3000 012516 012537 012722      MOV      (R5)+, NXTTS
3001 012522 010516      MOV      R5, (SP)
3002 012524 013705 012712      MOV      DATA1, R5
3003 012530 013777 015644 003014  MOV      LINANS, @DHMCSR      ;SET LINE COUNTER TO ANSWER LINE
3004 012536 017704 003012      MOV      @DHMLSR, R4      ;GET ACTUAL ANSWER LINE STATUS
3005 012542 013703 015644      MOV      LINANS, R3
3006 012546 020504      CMP      R5, R4      ;COMPARE
3007 012550 001402      BEQ     CKTRN1
3008 012552 004777 000124      JSR     PC, @ERR1
3009 012556 013777 015642 002766  CKTRN1: MOV      LINORG, @DHMCSR      ;SET LINE COUNTER TO ORIGINATE LINE
3010 012564 017704 002764      MOV      @DHMLSR, R4      ;GET ACTUAL ORIGINATE LINE STATUS
3011 012570 013705 012714      MOV      DATA2, R5
3012 012574 013703 015642      MOV      LINORG, R3
3013 012600 020504      CMP      R5, R4      ;COMPARE
3014 012602 001402      BEQ     CKTRN2
3015 012604 004777 000074      JSR     PC, @ERR2

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CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 73  
 CZDHK.E.P11 11-JUL-84 08:45

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3019
3020 012610 105737 012717
3021 012614 100003
3022 012616 042737 000010 015646
3023 012624 113704 015646
3024 012630 113705 012716
3025 012634 013703 015644
3026 012640 020504
3027 012642 001402
3028 012644 004777 000036
3029 012650 013704 015650
3030 012654 013705 012720
3031 012660 013703 015642
3032 012664 020504
3033 012666 001402
3034 012670 004777 000014
3035 012674 022626
3036 012676 000177 000020
3037 012702 000000
3038 012704 000000
3039 012706 000000
3040 012710 000000
3041 012712 000000
3042 012714 000000
3043 012716 000000
3044 012720 000000
3045 012722 000000

;CHECK FOR CORRECT TRANSITIONS ON
;SELECTED ORIGINATE AND ANSWER LINES

CKTRM2: TSTB DATA3+1
        BPL .+10
        BIC @10,ANSFLG
        MOVB ANSFLG,R4 ;GET TRANSITION DATA FOR
        MOVB DATA3,R5
        MOV LINANS,R3
        CMP R5,R4 ;DID CORRECT TRANSITIONS OCCUR
        BEQ CKTRM3
        JSR PC,BERR3
CKTRM3: MOV ORGFLG,R4 ;GET TRANSITION DATA FOR
        MOV DATA4,R5
        MOV LINORG,R3
        CMP R5,R4 ;DID CORRECT TRANSITIONS OCCUR
        BEQ CKTRM4
        JSR PC,BERR4
CKTRM4: POP2SP
        JMP BNXTTS

ERR1: 0
ERR2: 0
ERR3: 0
ERR4: 0
DATA1: 0
DATA2: 0
DATA3: 0
DATA4: 0
NXTTS: 0

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CZDNR-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 74  
 CZDNR.E.P11 11-JUL-84 08:45

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3051 012724
3052 012724 005237 015576
3053 012730 012737 000001 015600
3054 012736 000005
3055 012740 005037 015670
3056 012744 005337 015670
3057 012750 001375
3058 012752 104004
3059 012754 017231
3060 012756 013701 000042
3061 012762 001521
3062 012764 000005
3063 012766 004711
3064 012770 000240
3065 012772 000240
3066 012774 000240
3067 012776 000240
3068 013000 000137 013226
3069
3070
3071
3072
3073
3074
3075 013004 011646
3076 013006 162716 000002
3077 013012 017616 000000
3078 013016 006316
3079 013020 042716 177001
3080 013024 062716 017366
3081 013030 017616 000000
3082 013034 000136
3083
3084 013036 105777 002514
3085 013042 100001
3086 013044 104027
3087 013046 000002
3088

;END OF PASS
;UPDATE PASS COUNT
;TYPE END OF PASS MESSAGE

EOP:
    INC      PASCNT           ;UPDATE PASS COUNT
    MOV      #1,TSTNO        ;START AT FIRST TEST OF GROUP
    RESET
    CLR      FILLA           ;CLEAR THE WORLD
    14:      DEC      FILLA    ;INIT COUNTER
            BNE      14       ;COUNT THE CTR
            TYPE     14       ;BR TIL STALL TIMES OUT
            MEPASS
            ; RING BELL
    MOV      42,R1           ;ARE YOU ON ACT11?
    BEQ      TSTENT          ;NO
    RESET
    LOGICAL: JSR      PC,(R1)

    NOP
    NOP
    NOP
    NOP
    JMP      TSTENT          ;GET ADDRESS OF FIRST TEST

;EMT DISPATCH SERVICE
;ARGUMENT OF EMT IS EXTRACTED
;AND USED AS OFFSET TO OBTAIN POINTER
;TO SELECTED SUBROUTINE

EMTSRV: MOV      (SP),-(SP)   ;GET PC OF RETURN
        SUB      #2,(SP)    ;=PC OF EMT
        MOV      @B(SP),(SP) ;GET EMT
EMTOK:  ASL      (SP)        ;MULTIPLY EMT ARG BY 2
        BIC      #177001,(SP) ;CLEAR UNWANTED BITS
        ADD      @EMTTAB,(SP) ;POINTER TO SUBROUTINE ADDRESS
        MOV      @B(SP),(SP) ;SUBROUTINE ADDRESS
        JMP      @B(SP)+    ;GO TO SUBROUTINE

CKINT:  TSTB     @TKCSR
        BPL      14
        KBDIN
    14:  RTI
    
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CZDHK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 75  
 CZDHK.E.P11 11-JUL-84 08:45

