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I D E N T I F I C A T I O N

PRODUCT CODE: AC-9185D-MC

PRODUCT NAME: CZRJBDO RP04/5/6 FORMATTER PROGRAM

PRODUCT DATE: MAY, 1979

MAINTAINER: DIAGNOSTIC ENGINEERING

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1. ABSTRACT

THE RP04/5/6 FORMATTER PROGRAM FORMATS THE DISK PACK AND PERFORMS A CURSORY CHECK OF THE PACK'S SURFACE. THE PROGRAM ALLOWS THE OPERATOR TO SPECIFY ADDRESS LIMITS, PATTERNS, AND EITHER 16 BIT OR 18 BIT FORMAT MODE. THE PROGRAM VERIFIES EACH TRACK WRITTEN AS WELL AS VERIFYING THE FORMAT OPERATION.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 PROCESSOR
8K MEMORY
TELETYPE
PROGRAM LOAD DEVICE
KW11-L OR KW11-P CLOCK
RH11 OR RH70 WITH 1 - 8 RP04, RP05, RP06 DISK DRIVES

2.2 PRELIMINARY PROGRAMS

RP04/5/6 DISKLESS CONTROLLER TEST
PART 1 (MAINDEC-11-DZRJG)
PART 2 (MAINDEC-11-DZRJH)

RP04/5/6 FUNCTIONAL CONTROLLER TEST
PART 1 (MAINDEC-11-DZRJI)
PART 2 (MAINDEC-11-DZRJJ)

2.3 PROGRAMMABLE DRIVES (DUAL PORT ENABLED)

THIS REV INCORPORATES A SAFEGUARD TO PREVENT INADVERTENT CORRUPTION OF DISK PACKS IN PROGRAMMABLE DRIVES. THIS IS A POTENTIAL HAZARD IN RUNNING THIS PROGRAM IN A MULTIPROCESSOR SYSTEM. FOR THE STANDARD STARTING ADDRESS OF 200 THE PROGRAM HAS BEEN MODIFIED TO PREVENT INITIALIZING DRIVES FOUND TO BE PROGRAMMABLE. THIS MODIFICATION APPLIES ONLY TO THE FIELD ENVIRONMENT (XXDP CHAIN, STANDALONE) WHERE LOCATION 42 DOES NOT EQUAL LOCATION 46. FOR THE MANUFACTURING ENVIRONMENT (WHERE LOCATION 42 EQUALS LOCATION 46) PROGRAMMABLE DRIVES WILL NOT BE INHIBITED. IF THE OPERATOR DESIRES TO RUN THIS PROGRAM USING PROGRAMMABLE DRIVES IN A FIELD ENVIRONMENT USE STARTING ADDRESS 220, WHERE 220 IS THE SAME AS 200 WITHOUT INHIBITING PROGRAMMABLE DRIVES. SEE SECTION 4.1 FOR A SUMMARY OF ALL STARTING ADDRESSES.

3. LOADING PROCEDURES

THE PROGRAM MAY BE LOADED FROM PAPER TAPE USING THE ABSOLUTE
LOADER OR IT MAY BE LOADED FROM THE APPROPRIATE 'XXDP' MEDIA
USING THE ASSOCIATED LOADER. THE PROGRAM MAY NOT BE INCLUDED
IN AN 'XXDP' CHAIN.

4. STARTING PROCEDURES

4.1 STARTING ADDRESSES

THE PROGRAM IS STARTED FROM LOCATION 200(8) IF THE ADDRESS OF THE
RH11 OR RH70 WILL NOT BE CHANGED
PROGRAMMABLE DRIVES ARE INHIBITED, STANDALONE AND XXDP CHAIN-SEE SECTION 2.3

THE PROGRAM IS STARTED FROM LOCATION 204(8) IF THE ADDRESS OF
THE RH11 OR RH70 IS TO BE CHANGED FROM THE PRELOADED VALUE.
(SEE SECTION 4.3) PROGRAMMABLE DRIVES ARE NOT INHIBITED.

STARTING ADDRESS 220 IS THE SAME AS 200 BUT WITH NO INHIBITIONS.

4.2 OPERATION ACTION

1. LOAD THE PROGRAM INTO MEMORY (SEE SECTION 3).
2. LOAD THE STARTING ADDRESS - 200(8) OR 204(8) OR 220(8).
3. SET THE SWITCHES AS REQUIRED AND PRESS 'START'.