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3089
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3092
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3095
3096
3097 013050 005737 001252      LOOP:  TST      XFLAG      ;IS THERE AN XOR TESTER OUT THERE ?
3098 013054 100022                BPL      4#          ;NO
3099 013056 013746 000004                MOV      4,-(SP)    ;SAVE 4
3100 013062 012737 013102 000004                MOV      #14,4     ;SET UP SVC ROUTINE
3101 013070 005737 177060                TST      177060    ;GOT SOMETHING LIKE SLAVE SYNC
3102 013074 012637 000004                MOV      (SP)+,4   ;YOU BETCHUM
3103 013100 000404                BR       2#
3104 013102 022626                1#:     POP2SP      ;RESTORE STACK
3105 013104 012637 000004                MOV      (SP)+,4   ;RESTORE 4
3106 013110 000402                BR       3#
3107 013112 000137 013222                2#:     JMP      LOOPX    ;GO TO NEXT TEST
3108 013116 000137 013226                3#:     JMP      TSTENT   ;GO
3109 013122
3110 013122 005037 177776                CLR      PSW
3111 013126 052777 000100 002422                BIS      #INTENA,#TKCSR
3112 013134 005737 015576                TST      PASCNT
3113 013140 001430                BEQ      LOOPX
3114 013142 005737 015572                5#:     TST      ERRFLG
3115 013146 001404                BEQ      LOOPS
3116 013150 032777 002000 002410                BIT      #SW10,#SWR
3117 013156 001021                BNE     LOOPX
3118 013160 032777 040000 002400  LOOPS:  BIT      #SW14,#SWR
3119 013166 001041                BNE     LOOPX
3120 013170 032777 004000 002370                BIT      #SW11,#SWR
3121 013176 001011                BNE     LOOPX
3122 013200 005337 015604                DEC      ICOUNT
3123 013204 001406                BEQ      LOOPX
3124 013206 013716 015602                LOOPER: MOV      RETURN,(SP)
3125 013212 042777 000100 002336                BIC      #INTENA,#TKCSR
3126 013220 000002                RTI
3127 013222 005237 015600                LOOPX:  INC      TSTNO
3128 013226 013705 015600                TSTENT: MOV      TSTNO,R5
3129 013232 006305                ASL      R5
3130 013234 006305                ASL      R5
3131 013236 063705 015632                ADD      TSTPNT,R5
3132 013242 011537 015602                MOV      (R5),RETURN
3133 013246 001626                BEQ      EOP
3134 013250 012516                MOV      (R5)+,(SP)
3135 013252 011537 015604                MOV      (R5),ICOUNT
3136 013256 005037 015572                CLR      ERRFLG
3137 013262 042777 000100 002266                BIC      #INTENA,#TKCSR
3138 013270 000002                RTI
3139 013272 012737 000001 015604  LOOPL:  MOV      #1,ICOUNT
3140 013300 000742                BR       LOOPER
3141
3142
3143
3144

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;CHECK FOR LOOPING WITH SAME DATA
;CHECK FOR ESCAPE TO NEXT TEST ON ERROR

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 76  
 CZDMKE.P11 11-JUL-84 08:45

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3145 013302 005737 015572      FREEZE: TST      ERRFLG      ;IF ERROR FLAG=0,
3146 013306 001413              BEQ      FREEZX    ;DO NOT TEST FOR ESCAPE
3147 013310 032777 002000 002250      BIT      @SW10,@SWR ;IF SW10=1,
3148 013316 001341              BNE      LOOPX    ;ESCAPE TO NEXT TEST
3149 013320 032777 001000 002240      BIT      @SW09,@SWR ;IF SW09=1,
3150 013326 001403              BEQ      FREEZX    ;FREEZE CURRENT DATA
3151 013330 017616 000000      MOV      @2(SP),(SP) ;GET LOOPING ADDRESS
3152 013334 000002              RTI                      ;LOOP
3153 013336 062716 000002      FREEZX: ADD     @2,(SP) ;CONTINUE IN CURRENT TEST
3154 013342 000002              RTI
3155
3156
3157      ;ROUTINE TO STEP THRU LINES
3158 013344 052777 000400 002200  STEP: BIS      @STEP,@DMCSR
3159 013352 032777 000020 002172 1$: BIT      @BUSY,@DMCSR
3160 013360 001374              BNE      1$
3161 013362 000207              RETURN
3162
3163

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 77  
 CZDMKE.P11 11-JUL-84 08:45

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3164
3165 ;GENERAL ERROR SERVICE
3166 ;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
3167
3168 013364 005037 015572 ERR: CLR ERRFLG ;ALWAYS TYPE PC+2
3169 ;OF TEST THAT FAILED
3170 013370 005037 013604 CLR ERRMSG ;NO MESSAGE
3171 013374 005037 013616 CLR ERTAB ;NO TABLE OF DATA
3172 013400 000451 BR ERRGEN ;OUTPUT ERROR MESSAGE
3173
3174 ;TRANSITION DETECTION ERROR SERVICE
3175
3176 ;FORMAT FOR ERROR TYPEOUT IS
3177
3178 ;XXXXXX TRANSITION ERROR
3179 ;EXP REC LINE
3180 ;AA BB CC
3181
3182 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3183 ; AA=EXPECTED INTERRUPT FLAGS (CORRESPONDS TO 4 MSB OF CONTROL REGISTER)
3184 ; BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)
3185 ; CC=LINE ON WHICH ERROR OCCURED
3186 013402 005037 015572 ERRRT: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3187 013406 012737 016072 013604 MOV @MTRANE,ERRMSG ;TYPE "TRANSITION ERROR"
3188 013414 012737 013710 013616 MOV @ERTAB1,ERTAB ;TABLE OF DATA
3189 013422 000440 BR ERRGEN ;OUTPUT ERROR MESSAGE
3190
3191 ;ON-LINE STATUS ERROR SERVICE
3192
3193 ;FORMAT FOR LINE STATUS ERROR IS
3194
3195 ;XXXX LINE ERROR
3196 ;EXP REC LINE
3197 ;AAA BBB CC
3198
3199 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3200 ; AAA=EXPECTED LINE STATUS AT TIME OF ERROR
3201 ; BBB=RECEIVED LINE STATUS AT TIME OF ERROR
3202 ; CC=LINE ON WHICH ERROR OCCURED
3203
3204
3205 013424 005037 015572 ERRS: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3206 013430 012737 016041 013604 MOV @MLINE1,ERRMSG ;TYPE "LINE ERROR"
3207 ;EXP REC LINE"
3208 013436 012737 013726 013616 MOV @ERTAB2,ERTAB ;TABLE OF DATA
3209 013444 000427 BR ERRGEN ;OUTPUT ERROR MESSAGE

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 78  
 CZDMKE.P11 11-JUL-84 08:45

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3210
3211          ;FATAL TRANSITION ERROR
3212          ;FORMAT FOR FATAL ERROR TYPEOUT IS
3213
3214          ;XXXXXX FATAL ERROR
3215          ;CSTAT LSTAT
3216          ;AAAAAA BBB
3217
3218          ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3219          ;      AAAAAA=RECEIVED CONTROL STATUS ON LINE THAT INTERRUPTED
3220          ;      BBB=RECEIVED LINE STATUS ON LINE THAT INTERRUPTED
3221
3222 013446 005037 015572          ERRN: CLR      ERRFLG          ;ALWAYS OUTPUT ALL DATA
3223 013452 012737 017022 013604 MOV      #FATAL,ERRMSG      ;TYPE "FATAL ERROR
3224                                     ;CSTAT LSTAT"
3225 013460 012737 013744 013616 MOV      #ERTAB3,ERTAB      ;TABLE OF DATA
3226 013466 000416 BR        ERRGEN          ;OUTPUT ERROR MESSAGE
3227
3228          ;"CONTROL STATUS" ERROR SERVICE
3229          ;FORMAT FOR CONTROL STATUS ERROR IS
3230
3231          ;XXXXXX STATUS ERROR
3232          ;EXP REC
3233          ;AAAAAA BBBB
3234
3235          ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3236          ;      AAAAAA=EXPECTED CONTROL STATUS AT TIME OF ERROR
3237          ;      BBBB=RECEIVED(ACTUAL) CONTROL STATUS AT TIME OF ERROR
3238
3239
3240 013470 012737 015753 013604 ERRCS: MOV      #MSTATE,ERRMSG      ;TYPE "STATUS ERROR
3241                                     ;"EXP REC"
3242 013476 012737 013756 013616 MOV      #ERTAB4,ERTAB      ;TABLE OF DATA
3243 013504 000407 BR        ERRGEN          ;OUTPUT DATA
3244
3245          ;LINE STATUS ERROR SERVICE
3246          ;FORMAT FOR LINE STATUS ERROR IS
3247
3248          ;XXXX LINE ERROR
3249          ;EXP REC LINE SEL
3250          ;AAA DDD CC DD
3251
3252          ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3253          ;      AAA=EXPECTED LINE STATUS AT TIME OF ERROR
3254          ;      BBB=RECEIVED LINE STATUS AT TIME OF ERROR
3255          ;      CC=LINE ON WHICH ERROR OCCURED
3256          ;      DD=THE LINE ON WHICH THE PROGRAM WAS OPERATING
3257
3258
3259
3260 013506 012737 016004 013604 ERRLS: MOV      #MLINER,ERRMSG
3261 013514 012737 013770 013616 MOV      #ERTAB5,ERTAB
3262 013522 000400 BR        ERRGEN

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```

3263
3264
3265
3266
3267
3268
3269 013524 005037 177776
3270 013530 012777 000100 002020
3271 013536 032777 020000 002022
3272 013544 001026
3273 013546 021637 015624
3274 013552 001402
3275 013554 005037 015572
3276 013560 104005
3277 013562 005737 015572
3278 013566 001007
3279 013570 104006
3280 013572 013702
3281 013574 005737 013604
3282 013600 001407
3283 013602 104004
3284 013604 000000
3285 013606 005737 013616
3286 013612 001402
3287 013614 104006
3288 013616 000000
3289 013620 104007
3290
3291
3292
3293 013622 032777 100000 001736
3294 013630 001406
3295 013632 000000
3296 013634 022737 000176 015566
3297 013642 001001
3298 013644 104025
3299 013646 012737 000001 015572
3300 013654 042777 000100 001674
3301 013662 000002
3302
3303
3304 013664 012737 015674 013604
3305 013672 012737 014020 013616
3306 013700 000711
3307
3308

;GENERAL ERROR HANDLER
;TYPE PC.2 OF TEST THAT FAILED
;TYPE ERROR MESSAGE (IF ANY)
;TYPE DATA RELATING TO FAILURE (IF ANY)

ERRGEN: CLR PSW
MOV #INTENA,@TKCSR
BIT #SW13,BSWR ;IF SW13=1, DO NOT
BNE .3 ;TYPE ERROR MESSAGE
CMP (SP),SAVPC ;SAME ERROR AGAIN
BEQ .6
CLR ERRFLG
SAVOSP
TST ERRFLG ;IF ERROR OCCURED FLAG=1.
BNE .1 ;TYPE DATA ONLY
OCTASC ;TYPE PC.2 OF CALL TO ERROR ROUTINE
ERTAB0
TST ERRMSG
BEQ .2 ;TYPE ERROR MESSAGE
TYPE
ERRMSG: 0
.1: TST ERTAB
BEQ .2 ;TYPE DATA
OCTASC
ERTAB: 0
.2: RES05 ;RESTORE R0-R5

;ERROR HALT SERVICE
.3: BIT #SW15,BSWR ;IF SW15=0, DO NOT
BEQ .4 ;HALT ON ERROR
HALT ;HALT AND DISPLAY ADDRESS OF FAILING TEST
CMP #SMREG,SWR
BNE .4
CNTLW
MOV #1,ERRFLG ;SET ERROR OCCURED FLAG
BIC #INTENA,@TKCSR ;RETURN TO TEST
RTI

;TIMEOUT ERROR WAITING FOR INTERRUPT ON TEST 33
ERRQ: MOV #NOINT,ERRMSG
MOV #ERTAB6,ERTAB ;TYPE LNO,CSR,LSR,MSG
BR ERRGEN ;OUTPUT DATA

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 81  
 CZDMKE.P11 11-JUL-84 08:45

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3363
3364
3365
3366
3367 014036 017605 000000      OCTASM: MOV      B(SP),R5                ;GET POINTER TO TABLE OF DATA
3368 014042 062716 000002      ADD      #2,(SP)
3369 014046 012737 000010      MOV      #10,RADIX
3370 014054 012704 017251      MOV      @MBCD+2,R4
3371 014060 012537 015626      MOV      (R5),.MDCNT
3372 014064 012537 015630      OCTAS1: MOV      (R5),.CHRCNT
3373 014070 013537 014372      MOV      B(R5),.BINMRD
3374 014074 104010
3375 014076 005337 015626      CONVERT
3376 014102 001370      DEC      MDCNT
3377 014104 112714 000100      BNE      OCTAS1
3378 014110 005737 014226      MOVSB   #100,(R4)
3379 014114 001002      TST     SMLN
3380 014116 104004      BNE     1#
3381 014120 017247      TYPE
3382 014122 000002      MBCD
3383
3384
3385
3386 014124 005037 014222      CNTLU: CLR      TMP1
3387 014130 012737 000001      MOV      #1,TMP2
3388 014136 104004      TYPE
3389 014140 017206      #SMREQ
3390 014142 052737 000001      BIS     #1,SMLN
3391 014150 104006      OCTASC
3392 014152 014012      SWTB
3393 014154 104004      TYPE
3394 014156 017251      MBCD+2
3395 014160 104013      INSTRG
3396 014162 017217      #NEWS
3397 014164 000000      0
3398 014166 177777      177777
3399 014170 014222      TMP1
3400 014172 123727 015122 000015      CMPB   INBUF,#15
3401 014200 001403      BEQ    1#
3402 014202 013777 014222 001356      MOV    TMP1,@SWR
3403 014210 005037 014224      1#: CLR    TMP2
3404 014214 005037 014226      CLR    SMLN
3405 014220 000002      RTI
3406 014222 000000      TMP1:  0
3407 014224 000000      TMP2:  0
3408 014226 000000      SMLN:  0
3409
3410

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CZDHNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 82  
 CZDHNK.E.P11 11-JUL-84 08:45