IF THIS IS THE PROGRAM'S FIRST START, THE STATUS OF THE DRIVES
ON THE SELECTED MASSBUS SUBSYSTEM WILL BE TYPED OUT. THIS TYPEOUT
MAY BE INHIBITED ON SUBSEQUENT STARTS BY SETTING SW<02>.

4. THE PROGRAM WILL THEN TYPE THE FOLLOWING MESSAGE:

'PROGRAM MODE (C OR F):'

ENTER THE APPROPRIATE CODE: 'C' FOR 'CHECK' OPERATION OR 'F'
FOR 'FORMAT & VERIFY'. IF A 'CARRIAGE RETURN' IS ENTERED IN
RESPONSE TO THE REQUEST, THE PROGRAM WILL ASSUME 'FORMAT &
VERIFY'.

5. THE PROGRAM WILL THEN ASK FOR THE FORMATTING MODE:

'OPERATE IN 22 SECTOR (16 BIT) MODE (Y OR N)'

ENTER THE APPROPRIATE CHARACTER: 'Y' FOR 16 BIT MODE OR 'N' FOR
18 BIT MODE. IF A 'CARRIAGE RETURN' IS ENTERED IN RESPONSE TO
THIS REQUEST, THE PROGRAM WILL ASSUME 16 BIT MODE.

6. THE PROGRAM WILL THEN ASK FOR A DRIVE:

'DRIVE: '

ENTER THE ADDRESS OF THE DRIVE TO BE FORMATTED. A 'PERIOD' OR 'CARRIAGE RETURN' ENTRY WILL SELECT DRIVE 0. IF THE DRIVE SELECTED IS NOT AVAILABLE, THE PROGRAM WILL TYPE AN ERROR MESSAGE AND RETURN TO THE DRIVE ADDRESS REQUEST.

7. AFTER THE OPERATOR HAS SELECTED A DRIVE, THE PROGRAM WILL ASK FOR ADDRESS LIMITS FOR THE SELECTED DRIVE:

'ENTER ADDRESS LIMITS: '

THE PREVIOUSLY SELECTED OR DEFAULT VALUES FOR BEGINNING CYLINDER AND TRACK AND FOR ENDING CYLINDER AND TRACK WILL BE TYPED OUT. IF A 'CARRIAGE RETURN' IS TYPED AS A RESPONSE, THE PRESENT VALUE WILL BE USED; IF A 'PERIOD' IS TYPED, THE PROGRAM WILL BYPASS THE REMAINING ENTRIES AND WILL USE THEIR PRESENT VALUES. NOTE THAT THE CYLINDER AND TRACK VALUES ARE D E C I M A L NUMBERS. THE ADDRESS SPECIFIED BY THE BEGINNING CYLINDER AND TRACK MUST BE LESS THAN THE ADDRESS SPECIFIED BY THE ENDING CYLINDER AND TRACK ADDRESS.

7. THE PROGRAM WILL THEN ASK FOR THE DATA PATTERN:

'SELECT DATA PATTERN

(0) ZERO'S

(1) ONES

(2) WORST CASE:'

ENTER THE CODE FOR THE REQUIRED PATTERN. 'CARRIAGE RETURN' OR 'PERIOD' ENTRIES WILL CAUSE THE PROGRAM TO USE THE 'WORST CASE' PATTERN.

THE 'WORST CASE' PATTERN IS THE FOLLOWING OCTAL SEQUENCE REPEATED THROUGH THE DATA AREA OF THE SECTOR:

165555
133333

8. THE PROGRAM WILL THEN TYPE:

'STARTING FORMAT ON DRIVE N'

OR

'STARTING CHECK ON DRIVE N'

9. THE OPERATOR CAN DETERMINE WHERE THE DRIVE IS DURING THE FORMAT OR CHECK OPERATION BY TYPING A 'CONTROL C'. THE PROGRAM WILL TYPE THE FOLLOWING MESSAGE:

'PRESENT ADDRESS IS: CXXX TXX'

IF A 'CONTROL C' IS TYPED WHILE THE PROGRAM IS TYPING THE CURRENT ADDRESS, THE PROGRAM WILL ABORT THE FORMAT (OR CHECK) OPERATION AND RETURN TO THE 'DRIVE' REQUEST.