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3411
3412                                     ;INTEGER BINARY TO ASCII CONVERSION COMMON ROUTINE
3413
3414 014230 013700 015630      BINASC: MOV      CHRCNT,R0      ;SET UP COUNT FOR DIGITS TO BE CONVERTED
3415 014234 012701 017352      MOV      @TEMTAB,R1    ;SET UP POINTER FOR TEMPORARY STORAGE
3416 014240 104011              BINASA: EXTRACT      ;EXTRACT ONE DIGIT
3417 014242 062737 000060 014374 ADD      @60,DIGIT    ;CONVERT FROM BCD TO ASCII
3418 014250 113721 014374      MOV      DIGIT,(R1)+  ;STORE DIGIT
3419 014254 005300              DEC      R0           ;IF ALL DIGITS NOT DONE,
3420 014256 001370              BNE     BINASA       ;CONTINUE
3421 014260 114124              RINASB: MOV     -(R1),(R4)+ ;REVERSE ORDER OF DIGITS
3422 014262 005337 015630      DEC     CHRCNT      ;IF ALL CHARACTERS ARE NOT
3423 014266 001374              BNE     BINASB      ;IN ORDER, CONTINUE
3424 014270 112724 000040      MOV     @40,(R4)+   ;INSERT SPACE AFTER LAST DIGIT
3425 014274 000002              RTI                ;RETURN TO CALLING ROUTINE
3426
3427                                     ;SINGLE PRECISION UNSIGNED DIVIDE LOOP
3428
3429 014276 005037 014374      DIVI:  CLR      DIVIDH
3430 014302 023737 014374 014376 DIVIU:  CMP      DIVIDH,DIVIS
3431 014310 103027              BHS     DIVIB
3432 014312 012737 000021 014352 MOV     @17,,DIVCNT
3433 014320 000407              BR      DIVIC
3434 014322 023737 014374 014376 DIVIA:  CMP      DIVIDH,DIVIS
3435 014330 103403              BLO     DIVIC
3436 014332 163737 014376 014374 SUB     DIVIS,DIVIDH
3437 014340 006137 014372      DIVIC: ROL     DIVIDL
3438 014344 006137 014374      ROL     DIVIDH
3439 014350 005327              DEC     (PC)+
3440 014352 000000              DIVCNT: 0
3441 014354 001362              BNE     DIVIA
3442 014356 006037 014374      ROR     DIVIDH
3443 014362 005137 014372      COM     DIVIDL
3444 014366 000002              RTI
3445 014370 000000              DIVIB:  HALT
3446 014372 000000              DIVIDL: 0
3447 014374 000000              DIVIDH: 0
3448 014376 000000              DIVIS:  0
3449
3450                                     ;SAVE PC OF TEST THAT FAILED AND R0-R5
3451
3452 014400 016637 000004 015624 SV05P:  MOV     4(SP),SAVPC
3453
3454                                     ;SAVE R0-R5
3455
3456 014406 010537 015620      SV05:  MOV     R5,SAVR5
3457 014412 010437 015616      MOV     R4,SAVR4
3458 014416 010337 015614      MOV     R3,SAVR3
3459 014422 010237 015612      MOV     R2,SAVR2
3460 014426 010137 015610      MOV     R1,SAVR1
3461 014432 010037 015606      MOV     R0,SAVR0
3462 014436 000002              RTI

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CZDHNK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 83  
 CZDHNK.E.P11 11-JUL-84 08:45

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3463
3464
3465
3466 014440 013700 015606
3467 014444 013701 015610
3468 014450 013702 015612
3469 014454 013703 015614
3470 014460 013704 015616
3471 014464 013705 015620
3472 014470 000002
3473
3474
3475
3476 014472 017605 000000
3477 014476 062716 000002
3478 014502 105777 001054
3479 014506 100375
3480 014510 122765 000012 177777
3481 014516 001405
3482 014520 122765 000015 177777
3483 014526 001401
3484 014530 000402
3485 014532 004737 014602
3486 014536 122715 000100
3487 014542 001001
3488 014544 000002
3489 014546 122715 000042
3490 014552 001406
3491 014554 122715 000045
3492 014560 001403
3493 014562 112577 000776
3494 014566 000745
3495 014570 142715 000040
3496 014574 152715 000010
3497 014600 000770
3498
3499
3500
3501
3502 014602 113737 015666 015670
3503 014610 113777 015667 000746
3504 014616 105777 000740
3505 014622 100375
3506 014624 105337 015670
3507 014630 001367
3508 014632 000207
3509
3510
3511
3512
3513
3514
3515
3516 014634
3517 014634 011605
3518 014636 012537 014662

;RESTORE R0-R5
RS05: MOV SAVR0,R0
      MOV SAVR1,R1
      MOV SAVR2,R2
      MOV SAVR3,R3
      MOV SAVR4,R4
      MOV SAVR5,R5
      RTI

;TELETYPE OUTPUT ROUTINE
TYPER: MOV @ (SP),R5 ;GET POINTER TO MESSAGE (ON STACK)
      ADD @2,(SP) ;CORRECT STACK FOR RETURN
TYPERA: TSTB @TPCSR ;WAIT FOR TELEPRINTER READY
        BPL TYPERA
        CMPB @12,-1(R5) ;WAS LAST ONE A L.F. ??
        BEQ 1# ;BR IF YES
        CMPB @15,-1(R5) ;WAS LAST ONE A C.R. ??
        BEQ 1# ;BR IF YES
        BR 2# ;CONTINUE IF NEITHER
1#: JSR PC,TYFILL ;GO OUT PUT FILLERS
2#: CMPB @100,(R5) ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
     BNE TYPER1
     RTI ;CHARACTER IS TERMINATOR, EXIT
TYPER1: CMPB @42,(R5) ;IF CHARACTER=42,
        BEQ TYPECL ;TYPE LINE FEED
        CMPB @45,(R5) ;IF CHARACTER=45,
        BEQ TYPECL ;TYPE CARRIAGE RETURN
TYPER2: MOVB (R5)+,@TPDBR ;GET CHARACTER
        BR TYPERA ;TYPE IT
TYPECL: BICB @40,(R5) ;CONVERT CODE OF 42 OR 45
        BISB @10,(R5) ;TO 12 OR 15
        BR TYPER2 ;TYPE IT

;OUTPUT FILLERS AFTER <CR> OR <LF> CHAR IS OUT PUTTED.
TYFILL: MOVB FILL,FILLA ;GET FILL COUNT
1#: MOVB FILL+1,@TPDBR ;OUT PUT ONE FILLER
2#: TSTB @TPCSR ;WAIT FOR TTY TO FINISH OUTPUT
     BPL 2# ;BR IF TTY NOT DONE
     DECB FILLA ;COUNT ONE FILLER
     BNE 1# ;BR TIL ALL DONE
     RTS ;RETURN TO CALLER ABOVE

;INPUT OCTAL CHARACTER STRING
;TERMINATOR IS CARRIAGE RETURN
;IF MORE THAN SEVEN (7) CHARACTERS INCLUDING
;CARRIAGE RETURN ARE TYPED, THE IN PUT WILL
;BE RE-REQUESTED
INSTR: MOV (SP),R5 ;GET POINTER TO ARGUMENTS
      MOV (R5)+,MSG ;GET MESSAGE TO BE TYPED

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CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 84  
 CZDMKE.P11 11-JUL-84 08:45