10. IF THE OPERATOR DOES NOT SELECT A DIFFERENT DRIVE WHEN THE FORMAT OR CHECK OPERATION HAS COMPLETED, THE PROGRAM WILL NOT ALTER THE ADDRESS LIMITS SPECIFIED AT THE START OF THE PREVIOUS OPERATION. IF THE FORMAT OR CHECK OPERATION IS TERMINATED BY A 'CONTROL C' OR IF A DIFFERENT DRIVE IS SELECTED, THE PROGRAM WILL RESET THE ADDRESS LIMITS TO THE VALUES APPROPRIATE FOR THE DRIVE TYPE.
11. TO CHANGE EITHER THE ADDRESSING MODE OR THE OPERATION MODE, THE PROGRAM MUST BE STARTED FROM LOCATION 200(8) OR 204(8) AGAIN.

4.3 RH11 - RH70 UNIBUS ADDRESS

THE PROGRAM ASSUMES THAT THE RH11 OR RH70 ADDRESSES START AT 176700 AND THAT THE VECTOR ADDRESS IS 254. THESE ADDRESSES MAY BE CHANGED WHEN THE PROGRAM IS STARTED FROM LOCATION 204(8). IF THE RH11 - RH70 IS NOT AT THE DEFAULT ADDRESS, THE PROGRAM MUST BE STARTED FROM 204(8) INITIALLY AS THE PROGRAM GOES THROUGH THE ADDRESS CHANGE ROUTINE AT INITIAL START ONLY. ENTER THE RH11 RH70 ADDRESS IN RESPONSE TO THE REQUEST FROM THE PROGRAM.

4.4 OTHER UNIBUS ADDRESSES

LOC	TAG	CONTENTS	FUNCTION
---	---	-----	-----
1144	\$TKS	177560	TTY KEYBOARD STATUS REGISTER
1146	\$TKB	177562	TTY KEYBOARD BUFFER REGISTER
1150	\$TPS	177564	TTY PRINTER STATUS REGISTER
1152	\$TPB	177566	TTY PRINTER BUFFER REGISTER
1176	\$LKCSR	172540	KW11-P CONTROL REGISTER
1200	\$LKCSB	172542	KW11-P COUNTER REGISTER
1202	\$LPVEC	104	KW11-P VECTOR ADDRESS
1206	\$LKS	177546	KW11-L CONTROL REGISTER
1210	\$LKV	100	;ADDRESS OF KW11-L VECTOR

5. SWITCH REGISTER SETTINGS

SW<15>=1...HALT ON ERROR
 SW<13>=1...INHIBIT ERROR TYPEOUTS
 SW<10>=1...BELL ON ERROR
 SW<09>=1...LOOP ON ERROR
 SW<07>=1...PRINT SOFT ERROR REPORTS AS THEY OCCUR
 SW<02>=1...DON'T DISPLAY SYSTEM STATUS AFTER INITIAL START
 SW<01>=1...LOOP ON THE CURRENT TRACK
 SW<00>=1...LOOP THE PROGRAM ON THE SELECTED DRIVE

IF THE PROGRAM IS BEING RUN ON A SWITCHLESS PROCESSOR (I.E. AN 11/34) THE PROGRAM WILL DETERMINE THAT THE HARDWARE SWITCH REGISTER IS NOT PRESENT AND WILL USE A 'SOFTWARE' SWITCH REGISTER. THE 'SOFTWARE' SWITCH REGISTER IS LOCATED AT LOCATION 176 (8). THE SETTINGS OF THE 'SOFTWARE' SWITCHES ARE CONTROLLED THROUGH A KEYBOARD ROUTINE WHICH IS CALLED BY TYPING A 'CONTROL G'. THE PROGRAM WILL

306 RECOGNIZE THE 'CONTROL G' AT ANY TIME EXCEPT WHEN THE PROGRAM
307 IS AT A HIGHER PRIORITY PROCESSING AN RP04/5/6 INTERRUPT. THE
308 'SOFTWARE' SWITCH VALUES ARE ENTERED AS AN OCTAL NUMBER IN RESPONSE
309 TO THE PROMPT FROM THE SWITCH ENTRY ROUTINE:
310

311 'SWR = NNNNNN NEW ='
312

313 EACH TIME SWITCH SETTING ARE ENTERED, THE ENTIRE SWITCH REGISTER
314 IMAGE MUST BE ENTERED. LEADING ZEROS ARE NOT REQUIRED., 'RUBOUT' AND
315 'CONTROL U' FUNCTIONS MAY BE USED TO CORRECT TYPING ERRORS
316 DURING SWITCH ENTRY.
317

318 ON PROCESSORS WITH HARDWARE SWITCH REGISTERS, THE 'SOFTWARE' SWITCH
319 REGISTER MAY BE USED. IF THE PROGRAM FINDS ALL 16 SWITCHES IN THE
320 'UP' POSITION, ALL SWITCH REGISTER REFERENCES WILL BE TO THE
321 'SOFTWARE' REGISTER AND THE PROCEDURES DESCRIBED ABOVE MUST
322 BE FOLLOWED.
323

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326
327 6. ERROR MESSAGES
328 -----
329

- 330 1. 'RH11 INTERRUPT OCCURRED (RPAS=0) - AN INTERRUPT OCCURRED, BUT
331 NOTHING ON THE MASSBUS IS INDICATING AN ATTENTION.
332
333 2. 'UNEXPECTED ATTENTION OCCURRED' - THE INDICATED DRIVE INTERRUPTED,
334 BUT NO INTERRUPT WAS EXPECTED FROM THE INDICATED DRIVE.
335
336 3. 'MASSBUS PARITY ERROR (MCPE=1)' - A CONTROL BUS PARITY ERROR
337 WAS DETECTED BY THE RH11 WHEN THE INDICATED REGISTER WAS READ.
338
339 4. 'MASSBUS PARITY ERROR (PAR=1)' - A CONTROL BUS PARITY ERROR
340 OCCURRED WHEN THE INDICATED REGISTER WAS WRITTEN.
341
342 5. 'ADDRESS PLUG CHANGE BIT SET' - THE PROGRAM FOUND THE 'OPE'
343 BIT SET FOR THE INDICATED DRIVE.
344
345 6. 'RH11 DIDN'T RESPOND TO ADDRESSING' - THE PROGRAM ACCESSED THE
346 RH11 AT THE INDICATED ADDRESS AND RECEIVED NO RESPONSE.
347
348 7. 'DRIVE OFFLINE' - THE INDICATED DRIVE HAS GONE OFFLINE
349
350 8. 'PERSISTENT DRIVE UNSAFE ERROR' - THE INDICATED DRIVE HAS BECOME
351 UNSAFE AND THE CONDITION CANNOT BE CLEARED BY ISSUING 'DRIVE
352 CLEAR' INSTRUCTIONS.
353
354 9. 'UNCORRECTABLE MASSBUS PARITY ERROR' - THE PROGRAM ATTEMPTED
355 TO PERFORM AN OPERATION AND DETECTED 3 SUCESSIVE MASSBUS PARITY
356 ERRORS OR THE PROGRAM ATTEMPTED TO CLEAR A 'PAR' ERROR IN THE
357 DRIVE AND A PARITY ERROR OCCURRED.
358
359 10. 'SOFTWARE TIMEOUT' - THE OPERATION FAILED TO COMPLETE WITHIN
360 1 SECOND.
361

11. 'DRIVE UNSAFE ERROR' - A NON-PERSISTENT UNSAFE ERROR OCCURRED DURING THE OPERATION.
12. 'CONTROLLER/DRIVE ERROR DURING WRITE' - THE INDICATED NON-DATA ERROR WAS DETECTED DURING A FORMAT OPERATION.
13. 'CONTROLLER/DRIVE ERROR DURING WRITE CHECK' - A NON-DATA ERROR OCCURRED DURING THE WRITE CHECK.
14. 'DATA ERROR DURING WRITE CHECK' - A DATA RELATED ERROR OCCURRED DURING A WRITE CHECK OPERATION. A DATA ERROR IS CONSIDERED TO BE A 'DCK' ERROR.
15. 'RETRIES NOT SUCESSFUL - SECTOR NOT ACCEPTABLE' - THE INDICATED SECTOR FAILED DURING RETRY FOLLOWING A DATA ERROR.
16. 'CONTROLLER/DRIVE ERROR VERIFYING HEADERS' - AN ERROR OCCURRED DURING THE VERIFICATION PASS AFTER FORMATTING.
17. ''HCE' ERROR VERIFYING HEADERS' - A HEADER ERROR OCCURRED DURING THE VERIFICATION PASS AFTER FORMATTING.
18. 'CYLINDER FIELD IN HEADER IS NOT CORRECT' - THE CYLINDER FIELD FROM A HEADER READ DURING THE VERIFICATION PASS IS NOT CORRECT.
19. 'WRITE CHECK ERROR' - THE RH11 REPORTED A WRITE CHECK ERROR AND NO DRIVE ERRORS WERE SET.
20. 'HARDWARE ERROR DURING WRITE CHECK' - AN ERROR THAT WAS NEITHER A DATA ERROR, WRITE CHECK ERROR, NOR CONTROLLER ERROR OCCURRED DURING A WRITE CHECK. THESE ERRORS COULD BE ONE OF THE FOLLOWING: 'OPI', 'DTE', 'HCRC', 'HCE', OR 'FER'.