3519	014642	012537	015114		MOV	(R5)+,LOLIM	;GET LOWER LIMIT
3520	014646	012537	015116		MOV	(R5)+,HILIM	;GET UPPER LIMIT
3521	014652	012537	015120		MOV	(R5)+,STORE	;GET DATA STORAGE LOCATION
3522	014656	010516			MOV	R5,(SP)	;RESTORE STACK
3523	014660	104004			INSTR1: TYPE		;TYPE MESSAGE
3524	014662	000000			MSG: 0		
3525	014664	012704	015122		MOV	@INBUF,R4	;SET UP CHARACTER INPUT BUFFER
3526	014670	012703	000007		MOV	@7,R3	;SET UP INPUT COUNT
3527	014674	105777	000656		INSTRB: TSTB	@TKCSR	;WAIT FOR CHARACTER
3528	014700	100375			BPL	INSTRB	
3529	014702	005037	002206		INSTRB: CLR	SINTFL	
3530	014706	017737	000646	014222	MOV	@TKDBR,TMP1	
3531	014714	142737	000200	014222	BICB	@200,TMP1	
3532	014722	113714	014222		MOVB	TMP1,(R4)	
3533	014726	121427	000007		CMPB	(R4),@7	
3534	014732	001420			BEQ	INSTR	
3535	014734	121427	000015		CMPB	(R4),@15	;IS CHARACTER TERMINATOR
3536	014740	001420			BEQ	INSTR2	;IF IT IS, CONVERT INPUT STRING
3537	014742	121427	000025		CMPB	(R4),@25	
3538	014746	001003			BNE	1@	
3539	014750	005037	014222		CLR	TMP1	
3540	014754	000741			BR	INSTR1	
3541	014756	112477	000602		1@: MOVB	(R4)+,@TPDBR	
3542	014762	105777	000574		INSTRC: TSTB	@TPCSR	;WAIT TO FINISH TYPING
3543	014766	100375			BPL	INSTRC	
3544	014770	005303			DEC	R3	;UPDATE RECEIVED COUNT
3545	014772	001340			BNE	INSTRB	;AND CONTINUE
3546	014774	104004			INSTR: TYPE		;TYPE "?" AND RE-REQUEST INPUT
3547	014776	016741			MOVB		
3548	015000	000727			BR	INSTR1	
3549							
3550						;CONVERT ASCII STRING TO OCTAL	
3551							
3552	015002	104004			INSTR2: TYPE		
3553	015004	016745			MCRLF		
3554	015006	012704	015122		MOV	@INBUF,R4	;GET POINTER TO ASCII STRING
3555	015012	005003			CLR	R3	
3556	015014	122714	000015		CMPB	@15,(R4)	;IS TERMINATOR FIRST
3557							;CHARACTER IN STRING
3558	015020	001431			BEQ	CHCK	
3559	015022	121427	000060		INSTRD: CMPB	(R4),@60	;IS CHARACTER OCTAL DIGIT
3560	015026	002762			BLT	INSTR	;IF 67>=CHAR>=60
3561	015030	121427	000067		CMPB	(R4),@67	;CHARACTER IS OCTAL DIGIT
3562	015034	003357			BGT	INSTR	
3563	015036	142714	000060		BICB	@60,(R4)	;STRIP ASCII
3564	015042	152403			BISB	(R4)+,R3	;GENERATE OCTAL NUMBER
3565	015044	121427	000015		CMPB	(R4),@15	;IF END OF STRING, CHECK LIMITS
3566	015050	001404			BEQ	INSTR3	
3567	015052	006303			ASL	R3	;MULTIPLY DIGIT BY 10 (OCTAL
3568	015054	006303			ASL	R3	
3569	015056	006303			ASL	R3	
3570	015060	000760			BR	INSTRD	;GET NEXT DIGIT
3571							
3572						;TEST NUMBER TO SEE IF IT IS WITHIN LIMITS	
3573							
3574	015062	020337	015116		INSTR3: CMP	R3,HILIM	;TEST HI LIMIT

CZDHC-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 85  
 CZDHC.E.P11 11-JUL-84 08:45