7. MISCELLANEOUS

7.1 FORMAT TIME

IT TAKES APPROXIMATELY 8 MINUTES TO FORMAT AN ENTIRE RP04/5 PACK AND APPROXIMATELY 16 MINUTES TO FORMAT AN RP06 PACK. THE 'CHECK' MODE TIME FOR AN ENTIRE PACK IS 4 MINUTES FOR RP04/5'S AND 8 MINUTES FOR RP06'S.

7.2 HALTING THE PROGRAM

THE OPERATOR SHOULD NOT HALT THE PROGRAM DURING A FORMAT OPERATION. HALTING THE PROGRAM MAY LEAVE A SECTOR INCORRECTLY FORMATTED. TO TERMINATE THE FORMAT, TYPE A 'CONTROL C' AND WHILE THE PROGRAM IS TYPING THE ADDRESS, TYPE ANOTHER 'CONTROL C'; THIS SEQUENCE RETURNS THE PROGRAM TO THE DRIVE ADDRESS ENTRY ROUTINE.

7.3 SURFACE VERIFICATION

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POSITIONER IS RETURNED TO THE STARTING CYLINDER AND THE HEADER FROM SECTOR 0 ON THE STARTING TRACK IS READ. THE CYLINDER ADDRESS FIELD FROM THE HEADER IS COMPARED TO THE REQUESTED CYLINDER; IF THE CYLINDER ADDRESSES DO NOT COMPARE, AN ERROR MESSAGE IS TYPED. THE PROGRAM CHECKS THE CYLINDER ADDRESS FIELD FROM THE HEADER OF SECTOR 0 ON THE BEGINNING TRACK OF EACH CYLINDER FORMATTED. THIS CHECK IS PERFORMED TO CONFIRM THAT THE DISK'S POSITIONER ADVANCED PROPERLY DURING THE FORMAT OPERATION.

9. PROGRAM LISTING

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a
.TITLE CZRJBDO, RP04/5/6 FMTR
;*COPYRIGHT (C) 1976,1978
;*DIGITAL EQUIPMENT CORP.
;*MAYNARD, MASS. 01754
;*
;*PROGRAM BY C. HESS
;*
;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
;*

.SBTTL OPERATIONAL SWITCH SETTINGS
;*
;*      SWITCH      USE
;*      -----
;*      15          HALT ON ERROR
;*      13          INHIBIT ERROR TYPEOUTS
;*      10          BELL ON ERROR
;*      9           LOOP ON ERROR
;*      2           DON'T DISPLAY SYSTEM STATUS AFTER INITIAL START
;*      1           LOOP ON THE CURRENT TRACK
;*      0           LOOP THE PROGRAM ON THE SELECTED DRIVE

.SBTTL TRAP CATCHER
*=0
;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
*=174
DISPREG: .WORD 0      ;;SOFTWARE DISPLAY REGISTER
SWREG:   .WORD 0      ;;SOFTWARE SWITCH REGISTER