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3575 015066 101342          BHI    INSTER          ;IF R3>HILIM, ERROR
3576 015070 020337 015114  CMP    R3,LOLIM        ;TEST LOW LIMIT
3577 015074 103737          BLO    INSTER          ;IF R3<LOLIM, ERROR
3578 015076 010377 000016  MOV    R3,BSTORE       ;STORE NUMBER
3579 015102 000002          RTI                    ;EXIT
3580 015104 005737 014224  CMCK:  TST    TMP2
3581 015110 001731          BEQ    INSTER
3582 015112 000002          RTI
3583 015114 000000  LOLIM:  0
3584 015116 000000  HILIM:  0
3585 015120 000000  STORE:  0
3586 015122 000000  INBUF:  0
3587          015144  .*.+20
3588          ;ENTER HERE ON POWER FAILURE
3589
3590
3591 015144 010046  PFAIL:  MOV    R0,-(SP)      ;SAVE R0-R5 ON PROCESSOR STACK
3592 015146 010146          MOV    R1,-(SP)
3593 015150 010246          MOV    R2,-(SP)
3594 015152 010346          MOV    R3,-(SP)
3595 015154 010446          MOV    R4,-(SP)
3596 015156 010546          MOV    R5,-(SP)
3597 015160 013746 000024  MOV    24,-(SP)
3598 015164 010637 015622  MOV    SP,SAVSP        ;SAVE STACK POINTER
3599 015170 012737 015202 000024  MOV    @RESTART,24    ;SET UP FOR POWER UP TRAP
3600 015176 000000          HALT                  ;HALT ON POWER DOWN NORMAL
3601 015200 000776          BR     .-2
3602
3603          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
3604
3605 015202 013706 015622  RESTAR: MOV    SAVSP,SP    ;RESTORE STACK POINTER
3606 015206 012605          MOV    (SP)+,R5       ;RESTORE R0-R5
3607 015210 012604          MOV    (SP)+,R4
3608 015212 012603          MOV    (SP)+,R3
3609 015214 012602          MOV    (SP)+,R2
3610 015216 012601          MOV    (SP)+,R1
3611 015220 012600          MOV    (SP)+,R0
3612 015222 012737 015144 000024  MOV    @PFAIL,24      ;SET UP FOR POWER FAILURE
3613 015230 005726          POP1SP
3614 015232 104004          TYPE
3615 015234 017120          MPFAIL
3616 015236 005737 001756  TST    TIPFLG
3617 015242 001002          BNE    RESTA1
3618 015244 000137 001262  JMP    START0
3619 015250 104004  RESTA1: TYPE
3620 015252 017140          MPF1
3621 015254 012746 000340  MOV    #340,-(SP)
3622 015260 005746          PUSH1SP
3623 015262 000137 013226  JMP    TSTENT
3624
3625
3626          ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
3627 015266 013746 000020  XOR:  MOV    20,-(SP)   ;SAVE 20
3628 015272 013746 000022  MOV    22,-(SP)   ;SAVE 22
3629 015276 012737 015470 000020  MOV    #24,20     ;IOT INTR VECTOR
3630 015304 012737 000340 000022  MOV    #340,22    ;IOT INTR LVL

```



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3666
3667                ;INDIRECT POINTERS
3668
3669 015546 000300    DMHVEC: 300                ;MODEM CONTROL INTERRUPT VECTOR
3670 015550 000302    DMHVL: 302                ;MODEM CONTROL ONTERRUPT PRIORITY
3671 015552 170500    DMHCSR: 170500           ;MODEM CONTROL CONTROL STATUS REGISTER
3672 015554 170502    DMHLSR: 170502           ;MODEM CONTROL CONTROL STATUS REGISTER
3673 015556 177560    TKCSR: 177560
3674 015560 177562    TKDBR: 177562
3675 015562 177564    TPCSR: 177564
3676 015564 177566    TPDBR: 177566
3677 015566 177570    SMR: 177570
3678 015570 177570    DISPLAY:177570
3679
3680                ;PROGRAM VARIABLES
3681
3682 015572 000000    ERRFLG: 0
3683 015574 000000    TRACON: 0
3684 015576 000000    PASCNT: 0
3685 015600 000000    TSTNO: 0
3686 015602 000000    RETURN: 0
3687 015604 000000    ICOUNT: 0
3688 015606 000000    SAVRO: 0
3689 015610 000000    SAVR1: 0
3690 015612 000000    SAVR2: 0
3691 015614 000000    SAVR3: 0
3692 015616 000000    SAVR4: 0
3693 015620 000000    SAVR5: 0
3694 015622 000000    SAVSP: 0
3695 015624 000000    SAVPC: 0
3696 015626 000000    WRDCNT: 0
3697 015630 000000    CHRCNT: 0
3698 015632 017502    TSTPNT: TSTTBO
3699 015634 000000    TSTMAX: 0
3700 015636 000000    LINFLG: 0
3701 015640 000000    LINE: 0
3702 015642 000000    LINORG: 0
3703 015644 000000    LINANG: 0
3704 015646 000000    ANSFLG: 0
3705 015650 000000    ORGFLG: 0
3706 015652 000000    TIME1: 0
3707 015654 000000    TIME2: 0
3708 015656 000000    TIFLG: 0
3709 015660 177777    LINSEL: 177777
3710 015662 000000    SELMSK: 0
3711 015664 000000    SLMSK: 0
3712 015666 000002    FILL: 2                ;FILL CHAR/COUNT
3713 015670 000000    FILLA: 0              ;TEMP STORAGE FOR FILL COUNT
3714 015672 000000    RNGRET: 0
3715
3716                .NLIST BEX
015674 044524 042515 047440 MNOINT: .ASCII ;TIME OUT WAITING FOR INTERRUPT";
015734 047114 020040 051503        .ASCII ;LN CSR LSR;
015753      123 040524 052524 MSTATE: .ASCII ;STATUS ERROR="EXP REC;
016004 044514 042516 042440 MLINER: .ASCII ;LINE ERROR="EXP REC LINE SEL;
016041      114 047111 020105 MLINE1: .ASCII ;LINE ERROR="EXP REC LINE;

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016072	051124	047101	044523	MTRANE: .ASCII	; TRANSITION ERROR="EXP REC LINE@;
016131	045	022442	042042	DIALM: .ASCII	; "DIAL ANSWERING DATA SET@";
016167	045	022442	030442	MT103T: .ASCII	; "103A MODEM CONNECT-DISCONNECT TEST@";
016240	021045	021045	030062	MT202T: .ASCII	; "202C MODEM CONNECT-DISCONNECT TEST@";
016311	045	022442	047442	MSELOR: .ASCII	; "ORIGINATE LINE-@;
016335	045	040442	051516	MSELAN: .ASCII	; "ANSWER LINE-@;
016354	021045	030061	040463	MT103A: .ASCII	; "103A TEST COMPLETE@";
016403	045	031042	031060	MT202A: .ASCII	; "202C TEST COMPLETE@";
016432	021045	052123	044522	MDISC: .ASCII	; "STRIKE ANY TTY KEY TO TEST DISCONNECT@;
016502	021045	021045	033061	M16: .ASCII	; "16 LINE SCANNER TEST@";
016535	045	022442	042042	MTITLE: .ASCII	; "CZDNK-E -----MODEM CONTROL DIAGNOSTIC-----@";
016621	045	053042	041505	MVECTO: .ASCII	; "VECTOR ADDRESS-@;
016643	045	041442	047117	MREGAD: .ASCII	; "CONTROL REGISTER ADDRESS-@;
016677	045	046042	047111	MLINSL: .ASCII	; "LINE SELECT PARAMETER -@;
016731	045	052042	051505	MTEST: .ASCII	; "TEST-@;
016741	040	037440	100	MGM: .ASCII	; ?@;
016745	045	040042		MCRLF: .ASCII	; "@;
016750	021045	044523	043516	MLINE: .ASCII	; "SINGLE LINE CABLE TEST@";
017003	045	046042	047111	MLINEI: .ASCII	; "LINE NUMBER-@;