.SBTTL ACT11 HOOKS
;*****
;HOOKS REQUIRED BY ACT11
$SVPC=.              ;SAVE PC
.=46
$ENDAD               ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
.=52
  
```

000000

000174

000174 000000

000176 000000

000200

000046

000046 005422

000052

586	100000	SW15=	100000
587	040000	SW14=	40000
588	020000	SW13=	20000
589	010000	SW12=	10000
590	004000	SW11=	4000
591	002000	SW10=	2000
592	001000	SW09=	1000
593	000400	SW08=	400
594	000200	SW07=	200
595	000100	SW06=	100
596	000040	SW05=	40
597	000020	SW04=	20
598	000010	SW03=	10
599	000004	SW02=	4
600	000002	SW01=	2
601	000001	SW00=	1
602		.EQUIV	SW09,SW9
603		.EQUIV	SW08,SW8
604		.EQUIV	SW07,SW7
605		.EQUIV	SW06,SW6
606		.EQUIV	SW05,SW5
607		.EQUIV	SW04,SW4
608		.EQUIV	SW03,SW3
609		.EQUIV	SW02,SW2
610		.EQUIV	SW01,SW1
611		.EQUIV	SW00,SW0

612
 613 ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)

614	100000	BIT15=	100000
615	040000	BIT14=	40000
616	020000	BIT13=	20000
617	010000	BIT12=	10000
618	004000	BIT11=	4000
619	002000	BIT10=	2000
620	001000	BIT09=	1000
621	000400	BIT08=	400
622	000200	BIT07=	200
623	000100	BIT06=	100
624	000040	BIT05=	40
625	000020	BIT04=	20
626	000010	BIT03=	10
627	000004	BIT02=	4
628	000002	BIT01=	2
629	000001	BIT00=	1
630		.EQUIV	BIT09,BIT9
631		.EQUIV	BIT08,BIT8
632		.EQUIV	BIT07,BIT7
633		.EQUIV	BIT06,BIT6
634		.EQUIV	BIT05,BIT5
635		.EQUIV	BIT04,BIT4
636		.EQUIV	BIT03,BIT3
637		.EQUIV	BIT02,BIT2
638		.EQUIV	BIT01,BIT1
639		.EQUIV	BIT00,BIT0

640
 641 ;*BASIC 'CPU' TRAP VECTOR ADDRESSES

CZRJBDO, RP04/5/6 FMTR MACY11 30A(1052) 24-MAY-79 14:10 PAGE 20^F 2
CZRJBD.P11 28-MAR-79 11:23 RP04/5/6 DRIVER COMMANDS

SEQ 0018

922
923

1236				
1237			;ERROR 17	
1238				
1239	002010	023303	EM17	;RETRIES NOT SUCESSFUL - SECTOR NOT ACCEPTABLE
1240	002012	024326	DH17	
1241	002014	025260	DT17	
1242	002016	025514	DF17	
1243				
1244			;ERROR 20	
1245				
1246	002020	023361	EM20	;DATA ERROR DURING WRITE CHECK
1247	002022	024375	DH20	
1248	002024	025272	DT20	
1249	002026	025520	DF20	
1250				
1251			;ERROR 21	
1252				
1253	002030	023417	EM21	;CONTROLLER/DRIVE ERROR VERIFYING HEADERS
1254	002032	024056	DH10	
1255	002034	025204	DT10	
1256	002036	025500	DF10	
1257				
1258			;ERROR 22	
1259				
1260	002040	023470	EM22	; 'HCE' ERROR VERIFYING HEADERS
1261	002042	024056	DH10	
1262	002044	025204	DT10	
1263	002046	025500	DF10	
1264				

```
1265 ;ERROR 23
1266
1267 002050 023537 EM23 ;CYLINDER FIELD IN HEADER IS NOT CORRECT
1268 002052 024674 DH23
1269 002054 025354 DT23
1270 002056 025540 DF23
1271
1272 ;ERROR 24
1273
1274 002060 023607 EM24 ;WRITE CHECK ERROR
1275 002062 024772 DH24
1276 002064 025372 DT24
1277 002066 025544 DF24
1278
1279 ;ERROR 25
1280
1281 002070 023631 EM25 ;HARDWARE ERROR DURING WRITE CHECK
1282 002072 024375 DH20
1283 002074 025272 DT20
1284 002076 025520 DF20
1285
1286 ;:*****
1287
1288 .SBTTL MAIN PROGRAM
```

```
1289
1290
1291      ;;*****
1292 002100 005037 001302 BEGIN3: CLR   CHGADR      ;CLEAR THE INDICATOR
1293 002104 012737 000001 013310      MOV   #1,      TSTPGM ;ENABLE PROGRAMMABLE DRIVES
1294 002112 000413      BR      BEGIN2
1295 002114 012737 177777 001302 BEGIN: MOV   #-1,CHGADR ;SET CHANGE 'RH11 BUS ADDRESS' INDICATOR
1296 002122 012737 000001 013310      MOV   #1,      TSTPGM ;ENABLE PROGRAMMABLE DRIVES
```