017022	040506	040524	020114	MFATAL: .ASCII	; FATAL ERROR="CSTAT LSTAT@;
017054	021045	051124	047101	MTRNDE: .ASCII	; "TRANSITION DETECTED="CSTAT LSTAT@;
017120	021045	047520	042527	MPFAIL: .ASCII	; "POWER FAILURE@;
017140	041455	051125	042522	MPF1: .ASCII	; -CURRENT TEST WILL RESTART@";
017175	136	040103		MCONTC: .ASCII	; t@;
017200	053136	100		MCONTV: .ASCII	; tV@;
017203	136	040114		MCONTL: .ASCII	; tL@;
017206	021045	053523	036522	MSMREQ: .ASCII	; "SMR= @;
017217	040	020040	042516	MNEWS: .ASCII	; NEW= @;
017231	045	042442	042116	MEPASS: .ASCII	; "END PASS @;
017247	045	042		MBCD: .ASCII	; "@;

017351				.+.100	
017352				.EVEN	
017352	000000			TEMTAB: 0	
	017364			.+.10	
017364	000000			0	

;EMT DISPATCH TABLE

017366	013470	EMTTAB: ERRCS
017370	013506	ERRLS
017372	013050	LOOP
017374	013302	FREEZE
017376	014472	TYPER
017400	014400	SVOSP
017402	014036	OCTASN
017404	014440	RSOS
017406	014230	BINASC
017410	014276	DIVI
017412	013364	ERR
017414	014634	INSTR
017416	013402	ERRT
017420	013424	ERRS
017422	013446	ERRN
017424	011766	GETLIN
017426	012022	SETUPS

017430	012256	CKRNG	
017432	012354	WAITR	
017434	012442	CKTRN	
017436	012412	WAITRR	
017440	014124	CNTLU	;CALL BY EMT CNTLUU
017442	013036	CKINT	;CALL BY EMT CKINTT
017444	001760	KBDINT	;CALLBY EMT KBDIN
017446	013664	ERRG	;CALLED BY EMT ERRINT
017450	000000	EMTLIM:	0
017452	017502	TSTLST:	TSTTB0
017454	017664		TSTTB1
017456	017726		TSTTB2
017460	017734		TSTTB3
017462	000000		0
017464	000000		0
017466	000000		0
017470	000000		0
017472	000033	GRO:	NO-1
017474	000007		N1-100-1
017476	000001		N2-200-1
017500	000000		N3-300-1
017502	002210	TSTTB0:	T0
017504	000001		1
(2) 017506	002236		T1
(2) 017510	004000		TIMES
(2) 017512	002300		T2
(2) 017514	004000		TIMES
(2) 017516	002342		T3
(2) 017520	004000		TIMES
(2) 017522	002404		T4
(2) 017524	004000		TIMES
(2) 017526	002446		T5
(2) 017530	004000		TIMES
(2) 017532	002510		T6
(2) 017534	004000		TIMES
(2) 017536	002564		T7
(2) 017540	004000		TIMES
(2) 017542	002640		T10
(2) 017544	004000		TIMES
(2) 017546	002730		T11
(2) 017550	004000		TIMES
(2) 017552	003020		T12
(2) 017554	004000		TIMES
(2) 017556	003110		T13
(2) 017560	004000		TIMES
(2) 017562	003200		T14
(2) 017564	004000		TIMES
(2) 017566	003270		T15
(2) 017570	004000		TIMES
(2) 017572	003356		T16
(2) 017574	004000		TIMES
(2) 017576	003444		T17
(2) 017600	004000		TIMES
(2) 017602	003532		T20
(2) 017604	004000		TIMES
(2) 017606	003620		T21

(2)	017610	004000		TIMES
(2)	017612	003714		T22
(2)	017614	000400		TIMES
(2)	017616	004030		T23
(2)	017620	000400		TIMES
(2)	017622	004220		T24
(2)	017624	000400		TIMES
(2)	017626	004372		T25
(2)	017630	000200		TIMES
(2)	017632	004534		T26
(2)	017634	000200		TIMES
(2)	017636	004774		T27
(2)	017640	000200		TIMES
(2)	017642	005230		T30
(2)	017644	000200		TIMES
(2)	017646	005464		T31
(2)	017650	000200		TIMES
(2)	017652	005720		T32
(2)	017654	000200		TIMES
(2)	017656	006104		T33
(2)	017660	000200		TIMES
	017662	000000		0
	017664	006414	TSTTB1:	T100
	017666	000001		1
(2)	017670	006452		T101
(2)	017672	000200		TIMES
(2)	017674	006632		T102
(2)	017676	000200		TIMES
(2)	017700	007006		T103
(2)	017702	000200		TIMES
(2)	017704	007162		T104
(2)	017706	000200		TIMES
(2)	017710	007336		T105
(2)	017712	000200		TIMES
(2)	017714	007514		T106
(2)	017716	000200		TIMES
(2)	017720	007672		T107
(2)	017722	000200		TIMES
	017724	000000		0
	017726	010050	TSTTB2:	T200
	017730	000001		1
	017732	000000		0
	017734	010424	TSTTB3:	T300
	017736	000001		1
		000001	.END	

CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 92  
 CZDMKE.P11 11-JUL-84 08:45 CROSS REFERENCE TABLE -- USER SYMBOLS

ANSFLG	015646	2831*	2834*	2839*	2843*	2924*	2933	2956	2971*	3022*	3023	3704*		
ANSTR	01160?	2798	2829*											
ANSTRR	011670	2847*												
ANSTR1	011616	2830	2832*											
ANSTR2	011632	2833	2835*											
ANSTR3	011646	2837	2840*											
ANSTR4	011662	2842	2844*											
BINASA	014240	3416*	3420											
BINASB	014260	3421*	3423											
BINASC	014230	3414*	3716											
BINARD-	014372	857*	3373*											
BUSY -	000020	862*	1214	1218	1508	1534	2902	3159						
CHCK	015104	3558	3580*											
CHRCNT	015630	3372*	3414	3422*	3697*									
CKINT	013036	3084*	3716											
CKINTT-	104026	925*	2304	2368	2407	2466	2507	2551	2592	2632	2676	2741	2775	
CKRING-	104021	920*	2282	2443										
CKRING	012256	2950*	3716											
CKRING1	012322	2959	2961*											
CKRING2	012346	2965	2968*											
CKTRAN-	104023	922*	2310	2374	2472	2513	2557	2598	2638	2682	2747			
CKTRN	012442	2989*	3716											
CKTRN1	012556	3007	3009*											
CKTRN2	012610	3014	3020*											
CKTRN3	012650	3027	3029*											
CKTRN4	012674	3033	3035*											
CLRMUX-	002000	868*	1487	1608	1664	1718	1772	1832	1869	1955	1997	2037	2077	2901
CLRSCN-	004000	869*	1507	1533	2901									
CNTLU	014124	3386*	3716											
CNTLUU-	104025	924*	1011	1132	2265	2426	3298							
CO -	000100	883*	2134	2313	2317	2475	2478	2516	2520	2601	2605	2641	2646	
COF -	040000	872*	2809	2821	2832	2844								
CONVER-	104010	911*	3374											
CS -	000040	882*	2134	2313	2317	2478	2520	2601	2641					
CSF -	020000	871*	2812	2821	2835	2844								
CSTR1	002236	1158*												
CSTR2	002300	1171*												
CSTR3	002342	1184*												
CSTR4	002404	1197*												
CSTR5	002446	1213*												
DATA1	012712	1015*	1017*	1020*	1022	2863*	2872	2992*	3002	3041*	3631*	3633*	3635*	3637
DATA2	012714	1016*	1017	1018*	1021*	2864*	2874	2993*	3011	3042*	3632*	3633	3634*	3636*
DATA3	012716	2994*	3020	3024	3043*									
DATA4	012720	2995*	3030	3044*										
DHMCSR	015552	1043	1044	1048	1105*	1113*	1123*	1146	1158*	1159	1162*	1163	1171*	1172
		1175*	1176	1184*	1185	1188*	1189	1197*	1198	1202*	1203	1213*	1214	1217*
		1218	1228*	1231*	1244*	1247*	1260*	1262*	1265*	1268*	1279*	1284*	1285*	1288*
		1298*	1303*	1304*	1307*	1317*	1322*	1323*	1326*	1336*	1341*	1342*	1345*	1356*
		1361*	1362*	1365*	1375*	1380*	1381*	1384*	1394*	1399*	1400*	1403*	1413*	1418*
		1419*	1422*	1432*	1439*	1440	1457*	1462*	1466	1475*	1487*	1490*	1496*	1498
		1507*	1509	1512*	1514	1529*	1533*	1534	1536*	1537*	1539*	1541*	1545	1567*
		1572*	1576*	1579*	1583	1603*	1608*	1612*	1615*	1620	1639*	1659*	1664*	1668*
		1671*	1676	1693*	1713*	1718*	1722*	1725*	1730	1747*	1767*	1772*	1776*	1779*
		1784	1801*	1822*	1832*	1835*	1869*	1870*	1873*	1884*	1893	1897	1906	1912
		1918*	1920*	1952*	1955*	1957*	1959*	1962	1980*	1994*	1997*	1999*	2001*	2004
		2020*	2034*	2037*	2039*	2041*	2044	2060*	2074*	2077*	2079*	2081*	2084	2100*







CZDHW-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 96  
 CZDHW.E.P11 11-JUL-84 08:45 CROSS REFERENCE TABLE -- USER SYMBOLS

MENT1A	004056	14910	1493		
MENT1B	004104	14970	1506		
MENT1C	004126	1500	15040		
MENT1D	004134	15070	1519		
MENT1E	004166	15130	1522		
MENT1F	004210	1516	15200		
MENT2	004220	15290			
MENT2A	004242	15330	1554	1559	
MENT2B	004322	15440	1557		
MENT2C	004344	1548	15500		
MENT2D	004356	1551	15550		
MENT3	004372	15670			
MENT3A	004414	15710	1592	1597	
MENT3B	004426	15730	1575		
MENT3C	004464	15820	1595		
MENT3D	004506	1586	15880		
MENT3E	004520	1589	15930		
MEPASS	017231	3059	37160		
MFATAL	017022	3223	37160		
MLINE	016750	1939	37160		
MLINEI	017003	1941	37160		
MLINER	016004	3260	37160		
MLINE1	016041	3206	37160		
MLINSL	016677	1051	37160		
MNDINT	015674	3304	37160		
MPFAIL	017120	3615	37160		
MPF1	017140	3620	37160		
MQM	016741	3547	37160		
MREGAD	016643	1040	37160		
MSELAN	016335	2885	37160		
MSELOR	016311	2880	37160		
MSG	014662	35180	35240		
MSTATE	015753	3240	37160		
MTEST	016731	1058	37160		
MTITLE	016535	999	37160		
MTRANE	016072	3187	37160		
MTRNDE	017054	2866	37160		
MT103A	016354	2405	37160		
MT103T	016167	2262	37160		
MT202A	016403	2774	37160		
MT202T	016240	2423	37160		
MUX1	004534	16030			
MUX1A	004562	16080	1649	1653	
MUX1B	004630	16160	1637		
MUX1C	004666	1623	16260		
MUX1D	004704	1618	1630	1633	16340
MUX1E	004722	16390			
MUX1F	004754	1611	1646	16480	
MUX11	006452	19520			
MUX11A	006470	19550			
MUX11B	006520	19600	1978		
MUX11C	006546	1965	19680		
MUX11D	006564	1972	1975	19760	
MUX11E	006576	19800			
MUX11F	006630	1987	19890		
MUX12	006632	19940			

CZDNR-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 97  
 CZDNR.E.P11 11-JUL-84 08:45 CROSS REFERENCE TABLE -- USER SYMBOLS

MUX12A	006650	1997#			
MUX12B	006700	2002#	2018		
MUX12C	006726	2007	2010#		
MUX12D	006740	2012	2015	2016#	
MUX12E	006752	2020#			
MUX12F	007004	2027	2029#		
MUX13	007006	2034#			
MUX13A	007024	2037#			
MUX13B	007054	2042#	2058		
MUX13C	007102	2047	2050#		
MUX13D	007114	2052	2055	2056#	
MUX13E	007126	2060#			
MUX13F	007160	2067	2069#		
MUX14	007162	2074#			
MUX14A	007200	2077#			
MUX14B	007230	2082#	2098		
MUX14C	007256	2087	2090#		
MUX14D	007270	2092	2095	2096#	
MUX14E	007302	2100#			
MUX14F	007334	2107	2109#		
MUX15	007336	2115#			
MUX15A	007354	2118#			
MUX15B	007402	2128#	2143		
MUX15C	007430	2133	2136#		
MUX15D	007442	2137	2140	2141#	
MUX15E	007456	2145#			
MUX15F	007512	2152	2154#		
MUX16	007514	2160#			
MUX16A	007532	2163#			
MUX16B	007560	2173#	2188		
MUX16C	007606	2178	2181#		
MUX16D	007620	2182	2185	2186#	
MUX16E	007634	2190#			
MUX16F	007670	2197	2199#		
MUX17	007672	2205#			
MUX17A	007710	2208#			
MUX17B	007736	2218#	2233		
MUX17C	007764	2223	2226#		
MUX17D	007776	2227	2230	2231#	
MUX17E	010012	2235#			
MUX17F	010046	2242	2244#		
MUX2	004774	1659#			
MUX2A	005022	1664#	1703	1707	
MUX2B	005070	1672#	1691		
MUX2C	005126	1679	1682#		
MUX2D	005140	1674	1684	1687	1688#
MUX2E	005156	1693#			
MUX2F	005210	1667	1700	1702#	
MUX3	005230	1713#			
MUX3A	005256	1718#	1757	1761	
MUX3B	005324	1726#	1745		
MUX3C	005362	1733	1736#		
MUX3D	005374	1728	1738	1741	1742#
MUX3E	005412	1747#			
MUX3F	005444	1721	1754	1756#	
MUX4	005464	1767#			









CZDHR-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 102  
 CZDHRKE.P11 11-JUL-84 08:45 CROSS REFERENCE TABLE -- USER SYMBOLS

T202D1	010602	2488	2493#		
T202D2	010606	2489	2495#		
T202D3	010612	2490	2497#		
T202D4	010616	2491	2499#		
T202E	010622	2492	2505#		
T202E1	010666	2529	2534#		
T202E2	010672	2530	2536#		
T202E3	010676	2531	2538#		
T202E4	010702	2532	2540#		
T202F	010706	2533	2547#		
T202F2	010766	2572	2577#		
T202F3	010772	2573	2579#		
T202F4	010776	2574	2581#		
T202F5	011002	2575	2583#		
T202G	011006	2576	2590#		
T202G1	011052	2613	2618#		
T202G2	011056	2614	2620#		
T202G3	011062	2615	2622#		
T202G4	011066	2616	2624#		
T202H	011072	2617	2630#		
T202H2	011136	2655	2660#		
T202H3	011142	2656	2662#		
T202H4	011146	2657	2664#		
T202H5	011152	2658	2666#		
T202I	011156	2659	2672#		
T202I2	011236	2697	2702#		
T202I3	011242	2698	2704#		
T202I4	011246	2699	2706#		
T202I5	011252	2700	2708#		
T202J	011256	2701	2720#		
T202JM	011434	2763	2773#		
T202JS	011316	2724	2729#		
T202J1	011414	2759	2764#		
T202J2	011420	2760	2766#		
T202J3	011424	2761	2768#		
T202J4	011430	2762	2770#		
T21	003620	1431#	3716		
T22	003714	1455#	3716		
T23	004030	1486#	3716		
T24	004220	1528#	3716		
T25	004372	1566#	3716		
T26	004534	1602#	3716		
T27	004774	1658#	3716		
T3	002342	1183#	3716		
T30	005230	1712#	3716		
T300	010424	2419#	3716		
T31	005464	1766#	3716		
T32	005720	1821#	3716		
T33	006104	1868#	3716		
T4	002404	1196#	3716		
T5	002446	1212#	3716		
T6	002510	1226#	3716		
T7	002564	1242#	3716		
VECSTA	001374	1017#	1023		
VECSTR	001354	1002	1006	1014#	1115
VECST1	001500	1034	1037#		



CZDMK-E MACY11 30A(1052) 11-JUL-84 08:53 PAGE 105  
 CZDMKE.P11 11-JUL-84 08:45 CROSS REFERENCE TABLE -- MACRO NAMES

COMMEN	839#	959#	1143#	1274#	1351#	1927#	1935#	2258#	2419#	3716#					
EMTDEF	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917
	918	919	920	921	922	923	924	925	926	927	959#				
INTS	1139#	1351	1370	1389	1408										
MUXS1	1139#	1599	1655	1709	1763	1948	1990	2030	2070						
MUXS2	1139#	2110	2155	2200											
NOINT	1139#	1274	1293	1312	1331										
TM	960#	3716													
TS	958#	1143	1157	1170	1183	1196	1212	1226	1242	1258	1278	1297	1316	1335	1355
	1374	1393	1412	1431	1455	1486	1528	1566	1602	1658	1712	1766	1821	1868	1935
	1951	1993	2033	2073	2114	2159	2204	2258	2403	2419					
TSS	958#														

. ABS. 017740 000

ERRORS DETECTED: 0

CZDMKE,CZDMKE/SOL/CRF=CZDMKE.P11  
 RUN-TIME: 4 8 1 SECONDS  
 RUN-TIME RATIO: 30/14=2.0  
 CORE USED: 11K (21 PAGES)